



Nepal

Maternal Mortality and Morbidity Study 2008/2009



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Additional information about the MMMS may be obtained from:

Family Health Division, Department of Health Services, Government of Nepal; Teku, Kathmandu, Nepal.
Telephone: (977-1) 4262273, 4262155, Email: info@fhd.gov.np

Options Consultancy Services Ltd., 20-23 Grenville Street, London EC1N 855, United Kingdom.
Telephone: 44(0) 20-7430-1900; Email: info@options.co.uk

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Ajit Pradhan, Bal Krishna Suvedi, Sarah Barnett, Sharad Kumar Sharma, Mahesh Puri, Pradeep Poudel, Shovana Rai Chitrakar, Naresh Pratap K.C., Louise Hulton. 2010. Nepal Maternal Mortality and Morbidity Study 2008/2009. Family Health Division, Department of Health Services, Ministry of Health and Population, Government of Nepal, Kathmandu, Nepal.



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Ajit Pradhan
Bal Krishna Suvedi
Sarah Barnett
Sharad Kumar Sharma
Mahesh Puri
Pradeep Poudel
Shovana Rai Chitrakar
Naresh Pratap K.C.
Louise Hulton

Family Health Division
Department of Health Services
Ministry of Health and Population
Government of Nepal
Kathmandu, Nepal

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FOREWORD



The Nepal Maternal Mortality and Morbidity Study 2008/09 was conducted under the aegis of the Family Health Division, Department of Health Services, Ministry of Health and Population. It was carried out in eight selected districts (Kailali; Rupandehi; Okhaldhunga; Surkhet; Jumla; Baglung; Rasuwa; and Sunsari), as a representative sample of the different geographical and development regions of Nepal. The results offer a comprehensive picture of maternal health situation in Nepal and the factors affecting maternal mortality at health facility, community and family levels. Estimates of the maternal mortality ratio were also calculated for the eight study districts, and these were found to be, on average, consistent with the figure calculated in the 2006 Nepal Demographic and Health Survey, providing further evidence that Nepal is on track to meet the Millennium Development Goal for maternal health (MDG-5).

The robust methodology used includes components such as Community Surveillance System, Maternal Death Review, Emergency Obstetric Care (EOC) Morbidity Monitoring, Facility Assessments, Staff Competency Assessments and Qualitative Components, allowing for cross verification of findings. The information obtained from this study will help shape future safe motherhood programming in Nepal, by highlighting areas where interventions are working, such as the reduction of postpartum haemorrhage, and those that need further attention.

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Dr. Naresh Pratap KC
Director
Family Health Division
Department of Health Services

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ACRONYMS

ADRA	Adventist Development and Relief Agency
AHW	Auxiliary Health Worker
ANC	Antenatal Care
ANM	Auxiliary Nurse Midwife
APH	Anti Partum Hemorrhage
BC	Birthing Center
BEOC	Basic Emergency Obstetric Care
BPKIHS	Bishweshwor Prasad Koirala Institute of Health Sciences
BPP	Birth Preparedness Package
C/S	Caesarean Section
CAC	Comprehensive Abortion Care
CB-MNC	Community-based Maternal and Neonatal Care Program
CBR	Crude Birth Rate
CDK	Clean Delivery Kit
CECI	Centre for International Studies and Cooperation
CEOC	Comprehensive Emergency Obstetric Care
CFR	Case Fertility Rate
CHD	Child Health Division
CI	Confidence Interval
CPR	Contraceptive Prevalence Rate/Cardio Pulmonary Resuscitation
CREHPA	Centre for Research on Environment, Health and Population Activities
D&C	Dilation & Curettage
DoHS	Department of Health Services
DACAW	Decentralised Action for Children and Women
DALY	Disease-Adjusted Life-Years
DC	District Coordinator
DDA	Department of Drug Administration
DFID	UK Department for International Development
DHO	District Health Officer
DPHO	District Public Health Officer
EA(P)	Equity & Access (Programme)
EDCD	Epidemiology & Disease Control Division
EmOC	Emergency Obstetric Care
EOC	Emergency Obstetric Care
EOF	Essential Obstetric Functions
EPI Clinic	Expanded Programme on Immunisation Clinic
FCHV	Female Community Health Volunteer
FGD	Focus Group Discussion
FHD	Family Health Division
FP	Family Planning
FPO	Family Planning Officer
GoN	Government of Nepal
HA	Health Assistant
HDI	Human Development Index
HMIS	Health Management Information System
HP	Health Post
HPI(C)	Health Post In-charge
HSIS	Health Sector Information System
ICD	International Classification of Disease
ICU	Intensive Care Unit
IDI	In-Depth Interview
INGO	International Non-Governmental Organisation
IOM	Institute of Medicine
IUD	Injecting Drug User
JHU	John Hopkins University
LCD	Leprosy Control Division

LMD	Logistics Management Division
LSCS	Lower Segment Caesarean Section
MCHW	Maternal Child Health Worker
MD	Maternal Death/Management Division
MDG	Millennium Development Goal
MDR	Maternal Death Review
Merlin	Medical Emergency Relief International
MICU	Maternal Intensive Care Unit
MIRA	Mother and Infant Research Activities
MIS	Maternity Incentive Scheme
MMM	Maternal Mortality and Morbidity
MMMS	Maternal Mortality and Morbidity Study
MMR	Maternal Mortality Ratio
MO	Medical Officer
MoH	Ministry of Health
MR	Medical Recorder
MVA	Manual Vacuum Aspiration
NCASC	National Centre for AIDS & STD Control
NDHS 2001	Nepal Demographic and Health Survey 2001
NDHS 2006	Nepal Demographic and Health Survey 2006
NESOG	Nepal Society of Obstetric and Gynaecology
NFHP	Nepal Family Health Programme
NFHS 1996	Nepal Family and Health Survey 1996
NGO	Non-Governmental Organisation
NHEICC	National Health Education, Information & Communication Centre
NHRC	Nepal Health Research Council
NHTC	National Health Training Centre
NICU	Neonatal Intensive Care Unit
NMMMS	Nepal Maternal Mortality and Morbidity Study
NMR	Neonatal Mortality Rate
NPHL	National Public Health Laboratory
NSMP	Nepal Safer Motherhood Project
NTC	National Tuberculosis Centre
ORC	Outreach Clinic
PAC	Post-Abortion Care
PHCC	Primary Health Care Centre
PHN	Public Health Nurse
PMDF	Proportions Maternal among Deaths of Females of Reproductive Age
PNC	Post Natal Care
PPH	Post Partum Hemorrhage
PROM	Premature Rupture of Membranes
PSU	Primary Sampling Unit
RA	Research Assistant
RTI	Reproductive Tract Infections
SA	Statistical Assistant
SB	Still Birth
SBA	Skilled Birth Attendant
SBR	Stillbirth Rate
SDIP	Safe Delivery Incentive Programme
SDK	Safe Delivery Kit
SHP	Sub Health Post
SLC	School Leaving Certificate
SLTHP	Second Long-Term Health Plan 2007-2017
SMPoA	Safe Motherhood Plan of Action
SN	Staff Nurse
SNL	Strengthening Essential Newborn Practices
SO/A	Statistical Officer/Assistant
SSMP	Support to the Safe Motherhood Program
TAG	Technical Advisory Group
TB	Tuberculosis

TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
TT	Tetanus Toxoid
TV	Television
UCMS	Universal College of Medical Sciences
UMN	United Mission to Nepal
UN	United Nations
UNDP	United Nations Development Programme
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VA	Verbal Autopsy
VDC	Village Development Committee
VHW	Village Health Worker
WHO	World Health Organisation
WRA	Women of Reproductive Age

EXECUTIVE SUMMARY

Over the past two decades, the high levels of maternal mortality in developing countries has increasingly been recognised as an urgent public health concern. The fifth Millennium Development Goal (MDG) is to improve maternal health, with the target of reducing the 1990 maternal mortality ratio (MMR) by three quarters, by 2015. The Government of Nepal (GoN) is committed to achieving this goal and safe motherhood has been a national priority for Nepal.

A Maternal Mortality and Morbidity (MMM) study was conducted in Nepal in 1998 as part of the determined focus on maternal mortality. Following the publication of the 2006 Nepal Demographic and Health Survey (NDHS, 2006) there has been a good deal of discussion and debate about the level of maternal mortality in Nepal. While it is clearly important to monitor this, the MMR only illustrates part of the story. There is a real need to better understand the story behind the maternal mortality change over the past 10 years and to put in place the necessary steps to prevent maternal deaths in the future. Thus, ten years after the first MMM study, this follow on study sets out to present a current picture of maternal mortality and morbidity in Nepal, in 2008/09, as well as assess the changes that have occurred. The aim of this study is to identify programmatically useful information to inform investment and interventions in maternal health.

This study is based in eight selected districts (Kailali; Rupandehi; Okhaldhunga; Surkhet; Jumla; Baglung; Rasuwa; and Sunsari), covering a total population of 3,298,319, comprising 12 percent of Nepal's population. The study consisted of ten study components: community surveillance system (identifying deaths to women of reproductive age, live births and conducting verbal autopsies); hospital maternal death review; EOC obstetric morbidity monitoring; staff competency assessments; facility assessments; key stakeholder in-depth interviews; in-depth interviews with formal providers; in-depth interviews with informal providers; in-depth interviews with women who suffered a maternal complication in the last two years and focus group discussions with women who delivered in the last ten years.

The study period was of one calendar year (01 Baishak 2065 to 30 Chaitra 2065/13 April 2008 to 13 April 2009).

The key findings are:

All cause Mortality

- The all cause death rate was 174 deaths per 100,000 women of reproductive age, ranging from 120 in Baglung to 310 in Jumla. Excluding the pregnancy related deaths the overall rate was 154 per 100,000 women of reproductive age and the variation between districts was similar to that for all deaths.
- There was a large decline in the rate of deaths to women of reproductive age from the NFHS 1996 (364 per 100,000) to the NDHS 2006 (209 per 100,000), and the result of 174 per 100,000 for the eight study districts suggests further decline. However, for the three 1998 study districts the decline was greatest where the rate was highest (in Kailali) and in Rupandehi no reduction was seen.
- 'Pregnancy, childbirth and puerperium' was the leading ICD-10 Chapter in 1998, comprising 17 percent however it became the third leading Chapter, comprising 11 percent of all deaths in 2008/09. 'Pregnancy, Childbirth and Puerperium' contributed to the highest proportion of deaths to women of reproductive age in Rasuwa (17%) and lowest in Sunsari and Okhaldhunga (8%).
- Sixty percent of deaths to women of reproductive age, who died from non-pregnancy related causes, occurred at home, 19 percent occurred in facilities, and 9 percent occurred in transit.

- Suicide was the leading individual cause of death in 1998, accounting for 10 percent of deaths to women of reproductive age. This study has highlighted that suicide is still the leading individual cause, and the percentage contribution has increased to 16 percent. Suicide accounted for a quarter of all deaths to women aged 15-34 (24%) compared to just 8 percent of women aged 35-49. Furthermore, 63 percent of the suicide deaths occurred to women aged 15-29. Suicide accounted for a quarter of deaths to unmarried women of reproductive age (25%), compared to 15 percent of married and 14 percent of widowed/separated/divorced.
- Factors related to family/marriage/relationships were linked to 41 percent of suicide deaths; illness (excluding mental health) to 9 percent and mental health problems to 8 percent. The two main methods used by women to commit suicide were consuming poison (mainly pesticides), accounting for over half of all suicide deaths (57%), and hanging themselves, accounting for over one-third of deaths (39%).
- Accidents were the second leading cause (9%) and Tuberculosis was third (5%). Three maternal causes made it into the top twenty: haemorrhage (3%), eclampsia (2%) and maternal infectious and parasitic diseases (1.5%).

Maternal Mortality

- The overall Maternal Mortality Ratio (MMR) for the eight study districts is 229 per 100,000 live births, with district ratios ranging from 153 to 301. This is similar to the national figure of 281 per 100,000 live births calculated by the 2006 Nepal Demographic and Health survey (NDHS), but contrasts markedly with the WHO the revised, but unpublished, WHO estimate of 670 per 100,000 live births for 2005.
- The MMR varied considerably by age-group, reflecting international patterns of lowest risk amongst women in their early twenties (119 per 100,000 live births), with a slightly increased risk for women in their late twenties, and a further increase for those aged under 20 and between 30-34. The risk increased dramatically for women aged 35 or over, with an MMR of 962 per 100,000 live births. Levels of MMR also varied between different ethnic groups, with the highest rates among Muslims (318 per 100,000 live births), tarai/Madhesi (307 per 100,000 live births) and Dalits (273 per 100,000 live births).
- The overall proportion of deaths to women of reproductive age that are maternal (11%) is lower for these eight districts than the national figure estimated by the 2006 NDHS (18%). The study district level percentages range from 8 percent to 17 percent illustrating that this is a context-specific measure. Furthermore this study showed large variation in the proportion of maternal deaths by age and hence this measure will also be affected by the age-structure of different contexts. The proportions for this study are robust, given that all deaths to women of reproductive age were identified and maternal ones verified from these.
- The district level relationships between the MMR and the percentage of deliveries by a skilled attendant; percent of births in an EOC facility; met need for EOC; caesarean section rate and case fatality rate were weak. The strongest district level relationships were seen with GDP and female literacy.
- Maternal causes accounted for 11 percent of all deaths to women of reproductive age, however, this varies by age group with maternal deaths accounting for nearly a quarter of all deaths to women in their twenties.
- Maternal causes accounted for 93 percent of pregnancy related deaths, giving an overall pregnancy related mortality ratio of 247 per 100,000 live births and making this a good proxy indicator for maternal mortality. All accidental and incidental pregnancy related deaths occurred during the ante-partum period and many were unwanted pregnancies (namely suicide and homicide deaths), suggesting the pregnancy status of the women may have placed them at greater risk. With the exception of two cases the pregnancy status could have influenced the other deaths, although they are not officially classified as maternal deaths.

- Direct causes accounted for 69 percent of all maternal deaths, with 31 percent due to indirect causes. The obstetricians responsible for death assignment for the verbal autopsies had more confidence in their assignment of direct than indirect causes. The proportion of direct deaths is considerably higher when only hospital deaths are considered (89% direct; 11% indirect), but similar when all EOC facilities are considered (71% and 29%).
- The percentage contribution of haemorrhage (24%) to maternal causes has dramatically reduced, down from 43 percent in 1998. However, it remains the leading cause of maternal death, and the decline reflects a reduction in postpartum (from 39% to 18%), rather than antepartum.
- The percentage contributions of eclampsia, abortion related complications, gastroenteritis and anaemia to maternal causes have increased, while those from obstructed labour and puerperal sepsis have more than halved since 1998. Heart disease did not even feature in 1998, but now accounts for 7 percent.
- Thirty four percent of maternal deaths occurred in the antepartum period; 38 percent in the intrapartum period and up to 48 hours afterwards; and 28 percent in the postpartum period. The fact that 62 percent of deaths occurred outside the intrapartum period suggests that programming needs to actively consider interventions which aim to reduce risk of dying in the antenatal and post natal period as well as the intrapartum period. Although some of the problems occurring in the postpartum period, namely sepsis (accounting for 16% of postpartum deaths), may be prevented by interventions in the intrapartum period. The results for just hospital based deaths are very similar (39% occurred during the antepartum period; 37% during the intrapartum and 25% postpartum) with once again a high proportion (63%) occurring outside the intrapartum period.
- The proportion due to direct causes is highest in the intrapartum period where they account for 89 percent of deaths. The main causes in the antepartum period are due to abortion related complications; eclampsia and antepartum haemorrhage. The main causes in the intrapartum period are due to haemorrhage, eclampsia and obstructed labour. The main causes in the postpartum period are due to eclampsia, puerperal sepsis and postpartum haemorrhage. The main causes of death in each period were very similar when just hospital deaths were taken into account. All deaths due to indirect causes occurring in hospital occurred during the antepartum period.
- There was an increase in the proportion of maternal deaths occurring in a health facility, from 14 percent in 1998 to 42 percent; with 41 percent occurring at home; and 12 percent in transit (5% from a facility).
- Over 80 percent of women who died from maternal causes in hospital were emergency admissions and in a critical state on admission, according to the maternal death reviews completed by providers. Eighteen per cent died within four hours of arrival, 39 percent within the first twelve hours and 53 percent within the first 24 hours.

Maternal Morbidity

- The overall rate for all major obstetric morbidities (prolonged labour, abortion complications, haemorrhage, retained placenta, pre-eclampsia, eclampsia, ectopic pregnancy, sepsis, ruptured uterus) in the EOC facilities in the eight study districts was 196 per 1000 births. Prolonged labour had the highest rate of all the major obstetric morbidities at EOC facilities, at 79 per 1000 births, followed by abortion complications at 56 per 1000 births and haemorrhage at 27 per 1000 births. On average about two-thirds of haemorrhage morbidities at EOC facilities are due to PPH and one third APH.
- Anaemia and malnutrition are underlying factors in many maternal deaths. Over one-third of the women who died from maternal causes suffered from anaemia (34%) prior to pregnancy and over one fifth from malnutrition (21%) while 23 percent of women who died in hospital from a maternal death were anaemic after delivery. During their pregnancy

many had complications, possibly linked to anaemia and malnutrition: 42 percent felt weak/tired most of the time; 34 percent were very pale; 31 percent were breathless doing normal activities; and 27 percent suffered from dizziness and fainting. There was also a high prevalence of these complications after delivery as 54 percent felt weak/tired most of the time; 43 percent were very pale; 26 percent were breathless when doing normal activities; and 35 percent suffered from dizziness and fainting.

- Nearly one quarter of women who died from maternal causes (23%) did not want to become pregnant at that time; and this proportion increased for older women. Fifty four percent of women who had an unwanted pregnancy were of 35-49 age group compared to 8 percent of those aged 20-24. Nearly one third of those who had an unwanted pregnancy (32%) attempted to abort, with one third of those (33%) doing so in the second trimester. Fifty percent of those who attempted an abortion suffered from at least one obstetric complication.
- For 13 percent of women who died from maternal causes someone did something to speed up the delivery of the placenta, including common traditional practices, such as feeding the woman hair or inserting a hand to make her vomit; tying cloth tightly around her abdomen. The placenta was manually extracted in 6 percent of cases and in 50 percent of these it only came out partially.

Care Seeking Behaviour

- The low social status of women limits their decision-making power regarding care seeking, and can result in a fatal delay. Although many women prefer to deliver at home, and decide to do so themselves in anticipation of a normal delivery, in the event of a complication many people are usually involved in the decision-making process surrounding seeking care at a facility and assess the severity of a complication, finance and logistics.
- If the woman is referred from one facility to another, the decision to take her is not straightforward and again is dependent on the agreement of family members after considering cost, availability of transport and who will accompany her. The final decision often rests with husbands and mother-in-laws but service providers, birth attendants, other family members, neighbours and the women themselves play a part.
- Many women receive support from their husbands during pregnancy, namely in doing household chores; providing nutritious food; offering advice about taking rest and avoiding heavy work; and accompanying women to health facilities. Furthermore, they played a crucial role during an emergency in seeking assistance at home; arranging stretchers or other forms of transport and in overall decision making. Care was often received from mother-in-law and other female relatives around the time of delivery and neighbours frequently play an important role in seeking assistance at home, making transport arrangements to facilities and accompanying women to facilities.
- Self care during pregnancy is important to women and many women and their families are becoming more conscious about their well-being during pregnancy and are taking more care of their health during this period. But some women still do not reveal their problem until the last moment.
- Women are also increasingly aware of the availability and importance of antenatal care and this increased awareness is translating into increased service utilisation. However, traditional beliefs, such as pregnant women being forbidden from crossing rivers or going out of the house after labour pain starts, still exist in some communities and thus prevent them accessing care.
- Most women prefer to deliver at home, largely perceiving home deliveries to be safe, and often only seek care from a facility if they have complications. Reasons for preferring a home delivery include convenience, availability of clothes and food, shyness and lower cost. The overwhelming reason for women who suffered from a maternal death not

delivering in a facility was because they did not want to (70%), and one third of women did not see a need to (33%). Over-coming financial and distance barriers were less of an issue, just reported by 12 percent of respondents.

- Despite a traditional preference for home deliveries, many are positive about institutional deliveries, viewing them as safe and equipped to handle complications if the need arose. Twelve per cent of women who died from maternal causes were advised to deliver in a facility in order to receive better care.
- Just under one third of women died from maternal causes during or after delivery delivered in a facility (32%) and 36 percent were delivered by a formal care provider. While 52 percent delivered in their own home or that of a relative, and 24 percent had a friend or relative assist, 12 percent a TBA and nearly one-fifth had no one (18%).
- Women generally do not seek postpartum care unless they have a complication. The main reasons for not seeking postnatal care include lack of understanding of its importance; providers failing to emphasise this during antenatal care or childbirth; and a lack of availability of postnatal services.
- Overall there have been considerable changes in maternal health care seeking behaviour among the women over the last ten years: seeking care from traditional faith healers is declining though not entirely absent and increase in service utilisation has been most pronounced for antenatal care and women experiencing complications. However, change has been less dramatic for delivery and postpartum care. Women are increasingly aware of the advantages of delivering in a health institution and of having a skilled attendance at the birth, but this is not necessarily translating into practice.

Quality of Care

- There is reportedly good provision of antenatal, postnatal and routine delivery care, however, there is an urgent need for improvement regarding the provision of manual removal of placenta and assisted vaginal deliveries at BEOC and birthing centres.
- There were some concerning stock outs of essential drugs, including a stock out of ampicillin for longer than two weeks in the last twelve months at 30 percent of CEOCs and 18 percent of BEOCs.
- Magnesium sulphate was routinely used as the drug of first choice for women with eclampsia in all CEOC facilities. However, this was only the case in half of BEOC facilities and one third of birthing centres. It was never used in one fourth of BEOC facilities and half of birthing centres. The use is partly reflected in the availability of the drug. It was only in stock in 73 percent of BEOCs and just 18 percent of birthing centres at the time of visit. Furthermore, 10 percent of CEOCs and 27 percent of BEOCs had a stock out of magnesium sulphate for longer than two weeks in the last twelve months.
- Oxytocic drugs were routinely given to mothers after delivery in all facilities, except 4 percent of birthing centres. However, 30 percent of CEOC facilities, 18 percent of BEOC and 14 percent of birthing centres gave them to mothers routinely before delivery.
- Twenty percent of CEOC facilities did not routinely give prophylactic antibiotics to mothers during caesarean section, and 10 percent never did this. Twenty percent of CEOC and 27 percent of BEOC facilities do not routinely give prophylactics to women with premature rupture of membranes, with 10 percent of CEOC and 27 percent of BEOC never doing so.
- Only 70 percent of CEOC, 64 percent of BEOC and 23 percent of birthing centres used a partograph on a routine basis. One fifth of CEOC (20%), 18 percent of BEOC and nearly three quarters of birthing centres (73%) never used a partograph. Use is partly explained by availability, as the partograph was only present in 80 percent of CEOCs and 73 percent of BEOCs.

- The qualitative findings showed mixed responses regarding client-provider relationships. Most women who survived complications said providers were co-operative, friendly, polite and provided emotional support. However, there were also strong negative perceptions, describing providers as rude and unfriendly; scolding patients for insignificant things; not showing concern (even when in pain); getting angry; and making them wait for unnecessarily long periods of time.
- Women reported that the closure of facilities at night time is prohibitive to seeking care. It was particularly a problem for women in remote and mountainous areas, as they have fewer alternatives where they can seek care.
- The lack of 24 hour laboratory facilities caused problems, affecting the timely detection of high risk conditions for pregnant women, such as eclampsia or low haemoglobin. Although many of the BEOC and BC's have laboratories, very few were available twenty four hours.
- There were reports of referral systems not functioning effectively. Service providers acknowledged that in many instances patients were not referred in a timely manner; referred to an inappropriate facility; and that they had no clear mechanism for following up clients once they are referred to another facility. Factors preventing an efficient referral system included a lack of awareness among those accompanying patients; lack of money; lack of transportation between facilities; no established referral mechanism between facilities; no referral slips; inadequate information on referral slips; and lack of a support system.
- A high proportion of staff who are currently delivering care to women during the antepartum, intrapartum and post partum periods have not been trained in key competencies and are not confident in managing critical life threatening situations.
- The post-partum haemorrhage and partograph case studies highlighted better practice among those who had received SBA training and those who hadn't.
- To deliver the core signal functions, BEOC and CEOC facilities need both an enabling environment (adequate infrastructure, drugs and equipment), as well as the right skill mix of human resources, trained and confident to deliver these functions competently. This study highlights the important gaps that remain in both the facility as well as the skill level within the workforce.

Barriers

- A multitude of demand and supply side barriers contribute to maternal mortality and morbidity. The level of understanding in the community regarding the need for routine care, and where to go, has reportedly increased over time. However, it is still common practice to approach the informal sector first, and only seek formal care once it is clear a complication cannot be treated in the community.
- Due to the low status of women, and the view that pregnancy and childbirth are 'normal' events that all women experience, women are often prevented from speaking out when they require medical assistance. A 'culture of silence' and/or opposition from family members, particularly mothers-in-law leads to often fatal delays in seeking care. However, most respondents reported that family and social values have improved slightly, making a more conducive environment for women to seek care when they need it, and to take rest, limit heavy work and have a more nutritious diet during pregnancy.
- Various cultural practices delay women from accessing formal care, such as women being forbidden from leaving the house or touching anyone for eleven days after delivery; a superstitious belief that women should not cross a river during pregnancy; putting hair in a women's mouth to make her vomit and speed up the delivery of the placenta.

- Many women prefer home deliveries. Some are influenced by peers; some prefer the home environment (the warmth from a fire, hot food, and massage) to the expense of a long, difficult journey to a cold, uncomfortable facility with a lack of privacy, basic amenities, beds and equipment; while some are too shy to seek care from a health facility, especially if they have to see a male health provider.
- Those who do want to access formal care are often prevented from doing so by the long distances to health facilities; poor infrastructure; limited means of transport and the associated direct and indirect costs.
- The absence of services at facilities may prevent women receiving timely treatment when they do go to a facility, and previous bad experiences may discourage them from seeking care in the future. The major factors affecting the availability of services are inadequate levels of human resources; lack of drugs and supplies; and poor quality buildings and facilities. Those accompanying patients are frequently obliged to purchase required medications externally.
- Women often experience multiple referrals when facilities are unable to treat a complication or laboratory testing is not available, incurring further delays due to the time taken to reach the next facility; lack of transport and increased costs.
- Lack of human resources was one of the major factors affecting the availability and quality of maternal health services, especially in remote hill and mountainous areas. Care in an emergency is often highly compromised when patients do not receive accurate, timely diagnosis and treatment due to the lack of appropriately skilled providers.
- The frequent transfer of staff between facilities adds to the problem and affects staff motivation; the quality of service provided; and utilisation.
- Women reported the impact of staff behaviour on their utilisation of services, with positive experiences encouraging future utilisation, and negative experiences discouraging them and others.
- The main delays in the community were due to failure to recognise there was a problem; slow decision making to seek care; and the long distance between communities and facilities. Once at a facility, delays were caused by inability to treat the problem (lack of equipment/supplies and therefore the need to refer); lack of blood; inadequate clinical expertise; slow response to an emergency admission; and lack of transport from the referral facility.

The Newborn

- The national CBR of 23 in 2009 was similar to our overall live birth rate of 21 per 1000 population within the eight study districts.
- Nearly three-quarters of mothers in the sample districts were in their twenties (73%). In Surkhet over one-fifth of mothers were teenagers, while Okhaldhunga and Rasuwa had over a quarter of mothers over thirty (26% and 28% respectively).
- The birth rate was lowest during the monsoon period and highest just after the end of the monsoon.
- The stillbirth rate for EOC facilities in the study districts was similar to the national average, while the neonatal mortality rate was lower, but similar to other facility based data.
- The infants of those who suffered a maternal death had a poor neonatal outcome, with 16 percent stillborn, 7 percent suffered an early neonatal death and 9 percent a late neonatal death. Only 54 percent were still alive at the time of visit.

CHAPTER 1: INTRODUCTION

1.0 Background and Rationale for Study

Over the past two decades, the high levels of maternal mortality in developing countries has increasingly been recognised as an urgent public health concern. In 1987, the Safe Motherhood Conference in Nairobi, Kenya, drew attention to maternal mortality, and the issue has remained on the international agenda ever since. The Millennium Development Goal - Five (MDG-5) is to improve maternal health, with the target of reducing the 1990 maternal mortality ratio¹ (MMR) by three quarters, by 2015. The Government of Nepal (GoN) is committed to achieving this goal and developed a national Safe Motherhood Plan of Action (SMPoA) in 1994. Since then, safe motherhood has been a national priority for Nepal.



A Maternal Mortality and Morbidity (MMM) study was conducted in Nepal in 1998 (FHD/MOH, 1998), as part of the determined focus on maternal mortality. The study was designed to gain a better understanding of the causes of death for women of reproductive age, in particular those dying from maternal causes, and the delays experienced in seeking, reaching and receiving care. Following the publication of the report, the Family Health Division (FHD)/DoHs/Ministry of Health (MoH) initiated various interventions at both institutional and community levels, implemented in partnership with national and international agencies.

Following the publication of the 2006 Nepal Demographic and Health Survey (NDHS, 2006) there has been a good deal of discussion and debate about the level of maternal mortality in Nepal. While it is clearly important to monitor this, the MMR only illustrates part of the story. There is a real need to better understand the story behind the maternal mortality change over the past 10 years, to explore and identify the contributory factors and their relative importance in different parts of the country, and to put in place the necessary steps to prevent maternal deaths in the future. Thus, ten years after the first MMM study, this follow on study sets out to present a current picture of maternal mortality and morbidity in Nepal, in 2008/09, as well as assess the changes that have occurred. The study will inform policy makers and programme managers about current issues and challenges related to maternal mortality and morbidity in Nepal, with the aim of bolstering and refocusing efforts where they are most needed, to avert maternal deaths.

1.1 Main Findings from the 1998 MMM Study

The 1998 MMM Study was conducted in three districts: Kailali; Rupandehi; and Okhaldhunga. The main findings were as follows:

- *Maternal causes were leading ICD chapter:* comprising 21 percent of deaths to women of reproductive age (15-49).
- *Suicide was leading individual cause of death:* comprising 10 percent of deaths to women of reproductive age.
- *Cause of death:* 71 percent of maternal deaths were due to direct causes: including 33 percent due to postpartum haemorrhage; 11 percent due to obstructed labour/ruptured uterus; 10 percent due to pre/eclampsia; 8 percent due to sepsis;

¹ Maternal Mortality Ratio is the number of maternal deaths per 100,000 live births.

4 percent due to abortion; 4 percent due to antepartum haemorrhage and 1 percent due to ectopic pregnancy.

- *Cause of facility maternal deaths:* Of the 31 maternal deaths at facilities identified and reviewed, most (90%) were due to direct causes, with just 10 percent due to indirect causes. The main direct cause of death was eclampsia (32%); followed by prolonged/obstructed labour/rupture of uterus (19%); postpartum haemorrhage (13%); antepartum haemorrhage (10%); sepsis (10%); and amniotic fluid embolism (3%). The only indirect cause was severe anaemia.
- *Avoidable facility maternal deaths:* Of the avoidable maternal death reviews, 79 percent of deaths were due to service related problems (such as institutional delay in diagnosis; treatment; lack of blood); 13 percent were patient related (delay in deciding to seek care; patient non-compliance) and 8 percent were transport and distance related.
- *Timing of death:* Nearly two thirds of maternal deaths occurred during the postpartum period (after delivery), 28 percent during the antepartum, and 10 percent during the intrapartum period (not delivered).
- *Timing of facility maternal deaths:* 61 percent of maternal deaths at facilities occurred in the postpartum period; 23 percent during the antepartum period, and 16 percent during the intrapartum period.
- *Place of death:* 79 percent maternal deaths occurred either at home, or on the way to a health facility, and 21 percent died in a health facility.
- *Delay in deciding to seek care:* Although 78 percent of families recognised the seriousness of the problem, only 66 percent decided to seek care. Little more than one third percent of households took less than two hours to decide to take the woman to a health facility; 25 percent took between one and six days; while 4 percent took seven days or more. Lack of knowledge; difficulty in access (distance); and affordability were the main reasons stated for not seeking care.
- *Delay in reaching care:* For one third of women it took less than two hours to reach the first health facility from home; 6 percent took three to four hours; while 6 percent took between five and 23 hours. Of those who received care at home (n=25), only 32 percent received care from a trained health worker and 60 percent received help from an untrained health worker.
- *Delay in receiving care:* Of those who reached a health facility, 43 percent were attended to immediately by a health worker and 11 percent were attended to within one hour of arrival; 45 percent were unable to report the time taken to receive care.
- *Time between arrival and death:* 27 percent of women died within four hours of admission to the facility; 40 percent died between four and 24 hours; 13 percent died between 25 and 48 hours; 7 percent died between three and four days; and 13 percent died between five and nine days.
- *Met need for Emergency Obstetric Care (EOC):* This ranged from 4 percent to 21 percent; with met need for c-section ranging from 3 percent to 26 percent.
- *Case fatality rate:* Ranged from 1 percent to 4 percent.

1.2 Impact of 1998 MMM Study on Policy and Practice

Although various estimates had indicated a very high maternal mortality ratio for Nepal, the underlying social and clinical causes were poorly understood. The 1998 MMM Study provided valuable information to address this. In fact the revelation that maternal death was leading cause of death among women of reproductive age was so powerful that it was used to advocate for recognition of safe motherhood as a priority programme in Nepal.

The finding that most maternal deaths (70%) were due to direct obstetric causes reinforced the need to establish facilities where such complications could be treated. As a result 13 comprehensive, 20 basic emergency obstetric care facilities, 87 birthing center and 2 CAC buildings construction had been completed since the MMMS 1998. Nine CEOC, 66 BEOC, 33 birthing center and 5 CAC buildings were under construction in July 2009. Most deliveries take place at home and post partum haemorrhage (PPH) was the leading direct cause of maternal death in the community, so the GoN provided all peripheral level health workers (such as MCHWs and ANMs) with an obstetric first aid kit containing oxytocine to stabilize women with PPH and ensure they are referred to a facility where they can be managed properly and saved. Misoprostol piloting for the active management of third stage of labour to prevent PPH for home births is underway in one of the district (Banke) in Nepal.

The study revealed that around half the households surveyed did not recognise the severity of the problem in time. Various community awareness activities were therefore organised, such as street drama, to inform people about danger signs and importance of timely decision making and establishment of community emergency fund and local transport. Community health workers used a Birth Preparedness Package (BPP) to encourage families to save money to meet the costs of delivery and/or an emergency and make arrangements for transport to a facility. The messages in the BPP also highlighted danger signs during pregnancy, delivery and the postpartum period, stressed the importance of delivery by a skilled attendant (in a facility or at home), and the need for newborn care and postpartum family planning. To address the difficulties caused by Nepal's challenging terrain, limited availability of transport and poverty, Equity and Access (EA) activities were implemented by ActionAid Nepal in eight selected districts (2006 to 2009), focusing on promoting social inclusion and equitable access to services and the establishment of emergency funds and local transport schemes to help poor women get to a health facility quickly in an emergency. Other programmes have implemented similar initiatives.

The 1998 MMM study recommended formulation of a policy with mechanisms enabling midwives to practise life-saving skills, rather than limiting this to doctors based at specialised centres. This eventually led to government endorsement of the Policy for Skilled Birth Attendants (SBA) in 2006 and in-service SBA training strategy in 2007. A total of 15 SBA training sites have been developed to date and 1,132 SBAs have been trained. Clinical protocols for reproductive health, which include obstetric complication management for various categories of service provider, were developed and are in use. In 2002, to address the contribution of unsafe abortion to maternal deaths, the Government legalised abortion, endorsing the procedural order for provision of services in late 2003. Safe abortion services are now available at registered sites in all 75 districts of the country.

The Safe Delivery Incentive Programme (SDIP) was initiated in 2005 (initially known as the Maternity Incentive Scheme) to encourage women to deliver at a health facility by providing them with a lump sum at the time of discharge from the facility, to help offset the transport costs incurred. The amount varied by geographical area, reflecting the level

of difficulty in accessing transport (Rs.1,500 in the mountains, Rs.1,000 in the hills, and Rs.500 in Terai areas). There are also incentives for service providers attending deliveries at home or in a facility. A further step, in January 2009, was the launching of the Aama Programme, which provides free care for delivery, obstetric complication management and c-sections in government and some approved private non-profit facilities.

1.3 Study Aim

To identify programmatically useful information to inform investment and interventions in maternal health.

1.4 Study Objectives

- To increase the evidence base available on maternal mortality in Nepal to inform estimates of current levels of maternal mortality.
- To gain a better understanding of why women are dying during pregnancy, childbirth and the postpartum period, including social and clinical contributing factors.
- To identify factors that may have influenced levels of maternal mortality and morbidity in the past.
- To provide information to help identify interventions that may be successful in reducing maternal mortality and morbidity in the future.

1.5 Study Area

Nepal has three distinct types of geographical terrain (Terai plains, hills and mountains) with elevations ranging from 90 meters above sea level to 8,848 meters. About 85 percent of the total population of 27 million resides in rural areas, which has hindered the development of transport, communication, education and other infrastructures, including health facilities.

1.5.1 District Selection

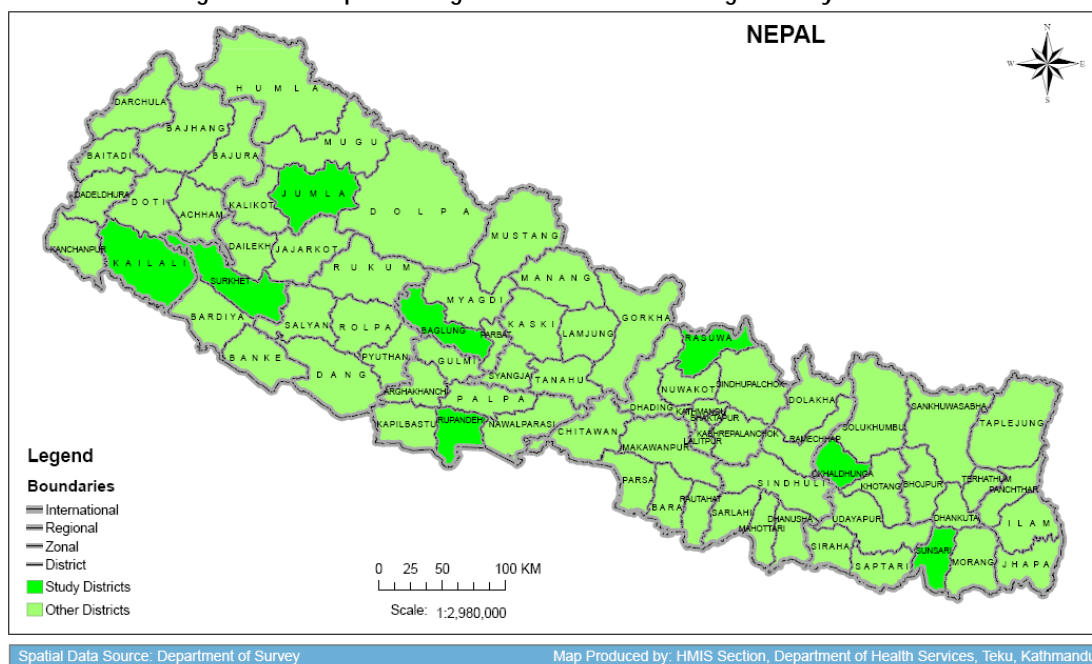
The study is based in eight selected districts (Table 1.1). Three of these were included in the 1998 MMM study (Kailali; Rupandehi; Okhaldhunga). The additional five districts (Surkhet; Jumla; Baglung; Rasuwa; Sunsari) were selected to ensure the study covered at least one district from each of the five administrative regions (Eastern, Central, Western, Mid-Western and Far Western) and at least two from each ecological zone (Terai, hill and mountain). The map in Figure 1.1 shows the location of the eight study districts.

Table 1.1: Selected Districts by Topography and Region

Region	Terai	Hill	Mountain
Eastern	Sunsari	Okhaldhunga*	
Central			Rasuwa
Western	Rupandehi*	Baglung	
Mid-Western		Surkhet	Jumla
Far Western	Kailali*		

* Included in 1998 Maternal Mortality and Morbidity Study

Figure 1.1: Map Showing the Location of the Eight Study Districts



1.5.2 District Characteristics

Population

The total population of the eight study districts is 3,298,319, comprising 12 percent of Nepal's population (Table 1.2). The population of the individual districts ranges from 44,167 to 710,954 and all have a high percentage living in rural areas, ranging from 74 percent in Sunsari to 100 percent in Okhaldhunga, Rasuwa and Jumla.

Table 1.2: Population for the Selected Districts

	Total Population 2008/09*	Number of women of reproductive age (15-49) 2008/09**	percent of population residing in rural areas (VDCs)	Population Density
Sunsari	740,113	199,080	74	619
Rupandehi	838,916	216,795	82	636
Kailali	745,362	190,635	83	226
Okhaldhunga	177,117	44,360	100	164
Baglung	306,110	82,993	92	167
Surkhet	336,853	89,161	100	135
Rasuwa	51,553	12,451	100	34
Jumla	102,295	25,837	89	40
8 Districts Total	3,298,319	861,312	84	216
Nepal Total	26,908,373	7,037,194	82	183

Source: * HMIS section, Management Division, DoHs.

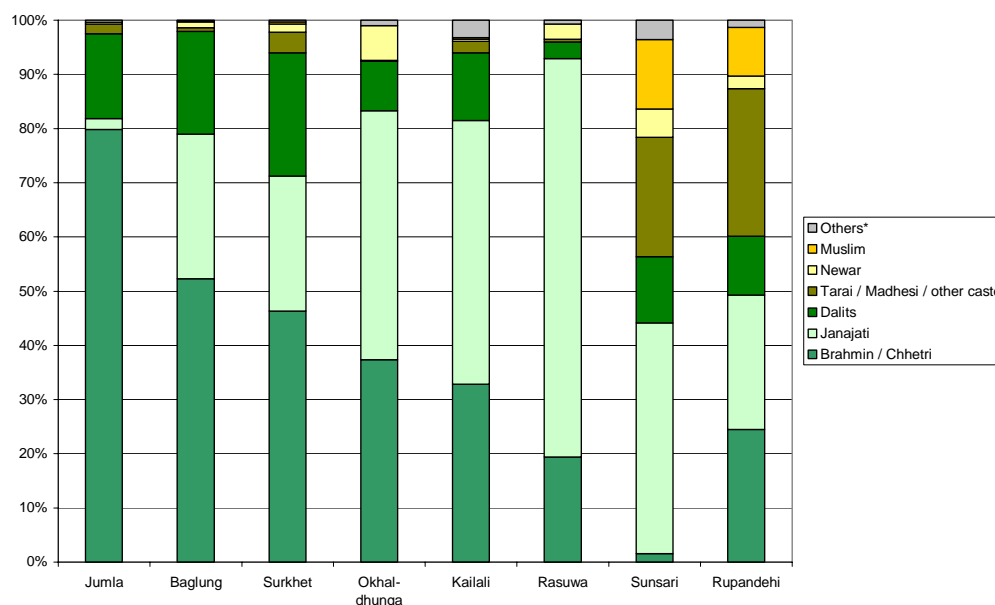
Note: Population estimates are based on the TFR of 3.3 for year 2006 and the fast fertility decline by CBS.

Ethnicity

Nepal is an ethnically diverse country and there has recently been increased recognition by government, academia and civil society that the effects of caste and ethnicity need to

be better understood. There is wide disparity in the health status and health service utilisation between different caste and ethnic groups. The most recent census, conducted in 2001, reported 103 different caste/ethnic groups, which were grouped into seven categories (Bennett et al. 2008). The percentage distribution within the study districts are shown in Figure 1.2, which indicates a high degree of variation between the study districts. Jumla is largely homogenous with 80 percent Brahmin/Chhetri, and 16 percent Dalit; Baglung and Surkhet are largely Brahmin/Chhetri, Janjati and Dalit; Okhaldhunga, Kailali and Rasuwa are largely Janjati and Brahmin/Chhetri; Sunsari is largely Janjati and Tarai/Madhesi/Other caste; and Rupandehi is equally divided between Tarai/Madhesi/Other caste, Brahmin/Chhetri and Janjati. Appendices 1.1 to 1.8 show the distribution of ethnic groups by district.

Figure 1.2: Chart Showing the Distribution of Major Ethnic/Caste Groups in the Study Districts



Socio-economic ranking

The Human Development Index (HDI) ranking for the study districts varies considerably, as shown in Table 1.3, with Rupandehi ranked the fifth most developed district in Nepal and Jumla ranked as one of the lowest at 70 out of the 75 districts (UNDP, 2004).

Table 1.3: Human Development Index Ranking of Study Districts

Districts	HDI ranking
Rupandehi	5
Sunsari	16
Baglung	19
Surkhet	22
Okhaldhunga	27
Kailali	46
Rasuwa	62
Jumla	70
	/ 75

Source: UNDP (2004)

Administrative Units

Nepal is divided into five development regions; 14 zones; 75 districts (each comprising between nine and 17 *Ilakas*); 58 municipalities; and 3,913 village development committees (each comprising nine wards). Table 1.4 shows the numbers of these units in each of the study districts. Only five of the districts have municipalities (Sunsari, Baglung, Rupandehi, Surkhet and Kailali).

Table 1.4: Administrative Units in Study Districts

Administrative units	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Number of Ilakas	12	11	13	11	12	11	9	9	88
Number of VDCs	49	69	42	56	59	50	18	30	373
Number of Municipalities	3	2	2	0	1	1	0	0	9
Number of VDC Wards	441	621	378	504	531	450	162	270	3357
Number of Municipality Wards	38	28	23	0	11	12	0	0	112
Total number of Wards	479	649	401	504	542	462	162	270	3469

Health Service Provision

Nepal has eight central hospitals, three regional hospitals, one sub-regional hospital, eight zonal hospitals and 65 district hospitals providing curative services. The network of peripheral facilities providing preventive, promotive, and essential clinical care includes 209 Primary Health Care Centres (PHCC), at least one in each of the 205 electoral constituencies, 696 health posts staffed with ANMs and 3,129 sub-health posts staffed with MCHWs. In addition there are 14,366 Outreach Clinics (ORC) and 16,013 Immunisation Outreach Clinics providing community level services.

Table 1.5 shows the number and type of health facilities in the study districts. All have at least one government hospital. There is one regional hospital (Mid-Western Regional Hospital, Surkhet); three zonal hospitals (Dhaulagiri Zonal Hospital, Baglung; Lumbini Zonal Hospital, Rupandehi; and Seti Zonal Hospital, Kailali district); and four district hospitals (in Rupandehi, Jumla, Rasuwa and Sunsari). Four of the government hospitals (zonal/regional hospitals in Baglung, Rupandehi, Surkhet and Kailali) provide CEOC services, and the district hospitals in Rupandehi, Sunsari, Rasuwa and Jumla provide BEOC services. Four of the districts have at least one NGO/private hospital. The number of PHCCs per district ranges from one to six, with a total of 27, but only 13 are functioning as BEOC sites. The number of health posts per district ranges from six to nine. Four of the districts have at least one health post with a birthing centre.

There are four government and nine non-government CEOC sites in the study districts, although two have neither a government nor a NGO/private CEOC facility (Jumla and Rasuwa). There are seventeen government and eight non-government BEOC sites in the study districts, with all districts having at least one government BEOC facility and a maximum of four in Rupandehi. The B P Koirala Institute of Health Sciences (BPKIHS) in Dharan, Sunsari district is a semi-government CEOC site. Okhaldhunga Community Hospital (Mission Hospital) is the only CEOC facility in Okhaldhunga district. The Government has recently upgraded the PHCCs in Rumjatar, Okhaldhunga, Burtibang, Baglung and Tikapur, Kailali to hospital status but they are still in fact functioning as PHCCs. Similarly, the district hospital in Baglung has just been upgraded to zonal hospital status and the building construction is in progress. The Mid-Western Regional Hospital, Surkhet and Dhaulagiri Zonal Hospital, Baglung are SBA training centres.

Appendices 1.9 to 1.16 show the distribution of health institutions, road network, land cover, settlement and population, with VDC boundaries by district.

Table 1.5: Number and Type of Health Facilities in Study Districts

Facility Type	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Government Hospitals	1	2	1	0	1	1	1	1	8
Private/NGO Hospitals	2	4	0	1	2	1	0	0	10
PHCCs	5	5	6	2	3	4	1	1	27
Health Posts	7	6	7	9	9	9	8	8	63
HPs with Birthing Centres	1	1	0	0	0	0	4	2	8
Sub-Health Posts	40	58	31	45	49	38	9	20	290
Government CEOC	0	1	1	0	1	1	0	0	4
Government BEOC	2	4	3	1	2	2	1	2	17
Non-government CEOC	1	6	0	1	0	1	0	0	9
Non-government BEOC	2	0	4	0	2	0	0	0	8

Maternal care within the health system begins with Female Community Health Volunteers (FCHV) at the community level (at least one per ward). Currently there are a total of 48,448 FCHVs in the country. Safe motherhood services are provided by MCHWs at sub-health posts and ANMs at health posts, both of whom are female, although it should be noted that not all facilities are fully staffed. The MCHWs and ANMs assist institutional and home deliveries, with some health posts being formally recognised as birthing centres. MCHWs have received only six weeks of midwifery training and are gradually being replaced by ANMs, with those that have the required educational pre-requisites being offered ANM training. In PHCCs, ANMs and staff nurses provide safe motherhood services and assist institutional and home deliveries. Auxiliary health workers (AHW) and health assistants (HA), who are generally male, also provide maternal care and attend home deliveries. The organisation structure of the Ministry of Health and Population, Department of Health Services is described in Appendix 1.17.

1.6 Study Period

The study period was of one calendar year. The study includes live birth, and death to women of reproductive age occurred in the study districts in 2065 B.S. i.e., from 1st Baisakh to 31 Chaitra 2065 (13 April 2008 to 13 April 2009).

CHAPTER 2: OVERVIEW OF MATERNAL HEALTH IN NEPAL



2.0 Introduction

In 1968 Nepal Family Planning and Maternal Child Health Board, a semi autonomous body in the Ministry of Health was formed and with a vertical structure from centre to periphery established through the implementation of Family Planning, Maternal and Child Health Project in Nepal. Although explicit targets for reducing crude birth rate and infant mortality rate was laid in the third long term plan of Nepal (1970-1975) there was no mention on maternal health targets. It was only after the Safe Motherhood Conference in Nairobi in 1987 Nepal formulated the long term health plan in 1991 and identified safe motherhood as a priority programme and institutionalised in the primary health care. Consequent to the International Conference on Population and Development in 1994 and a signatory to the plan of action Nepal formed a task force on safe motherhood and developed a safe motherhood plan of action (1994-97). In 1998 a national reproductive health strategy which included safe motherhood as one of the key component of the reproductive health package was also developed. A national safe motherhood policy was formulated in 1998 which reiterated the issues already contained in the safe motherhood plan of action. A maternal mortality and morbidity study was conducted and report published in 1998. A national safe motherhood plan (2002-2017) was formulated which served as the basis for implementation of safe motherhood interventions.

2.1 Maternal Health Care Utilisation

Obstacles to utilising maternal health care in Nepal are manifold: the geography; terrain; limited infrastructure; and the lack and cost of transport provide major physical and logistical barriers to accessing health services. Lack of time due to a heavy work burden restricts women's healthcare-seeking and cultural preferences and beliefs regarding care practices may influence women to seek care outside the formal sector (or not at all), often the first choice for treatment is home medicine, followed by visiting traditional healers, both of which delay contact with formal providers (Jimba et al. 2003; World Bank 2001; WHO/SEAR 2005). Women's low social status; lack of knowledge about illness and general lack of awareness of obstetric/gynaecological danger signs, as well as the low value given to their lives, also delays their healthcare-seeking (WHO/SEAR 2005). Lack of decision making power and inability to pay leads some women to seek care on their own accord only if services are free; and a disregard for illness signifies that women are often recognized to be ill by family members only when they are bedridden or unable to perform their daily tasks (World Bank 2001; WHO/SEAR 2005; Shakya & McMurray 2001). Girls under the age of 18 hesitate to visit health facilities if they need gynaecological or family planning services, often only going to hospital if they are seriously ill. Discrimination of low caste women by providers can prevent them from accessing care, whilst the absence of female health care workers inhibits women from visiting health service facilities (World Bank 2001) where lack of adequate training of health care providers to maintain confidentiality and privacy can deter women from seeking care (Simkhada et al. 2006). From 1996 to 2006, there was a civil war in Nepal, which affected the access to and provision of health services, with many health workers fleeing conflict-affected areas (UNFPA 2007). However, despite these obstacles the overall utilisation of maternal health services in Nepal has increased considerably over the last ten years (NDHS 2006), though this increase in utilisation has not benefited all equally. For example, receipt of antenatal care from a SBA varies by 66 percent between the lowest and highest wealth quintile, by 61 percent between women with no education and those with SLC or above, and the difference in receipt of ANC from a SBA between rural and urban women is 47 percent (NDHS 2006). Skilled birth attendance at delivery also shows wide disparities, ranging from

5 percent to 41 percent between sub-regions and there is a 36 percent difference between rural (38%) and urban (85%) areas (NDHS 2006). Women with no education are 2.7 times more likely to have had no postpartum checkup relative to women educated to SLC level and above, with disparities also persisting in the timing after delivery of the first postnatal checkup, where, for instance, 28 percent of primiparae had their first postnatal checkup less than 4 hours post-delivery, compared to 13 percent of grand multiparae (parity of 6 or above) (NDHS 2006).

The socio-economic status of women (including educational attainment and their position within the household) and their geographical and financial accessibility to services has a stronger association with health care utilization than intervention programmes (Sharma et al. 2007; Furuta & Salway 2006; Niraula 1994) in Nepal. For example, between 1996 and 2001, number of living children, household economic status and place of residence (urban vs. rural) were more strongly associated with the increase in maternal healthcare utilization over this period than were intervention programmes (Sharma et al. 2007). Within programme interventions that aimed to increase MH care utilization, health worker visits and educational status of women had a greater effect on increasing utilization than did radio programmes or mass media information campaigns (Sharma et al. 2007). Five years later in 2006, Karki and Agrawal (2008) also found that, "exposure to mass media [in general] had a significant positive impact on the use of services of SBAs", however, only one of seven specific radio programmes on health and family planning showed a significant positive impact on utilization of SBA services at last delivery. None of the two television programmes on health and FP showed effects on female health behaviour.

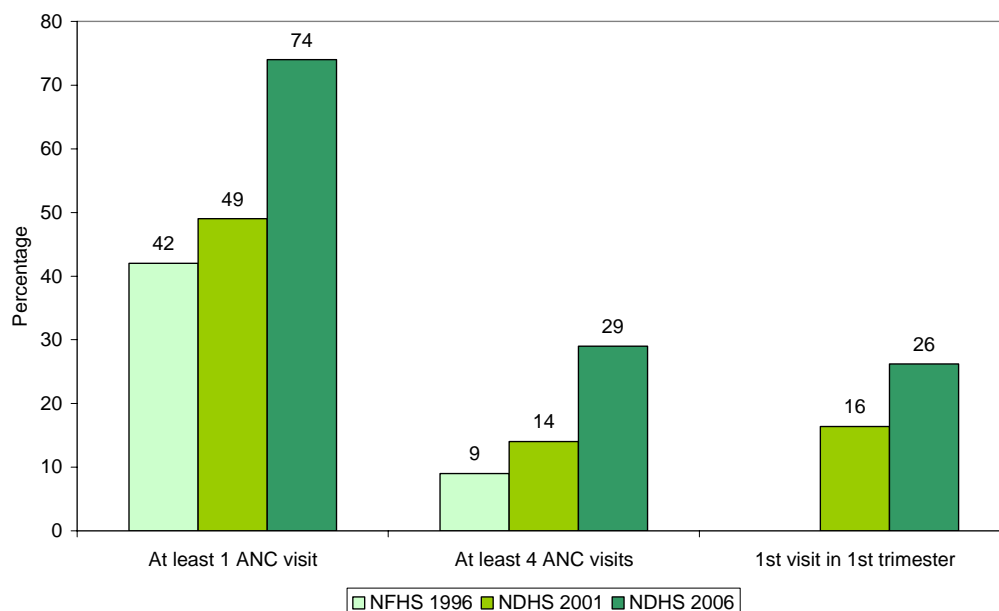
Studies have shown that geographical accessibility has an impact on utilization of services (Matthews & Gubhaju 2004; Niraula 1994). In the western and middle-western Hill region of Nepal, travelling time was found to have a significant effect on use of antenatal services; compared to communities that were 2-3 hours away from a health post, use of antenatal services was about twice as high when the health post was located within the community. When visits were on a regular monthly basis, the frequency of VHW visits to a community also had a significant effect on antenatal service utilization. However, a stronger predictor of antenatal service use was that of overall quality; whereby "the adjusted odds of using some form of antenatal service were 6.6 times higher in the catchment areas of high quality health posts than in areas served by low quality posts" (Acharya & Cleland 2000).

2.1.1 Antenatal Care (ANC)

If sought early in pregnancy, and continued up until delivery, antenatal care (ANC) can help to avoid adverse pregnancy outcomes. The national safe motherhood programme recommends at least four ANC visits, with the first visit soon after the realization of pregnancy and for visits to continue throughout pregnancy, irrespective of whether a woman suffers from any complications or danger signs.

National level surveys (NFHS 1996, NDHS 2001 and NDHS 2006) and facility data (DoHS reports) show a substantial increase in the utilization of ANC services in Nepal over the last decade, with the percent of women having at least one ANC visit increasing from 42 percent in 1996 to 74 percent in 2006 (Figure 2.1) and the number making four or more ANC visits increasing three-fold, from 9 percent in 1996 to 29 percent in 2006 (NFHS 1996; NDHS 2006). The percentage having their first antenatal visit in the first trimester increased from 16 percent in 2001 to 26 percent in 2006. Despite large increases in the utilisation of ANC services, the 1996 levels were very low and thus there is still a long way to go to meet the Second Long-Term Health Plan (SLTHP) target of 80 percent of pregnant women attending four or more ANC visits by the year 2017.

Figure 2.1: Antenatal Care Utilisation 1996-2006



Source: NFHS 1996; NDHS 2001; NDHS 2006

Subregional skilled ANC coverage remains patchy and uneven. It is highest in the Central Hill region (64%) and lowest in the Far-Western Hill region (25%), nearly a 2.6 fold difference. ANC coverage has not increased in all regions, with declines in percent coverage between 2001 and 2006 seen in the Eastern Hill (-11%) and the Far-Western *terai* (-34%) regions (NDHS 2006). There are socioeconomic disparities in ANC uptake, with 84 percent of those in the highest wealth quintile receiving ANC from a SBA; a proportion 4.75 times greater than that seen in the lowest wealth quintile (18%). A similar gradient is also seen by level of education. Urban residents have a 2.26 times greater ANC coverage by a SBA than do rural residents (85% vs. 38%, respectively), with a greater contrast if we look at those who receive ANC from a doctor (53% vs. 16%) (NDHS 2006).

Both the proportion of women who received at least one TT injection during pregnancy, and those who received two or more, increased by 30 percent from 1996 to 2006; those receiving at least one increased from 46 percent to 74 percent, and those having two or more from 33 percent to 63 percent (NDHS 2006).

The risk of anaemia increases during pregnancy and supplementation of the diet with iron is often necessary. The NDHS 2006 showed that 69 percent of women aged less than 20 years, 61 percent of those aged 20-34 years and 30 percent of those aged 35-49 years, took iron tablets during the pregnancy of their last birth. Though an increase in iron tablet consumption during pregnancy over time cannot be directly inferred from this cross-sectional data, the increase in intake by younger women relative to older is suggestive of this. Additionally, though it is not directly comparable, NDHS 2001 results show a similar pattern in iron/folic acid tablet intake, for women who received ANC (30%, 23% and 11%, respectively), which were much lower than the more recent rates. This is a positive outcome given the negative side-effects that anaemia has on pregnant women and the historically high prevalence of anaemia in Nepal. However, intake of iron tablets does vary by birth order, where 75 percent of nulliparae (birth order 1) took iron tablets, compared to only 30 percent of grand multiparae (birth order of 6+). The fact that older women are more likely to have had more children may partly explain why iron tablet intake decreases with mother's age at birth.

In addition to the time it takes to travel to, and the quality of, a health post (Acharya & Cleland 2000), or distance to nearest main hospital for ANC services, one of the barriers to increasing uptake of ANC is that regular medical attention and check-ups throughout pregnancy, are often considered unnecessary by pregnant women, particularly in rural areas, except in the case of an emergency or for those exhibiting signs of complications (Suwal 2008; World Bank 2001). The nature of ANC consultations is also a deterrent to uptake, in that women are often “reluctant to consult male health workers [for general health services], especially when a gynaecological examination [is] required” (World Bank 2001); therefore, the presence of male health workers also puts women off from accessing ANC services, just as it does with accessing other health services (World Bank 2001; Niraula 1994). A study in the Benighat area, reported that “pregnant women are treated as sick (*bhari jiwaki*)” and that in the higher caste Brahman households “a woman may be barred from worship and cooking responsibilities after six months of pregnancy” (Niraula 1994) – in this situation, it seems, a woman might only be able to access third-trimester ANC if a health worker were to visit her. There is also evidence that women who are deemed to be more ‘empowered’ (e.g. able to communicate about FP or their health problems with their spouses), are from nuclear families and are engaged in self-employed agricultural work are more likely to use ANC services (World Bank 2001; Matthews & Gubhaju 2004; Furuta & Salway 2006).

2.1.2 Intrapartum Care

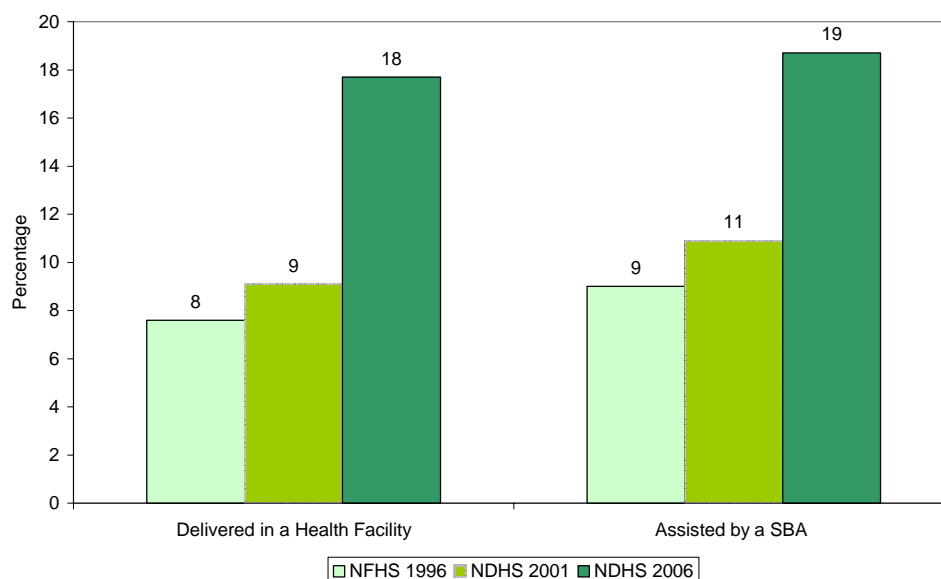
The NDHS 2006 shows that over half of mothers (54.2%) had made some preparations for their most recent birth. Among those who made preparations, over a third (37%) saved money for delivery; about 10 percent (9%) bought a clean delivery kit (CDK); 4 percent contacted a health worker, and 26 percent had arranged for food and clothing for the newborn.

Most births in Nepal (81%) take place at home, without any assistance from a skilled Birth Attendant (SBA)² (81%) (NDHS 2006). Just 18 percent take place at some form of health facility (government, non-government or private sector), with SBAs present at only 19 percent of live births (Figure 2.2). However, despite these low rates, the percentage delivering in a health facility doubled between the NDHS 2001 and NDHS 2006, increasing from 9 percent to 18 percent, and the percentage assisted by a SBA nearly doubled, increasing from 11 percent to 19 percent for the same time period. Deliveries in government, private and NGO facilities have all increased (deliveries in a government facility increased from 7 percent to 13 percent and in NGO and private facilities from 2 percent to 5%) but government facilities account for over twice the number of deliveries as NGO and private facilities. There has also been an increase in deliveries conducted by health workers, who are not qualified SBAs (from 2% to 4%). Despite these increases in skilled birth attendance and institutional delivery there is still much room for increase. Though an aim of having a high percentage of births delivered in a facility may not be necessarily appropriate in the Nepal context, due to poor accessibility and transport, it is a woman’s right to have access to a skilled attendant at delivery and skilled birth attendance is an area where improvements could be made, and there is still a long way to go to reach the target of 60 percent by 2015.

Unskilled birth attendants play an important role at delivery in Nepal. Half of live birth deliveries (50%) are attended by relatives or others, 19 percent are attended by TBAs and 7 percent are attended by no one. There has been some change since 2001, when 55 percent of live birth deliveries were attended by a relative, a friend or other; 23 percent were attended by TBAs and 9 percent were attended by no one.

² Defined as a doctor, nurse or midwife

Figure 2.2: Live Births Delivered in a Health Facility and Assisted by SBA 1996-2006



Source: NFHS 1996; NDHS 2001; NDHS 2006.

Within Nepal there is a lot of variation between districts in regards to institutional deliveries as well as skilled attendance. A community-based field survey in eight districts found that overall 8 percent of births occurred at health facilities, but the figure varied dramatically between the districts, from 27 percent in Dadeldhura to 2 percent in Rautahat (UNFPA & IOM 2006). The NDHS 2006 shows how the percentage of live births delivered in a health facility vary markedly across wealth quintiles, with 4 percent of women in the lowest wealth quintile compared to 55 percent of women in the highest delivering in a health facility. There was also variation by number of ANC visits a pregnant woman had had; 94 percent of those who had no ANC, 85 percent of those who had 1 to 3 ANC visits and 57 percent of those who had 4 or more ANC visits, delivered at home (NDHS 2006). This suggests that women who are already accessing pregnancy-related health services before delivery are more likely to access skilled delivery attendance services than those who aren't. Characteristically strong urban-rural differences were also found, in that 48 percent and 14 percent delivered in a health facility, respectively.

The community-based field survey in eight districts also found variation in birth attendance, ranging from 31 percent of births attended by an SBA in Dadeldhura to 7 percent in Rautahat. Delivery assistance by mother/mother-in-law/neighbour ranged from 97 percent in Saptari to 40 percent in Dadeldhura; and deliveries by a TBA ranged from 62 percent in Jumla to a low of 4 percent in Dadeldhura (UNFPA & IOM 2006). According to the NDHS 2006, the proportion of deliveries attended by skilled health practitioners varies by subregion, the highest coverage of SBA being in the Central hill region (41%) and the lowest being in the Western mountain region (5%) (NDHS 2006). Between 21 percent and 26 percent of live births in the second to the fourth wealth quintiles were attended by TBAs, whereas the equivalent figure is lower in the lowest (9%) and in the highest (9%) wealth quintiles. Live births to urban residents were 3.5 times more likely to be attended by a SBA than for rural residents (51% vs. 14%, respectively). SBAs only attended 6 percent of the deliveries that took place outside a health facility; skilled attendance is therefore a very health facility-bound practice.

The percentage of live births that were delivered by caesarean section increased nearly three-fold between 1996 and 2006, albeit from a very low baseline, from 1 percent to 3 percent (NDHS 2006). In 2006, 12 percent of live births to women in the highest wealth

quintile (an increase from 6% in 2001; NDHS 2001), and 14 percent of live births to women with SLC and above, were caesarean sections. Fifteen percent of deliveries at health facilities were caesarean sections, compared with only 1 percent of those taking place elsewhere (NDHS 2006). C-sections remain an urban procedure, with 4.4 times the proportion of deliveries to urban residents being C-section to those of rural residents (8% vs. 2%, respectively) this is probably due to most CEOC facilities being based in urban settings.

Studies have shown a direct correlation between the availability of EOC facilities and the case fatality rate (CFR) i.e. greater the availability of EOC services lower is the CFR (NDHS 2001). This indicates a need to improve EOC services in the existing health facilities to help reduce the CFR and the MMR. Managing obstetric complications requires basic (BEOC) and comprehensive emergency obstetric care (CEOOC) facilities that are functional and in accessible places (WHO/SEAR, 2005). In 2005, there were 32 CEOC sites in 26 districts and 17 BEOC facilities in the country. Currently there are 79 CEOC facilities in 35 districts and 90 BEOC facilities (PHCCs & district hospitals) in the country in 2008/09. As per the UN recommended standards CEOCs are insufficient. Furthermore, because maternal deaths mostly occur in the community, such services need to be located nearby the community. Equally, the demand-side also needs to be addressed, in that family members need to be made aware of the danger signs of pregnancy so that appropriate EOC care can then be sought (WHO/SEAR, 2005).

Table 2.1: Basic, Comprehensive EOC Facilities and Birthing Centers in Nepal: 2008/09

Sites	UN recommended Standard	Target for 2009 (SMNH Long Term Plan 2006-2017)	Achievement in 2008/09
CEOOC	1 CEOOC per 500,000 population	37 Districts	35 District (79 facilities)
BEOC	1 BEOC for 125,000 population	40% PHCC	90/200 (PHCC & District Hospital) = 45%
Birthing Centers	Not specified	15% (HPs)	45% (HPs)

Furuta & Salway (2006) found that discussion of family planning with husband at least once was consistently associated with skilled delivery care, "with women who had discussed it with their husbands having 34 percent higher odds of receiving delivery care than those who had not", after controlling for potential confounders. Their findings suggested use of skilled delivery care was associated with a woman's position within her household. However, they also cautioned that other variables had a stronger influence on receipt of skilled delivery care, such as women's education, household socioeconomic status, economic accessibility of healthcare and urban-rural residence. They also found that women of high socioeconomic status had odds of using delivery care that were more than three times as high as those of women of low socioeconomic status.

2.1.3 Postpartum Care

A high proportion of maternal deaths occur during delivery and within 48 hours postpartum (Dhakal et al. 2007), therefore, this period is critical for monitoring complications arising from delivery and it is recommended that all mothers have a postnatal check up within two days of delivery.

The NDHS 2006 showed that only 31 percent of women who gave birth in the five years preceding the survey received postnatal care within two days after delivery for their most recent live birth. The ratio of institutional to non-institutional deliveries that received a postnatal checkup within 2 days of delivery is 3.97 (85% vs. 22%). For non-institutional deliveries only, this figure was 22 percent; an improvement on previous nationally representative surveys, given that receipt of postpartum care within 2 days of delivery for

women who had a non-institutional live birth, was 17 percent in the 2001 NDHS, and in 1996 only 9 percent of women who had a live birth in the 3 years preceding the survey received a postnatal checkup from a doctor, nurse or midwife. In 2006, 67 percent of women who had had institutional or non-institutional deliveries reported having had no postpartum checkup; the equivalent figure for non-institutional deliveries being 77 percent. Seventy-nine percent of women who had non-institutional deliveries reported the same in 2001 and the 1996 NFHS found that “one of five women did not receive postnatal care from anyone”, though an additional 42 percent were visited by relatives or friends, 24 percent by TBAs and 4 percent by MCHWs. Women who deliver in health facilities therefore, are more likely to receive PNC.

In the NDHS 2001, those women who had had non-institutional deliveries and were most likely to have had a postnatal checkup within 2 days of delivery were those aged under 20 years at birth (18%); rural residents (17%); women of the Terai ecological zone (32%), the Central development region (39%) or the Central Terai region (61%); and those with either no education (19%) or SLC and above (15%). Again, it should be reiterated that the results found in the NDHS 2006 are not directly comparable given that they also include women who had institutional deliveries. The latter survey found that uptake of postnatal care had risen, with 35 percent of deliveries to women aged less than 20 years receiving a postnatal checkup within 2 days (though this may be partly due to the greater likelihood of this age-group delivering in a health facility) compared to 19 percent for deliveries to 35-49 year-olds. By place of delivery, we see great disparities in uptake of postnatal care, with 56 percent of deliveries taking place in health facilities having a postnatal checkup within less than 4 hours, compared with only 16 percent of deliveries that take place elsewhere. Seventy percent of rural births have no postnatal checkups, whereas the equivalent figure is 46 percent for urban deliveries.

Utilisation of postnatal care (PNC) is low in Nepal and mostly takes place in health facilities (NDHS 2006). Women have a preference for receiving postnatal care at a hospital rather than at a health post, which is thought to be related to service quality and trust in health workers (Dhakal et al. 2007). Barriers to accessing PNC include “lack of awareness among women and their family about the care, distance to health facilities, lack of trained health workers and lack of health facilities in the village” (Dhakal et al. 2007).

Household work in the Nepalese context often entails carrying heavy loads, including carrying water from some distance away, and early resumption of this following delivery can harm postpartum physical health and recovery. In one community-based survey in eight districts it was found that 12 percent of women returned to their respective workload within a week of delivery; 25 percent did so within 8-14 days; 51 percent did so within 15-30 days and only 12 percent waited over a month before resuming their pre-pregnancy activities (Gurung et al. 2007).

2.2 Health Service Delivery

According to national guidelines (UNICEF & MoH 1996) maternity services aim to help families take appropriate decisions through health information and counselling, to provide basic antenatal and delivery services to all pregnant women and to ensure referral and adequate obstetric care to high-risk mothers and obstetric emergencies (Jahn et al. 2000). The maternity health care system in Nepal operates at various levels:

- *Household*: initiatives have been taken to empower families with basic knowledge in caring for pregnant and postpartum women; seeking appropriate and timely help from trained health care providers; and encourage for registration of births and maternal and neonatal deaths.

- *Community*: aims to register all births and maternal and neonatal deaths; ensure MCHWs and ANMs are available at community level; and ensure availability of transportation and blood for obstetric emergencies through community mobilization. Female Community Health Volunteers provide some maternal care services such as advise pregnant women to go for ANC checkups, distribute iron tablets to pregnant women, give misoprostol (in one pilot district) for preventing PPH.
- *Sub health post*: MCHWs conduct clean normal deliveries at homes and ensure referral of appropriate cases; provide family planning counselling, services and refer as required; provide postnatal services and counselling; record maternity services provided; and follow-up maternal and neonatal deaths.
- *Health post*: ANMs provide both normal and live-saving midwifery services (obstetric first aid) at the health post and at the home; identify and arrange for referral of obstetric complications/emergencies; ensure availability and increased utilization of family planning services; and provide supportive supervision to MCHWs at the community.
- *Primary Health Care Centre (PHCC)*: provide some essential obstetric functions e.g. management of postpartum hemorrhage, vaginal delivery (forceps, vacuum), manual removal of placenta, treatment of anemia, augmentation of labour, treatment of pregnancy induced hypertension, evacuation of uterus in incomplete abortion and treatment of sepsis. Some PHCC's upgraded as BEOC facility provide all essential obstetric function as per WHO guidelines.
- *District hospitals*: are developed and staffed as first referral facilities and basic emergency obstetric care (BEOC) sites providing all essential obstetric functions (EOF) as per WHO guidelines. These hospitals undertake life saving procedures to reduce maternal mortality at the most appropriate peripheral level of the existing health infrastructure.
- *Zonal and regional hospitals*: function as Comprehensive Emergency Obstetric Care (CEOC) centres providing obstetric and gynecology special services. At the same time some district hospitals also provide CEOC services.
- *Central level hospitals*: function as tertiary level care centre and CEOC centre providing obstetric and gynecology special care services including facilities for intensive care (ICU/NICU). These hospitals also function as training units for special skills in midwifery and obstetric/gynecology.

In reality, implementing the above plan has faced many challenges. A lack and geographical maldistribution of skilled health workers, has given rise to a shortage of ANMs and low coverage of deliveries by SBAs, particularly in rural areas (Simkhada et al. 2006). However, the government has launched an initiative to upgrade MCHWs to ANMs by providing additional training and there is a need to increase training facilities to train women to be ANMs (SEARO 2007). Many district hospitals are unable to cope with obstetric emergencies (Presern 1992), there is extreme pressure on out-patient departments in Nepal due to limited health facilities and being poorly equipped, which leads to overcrowding and can sacrifice privacy; this has not only been the case in rural areas, but also in easily accessible urban areas (Simkhada et al. 2006).

Drugs are not always readily available in the hospitals, with patients and relatives frequently having to purchase them from outside, with many poor families unable to do so. Additionally, health care staff in rural health posts are often reported as being unreliable, hostile towards local patients, and absent from the care centres (Justice 1986,

Niraula 1994, Carlough 1997, Sigdel 1998), all of which deter patients from seeking care (Suwal 2008). To improve the utilization of services health care staff need to be available at facilities around the clock and women need to be treated with respect by the staff and well equipped to deal with maternity emergencies (Suwal 2008).

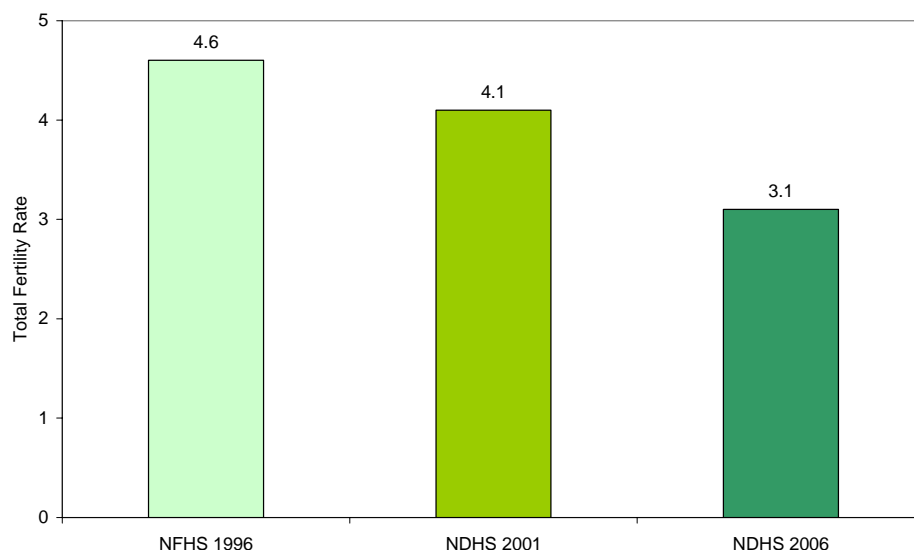
Antenatal screening for at-risk pregnancies has been found to be insufficiently specific, therefore failing to trigger an adequate use of referral-level obstetric services (Jahn et al. 2000). Often women in need of obstetric care (either due to their risk status or delivery complications) give birth without skilled attendance at home. Referral for at-risk pregnancies does not results in a considerable increase of high-risk pregnancies and obstetric emergencies in the hospital maternity ward (Jahn et al. 2000).

This underlines the need for improving human resources in the health sector and health facilities, whilst at the same time increasing women’s awareness of the availability of such services.

2.3 Fertility

Fertility is in decline in Nepal, the total fertility rate³ (TFR) having reached 3.1 by 2006 (Figure 2.3) from a rate of 4.1 in 2001 and 4.6 in 1996 (NFHS 1996; NDHS 2001; NDHS 2006). This in itself is a positive indicator for maternal health, given that if women have fewer children they put themselves at the risk of maternal-related morbidity and mortality less frequently. There is direct relationship between fertility and maternal mortality, with the higher the TFR the higher the life time risk of a maternal death⁴.

Figure 2.3: The Total Fertility Rate 1996-2006



Source: NFHS 1996; NDHS2001 and NDHS 2006

Fertility decline has been most pronounced in rural areas where the TFR went from 4.8 in 1996 to 3.3 in 2006 (NDHS 2006), however, the TFR remains lower in urban areas where it had reached replacement level (2.1) by 2006 (NDHS 2006). TFR has remained lowest among groups with higher educational attainment. For example, in 1996, the TFR was 5.1

³ The Total Fertility Rate is average number of children a woman would have in her life time if she experiences the current fertility rate.

⁴ The lifetime risk of maternal death is the probability that a woman aged 15-49 years will die of a maternal cause subject to the current level of maternal mortality ratio and total fertility rate.

for women with no education and 2.5 for those with secondary or above. Similarly, the TFR was 3.9 among women with no education and 1.8 among women with SLC and above in 2006. Total fertility also varies strongly across wealth quintile, where women in the lowest wealth quintile have a TFR of 4.7, compared to those in the highest with a TFR of 1.9. TFR varies somewhat by ecological zone; it is 4.1 in the mountain regions, 3 in the hill regions and 3.1 in the *terai*. Fertility has been found to vary seasonally in non-contracepting populations of rural Nepal due to out-migration of men for wage labour, the fertility-moderating effects of “suppressed ovarian function triggered by weight loss and intense agricultural workloads during the monsoon season” and weight gain in winter (Panter-Brick 1996).

The median age at first marriage has increased very slightly from 16.6 years in 2001 to 17.2 in 2006, and is higher for urban (18.1 years) than rural residents (17.0 years) (NDHS 2006). Child marriage is not uncommon in Nepal, but more so in rural areas, with 16 percent of rural females marrying before the age of 15 years (NDHS 2006). Although females living in urban areas get married at a later age on average, one study found 11 percent of them married before the age of 15 in selected towns and cities (Choe et al. 2005). Marriage is one of the key proximate determinant of fertility (Bongaarts 1978; Bongaarts & Potter 1983), particularly in Nepal where most births take place within childbearing, which in turn is associated with negative maternal and child health consequences; increasing the likelihood of pregnancy complications due to physical reproductive immaturity. It is also associated with higher parity, which in turn entails exposure to repeated life-threatening processes (Suwal 2008). Nepal has the second-highest adolescent fertility rate (19%) in South and Southeast Asia (NDHS 2006). A quarter of women aged 25-29 have given birth by the age of 18, with a median age for this cohort of 19.6 (NDHS 2006) indicating that there has been little reduction in the age at marriage for younger women. Therefore, although fertility has fallen in Nepal, this decline has been more pronounced in older rather than younger age-groups. A community-based survey in eight districts showed a lot of district variation in early childbearing with 46 percent of first births in Baglung taking place at age 19 or below, compared to 83 percent in Mahottari (UNFPA 2006).

Birth spacing has an impact on maternal health, with the risk of maternal death increasing if births are spaced less than 24 months apart (NDHS 2006). The median inter-birth interval⁵ in Nepal is healthy at 33.6 months. There is little variation in birth intervals by geographic area or education, however, it does vary by the age of mother, with younger women having shorter birth intervals (30.8 months for 20-29 year olds vs. 42.3 months for 40-49 year olds), and longer birth intervals in urban (36.7 months) than rural (33.1 months) areas (NDHS 2006).

Overall, the percentage of currently married women age 15-49 who want no more children increased by 20 percent between 1996 (59%) and 2006 (71%), reflecting a high potential demand for contraception for birth limiting purposes. The increase was most pronounced in rural areas, where it increased by 21 percent in 10 years, going from 58 percent in 1996, to 65 percent in 2001, to 70 percent in 2006, and among women with no education (a 27% increase from 60% to 76% between 1996 and 2006), or primary education (a 16% increase from 56% to 65% between 1996 and 2006). Ideal family size averages 2.3 children in Nepal, which has decreased from 2.9 in 1996. The mean ideal number of children for all women aged 15-49 years is highest amongst women with no education (2.6) and decreases with increasing level of education to 1.8 children for those with secondary-level education and above (NDHS 2006).

⁵ The median number of months since the preceding birth.

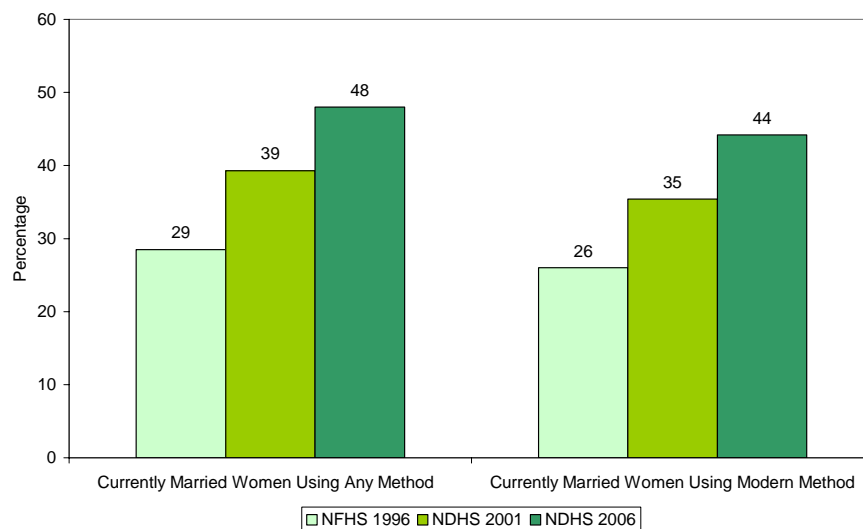
Grandmultiparity⁶ is an obstetric risk factor in Nepal. A case-control study in Kathmandu Maternity Hospital found that 60 percent of the grandmultiparous group were rural residents compared to 28 percent of the control group. The grand multipara were more likely to have had an early marriage and an older age profile, and lower ANC attendance. They also had a higher frequency of many conditions (hypertensive disorders during pregnancy, preterm birth, anaemia, malpresentations, multiple pregnancy, premature rupture of membranes, PPH, and retained placenta) as well as a slightly higher caesarean section delivery rate (Rayamajhi 2006).

2.4 Family Planning

Knowledge of at least one method of family planning is a precursor to the use of contraception, and among women of reproductive age in Nepal, knowledge of at least one modern method is high. Knowledge of all modern contraception methods has increased since 1996 and knowledge of at least one modern method was almost 100 percent in 2006. The IUD is the least known modern method (67%) though knowledge has increased since 1996. Traditional methods are less well known than modern (NDHS 2006).

Figure 2.4 shows that 44 percent of currently married women aged 15 to 49 use a modern method of contraception. There is a marked time-trend for increased use of modern contraception; it was 26 percent in 1996 and 35 percent in 2001 among women currently married women aged 15-49 (NDHS 2006). The percentage of currently married women aged 15-49 currently using a modern contraceptive method has increased more markedly in rural areas (24% in 1996 to 43% in 2006) and among those with no (25% in 1996 to 46% in 2006), or primary (28% in 1996 to 42% in 2006), education; these are promising signs that women/men/couples throughout the country are now more able to choose how many children they have and also when to have them. This is thought to be the key contributory factor to the steep fertility decline in Nepal, as well as the substantial reduction in maternal mortality. However, there remain disparities between regions and other population groupings that need to be addressed. For example, in 2006 the modern contraceptive prevalence among currently married women age 15-49 was 26 percent in the Far-western hill region and 65 percent in the Far-western Terai (NDHS 2006).

Figure 2.4: Use of Contraception by Currently Married Women



Source: NFHS 1996; NDHS 2001; NDHS 2006

⁶ When a woman gives birth for the fifth to ninth time.

A community-based survey showed that contraception was practiced by 32 percent of the women at the community-level. This was a lower prevalence rate than that found by the NDHS 2006 (48%) that took place at a similar time, but the former study's generalisability may have suffered because the 8 districts surveyed were not randomly selected and therefore could have led to biased or non-nationally representative results. Permanent methods were the most prevalent (minilap 51%; laparoscopy 2% and vasectomy 10%). Contraceptive prevalence varied widely by district, e.g. 52 percent in Dang vs. 18 percent in Kapilvastu. Overall, limiting methods were more common than spacing methods. IUD/Copper T accounted for only 1 percent of contraceptive use, pills 6 percent and condoms 9 percent. Depo Provera/Sangini accounted for 20 percent of contraceptive methods used (UNFPA 2006).

The NDHS 2006 shows that knowledge of modern methods of contraception, a precursor to use (Cleland & Wilson 1987), is high among married (100%) and unmarried women (100%). The only modern contraceptive method for which knowledge is low, is emergency contraception (7% among all women). Sixty-five percent of currently married women have ever used a modern method of contraception and the modern methods with highest ever-use are female sterilization (18%), the pill (18%), injectables (32%) and the condom (22%); this is broadly the case across all ages, excepting at ages 35-49 years where male sterilization also becomes an important mode of contraception. Current use of any modern method of contraception among currently married women in Nepal peaks at age 35-39 years (60%), from a low starting point of 14 percent among 15-19 year olds.

Overall use of modern contraception in Nepal has increased from 26 percent in 1996, to 44 percent in 2006, and to 44 percent in 2006. Traditional methods of contraception are little used in Nepal, with 4 percent of currently married women using them. This rate has fallen since 2001, when it was 4 percent and has risen since 1996, when it was 3 percent.

Breaking down current use of any modern method of contraception by background characteristics of currently married women shows us that it is fairly evenly distributed across development regions (min.: 36 percent in Western region; max.: 50 percent in Far-western region) but more unevenly distributed across subregions, where it is highest in the Far-western *terai* (64.6%) and lowest in the Far-western hill region (26%). The highest rate of a modern contraceptive currently being used by currently married women with an education level of SLC and above was the condom (16%), whereas it was female sterilization (23%) among women with no education. In urban areas the most common modern contraceptive being used was female sterilization (18%) followed by injectables (12%), and in rural areas the corresponding methods were also female sterilization (18%) followed by injectables (10%).

In 2006 unmet need⁷ for birth spacing was found to be 9 percent and unmet need for limiting was 15 percent. These figures are at the tail-end of a decline in total unmet need for family planning, which was 31 percent in 1996 and 25 percent in 2006 (NDHS 2006); again. There are wide regional and urban-rural disparities in unmet need for family planning for Nepal; the decline has been greater in rural areas, although overall unmet need is lower in urban areas; and it is highest in the Eastern Mountain region (41%) and lowest in the Far-western *terai* (14%).

2.5 Abortion

About one-third of pregnancies in Nepal are unplanned (NDHS 2006). The high proportion of unplanned pregnancies may be attributed to the limited decision making power of

⁷ Unmet need for FP is an indicator of how much more needs to be achieved by the national FP programme.

women regarding reproductive health and poor access to family planning. Most women therefore rely upon abortion services to manage unwanted pregnancies. In 1996 induced abortion made up 0.4 percent of pregnancy outcomes, or 2 percent of pregnancy outcomes in urban areas and 0.3 percent in rural areas (NFHS 1996). In 2001, induced abortion made up 1 percent of pregnancy outcomes, or 2 percent of pregnancy outcomes in urban areas and 1 percent in rural areas. Induced abortions are likely to have been underreported due to having been illegal during the survey periods. In 2006, induced abortion constituted 2 percent of all birth outcomes, the rate being three times higher in urban areas (6%) than in rural areas (2%), though these recent data are also fairly low. Induced abortion peaks as a proportion of pregnancy outcomes at ages 30-34 years (urban: 14%; rural: 3%; total: 4%) (NDHS 2006; Thapa et al. 1992), which corresponds to the sharpest reproductive lifetime decline in age-specific fertility rates (42% between age groups 25-29 and 30-34 years, suggesting that this is the age at which women most desire to limit their fertility. The most common reasons for having an induced abortion include having too many children, illegitimate pregnancy, spacing births or delaying the next pregnancy and economic hardship (Thapa et al. 1992; Ojha et al. 2004; CREHPA, WHO & GoN 2006).

Abortion was legalised in Nepal in September 2002 (Tamang & Tamang 2005). It is legal until 12 weeks into a 'normal' pregnancy at the woman's request; up to 18 weeks if the pregnancy is the result of rape or incest; and at any time during pregnancy if there is a sound medical reason for an abortion, (i.e. if it is officially sanctioned by a medical practitioner, if the mother's physical or mental health of the woman is deemed to be at risk, or if the foetus is impaired or has a condition incompatible with life) (Tamang & Tamang 2005). Despite the change in the law, many are unaware that abortion has been legalized (UNFPA & IOM 2006). One survey in 2005/6, in a sample of eight districts, found that 90 percent did not know that abortion had been legalised and only 7 percent knew rightly that women have a right to abort their pregnancy up to 12 weeks gestation (UNFPA & IOM 2006). Jumla district was prominent as having an exceptionally high awareness rate of the legal conditions for abortion with 50 percent aware that pregnancies up to 12 weeks gestation could be aborted. The majority of people in the eight districts (63%) were aware that one of the conditions for legal abortion over 12 weeks gestation was if the pregnancy were a threat to the mother's life (UNFPA 2006).

Before abortion was legalised in 2002, induced abortion was a criminal act under any circumstances, punishable by imprisonment for both the woman undergoing an abortion and the service provider. There was strong enforcement of the law, with many women imprisoned for having an abortion. One fifth of the women prisoners and 0.3 percent of the men prisoners were imprisoned for charges of abortion or infanticide (CREHPA 2000). Some remain in prison today. Wealthier women often paid to have abortions at private clinics or even travelled to India. Others frequently resorted to clandestine and unsafe abortion services (Tamang & Tamang 2005). A very high proportion (98%) of women who attended government hospitals for treatment of post abortion related complications were married and from poor economic backgrounds (CREHPA 1999).

Unsafe abortion can have a large impact on levels of maternal mortality and morbidity. The 1998 *Maternal Mortality and Morbidity Study* (GoN 1998) found that 5 percent of maternal deaths at community level were due to abortion, that abortion accounted for 10 percent of maternal factors for the 31 maternal deaths in a hospital death audit and that 54 percent of gynaecological and obstetric hospital admissions over the course of a year were for induced abortion complications (GoN 1998). Before legalization, a study that gathered data from 5 hospitals around Kathmandu from 1984 to 1985, found that of all 1,576 cases of abortion detected, 124 (8%) cases were induced and 41 (3%) were possibly induced (Thapa et al. 1992). Hospital-based studies by the Centre for Research on

Environment, Health and Population Activities (CREHPA 1999) calculated that 20 percent to 61 percent of gynaecological and obstetric admissions were for complications of unsafe abortions. A post-legalisation hospital-based study of abortion cases found that the 305 cases of abortion admitted during a three-month period between 2003 and 2004 constituted 40 percent (N=768) of the total gynaecological admissions, of which 31 (10.3%) had a history of induced abortion (Ojha et al. 2003). The authors also said that “there was not much difference in the total number of abortion complications cases in the study period and in the same three months the previous year, previous to legalisation of abortion” (Ojha et al. 2003). A higher proportion of those feeling sick after an abortion sought their abortion from Ayurvedic practitioners, *Dhami/Jhankri* or *Sudenis* than from a formal provider (UNFPA & IOM 2006). These findings show that abortion induced complications contribute to the high maternal mortality and morbidity in Nepal and highlight the fact that comprehensive abortion care services are crucial in addressing high maternal mortality. Data from 13 districts collected by the FHD of DoHS EOC monitoring system show a year-by-year decline in the percent of obstetric complications in these districts that were abortion-related between 2002 and 2006 (35% in 2002-3; 30% in 2003-4 and 28% in 2004-5 and 2005-6), suggesting post-legalisation improvement in safe abortion care and possible eventual contribution to lowering of the MMR (Pant et al. 2008).

Post-abortion care (PAC) services for management of abortion-related complications were introduced at selected hospitals in 1995, before legalization of the procedure (CREHPA 2006) and are now available in most major public hospitals (45 out of 72 in 2004) (Shakya et al. 2004). Comprehensive abortion care services (CAC) were introduced in 2004 (Tamang & Tamang 2005) and include pregnancy testing; pre- and post-abortion counselling for informed decision-making about the termination procedure, consent, follow-up care and family planning; and surgical abortion (Tamang and Tamang, 2005). Currently CAC services are provided in 245 institutions (governmental and non-governmental) in 75 districts. The recommended procedure for abortion is manual vacuum aspiration (MVA) (Tamang & Tamang 2005; CREHPA 2006), although the number of health practitioners providing such surgical abortion is small.

Medical abortion, namely Medabon,⁸ is legally registered by Department of Drug Administration (DDA) in Nepal for research purposes (Chawdhary et al. 2009). It is available in six districts (Jhapa, Dhading, Chitwan, Tanahu, Surkhet and Kailali) as part of a pilot programme implemented by MOHP. Furthermore, CREHPA is providing medical abortion at four government hospitals for research purposes.

However, taking medication to induce an abortion is widespread, with little control over the drug types and doses. One study found that 45 percent of induced abortions took place in hospitals and a similar proportion (44%) acquired medication from a pharmacy (UNFPA 2006). Mifepristone and misoprostol are widely available from Indian chemists, and misoprostol is available in Nepal as an anti-ulcer drug. Certain drugs manufactured in India for treating “menstrual disorders” or “regulating menstruation”, including the banned drug EP Forte, are openly available from Nepalese chemists and illegally prescribed by health care providers. Informal medicine traders also operate along the Indo-Nepalese border, smuggling in medicines from India at cheap rates and supplying them to Nepalese chemists (Tamang & Tamang 2005). Regulated medical abortion has the potential to dramatically increase access to safe abortion services since not all health institutions can conduct surgical abortion procedures.

There is low awareness of abortifacient drugs among health care providers, including obstetricians, general practitioners, paramedics, ayurvedic and homeopathic practitioners

⁸ A combination of mifepristone followed by misoprostol for pregnancy termination up to 63 days LMP.

and chemists with a negligible proportion citing misoprostol and mifepristone despite knowing the names of many allopathic, ayurvedic and homeopathic medicines available for menstrual regulation and abortion. Despite low awareness of it, approval of medical abortion was widespread among medical practitioners and medicine vendors and general consensus was for mifepristone and misoprostol to be dispensed by approved medical abortion providers to prevent unsafe use (Tamang & Tamang 2005).

Table 2.2: Number of Providers Trained, Site Listed and CAC Cases in Nepal: 2004/05 - 2008/09

Fiscal Year	No of provider trained	No. of site listed	No. of CAC cases
2003/04	54	12	719
2004/05	95	57	10,561
2005/06	111	64	47,451
2006/07	114	34	73,474
2007/08	138	39	97,378
2008/09	192	39	83,978

Note: Nepal FY begins from Mid July.

Comprehensive abortion care service was started in March 2004.

Following liberalisation of the abortion law in 2002, scale-up of comprehensive abortion care (CAC) services started in March 2004, with 245 CAC service sites set up around the country by 2008/09. In a prospective study of abortion care conducted in 30 randomly selected CAC service sites over a three-month period (Ipas, 2009), the majority of patients were found to seek care from Marie Stopes International/Sunaolo Parivar Nepal facilities and contraceptive counselling occurred with 6,983 (99%) of clients and 5,679 (81%) left with a family planning method.

The overall complication rate was low at 2 per 100 procedures (95% C.I.: 0.63-3.45) during the procedure, the follow-up period, or both. One percent of women receiving care at MSI/SPN clinics experienced abortion complications, which was significantly different from the 6 percent of women accessing CAC at other facility types (i.e. government, Family Planning Association of Nepal, private; $p < 0.001$). Post-procedural problems most often reported were retained products of conception (1%), with no reports of "cervical tears/lacerations, uterine perforations or missed ectopic pregnancies." On a modified version of the Jewkes scale to measure complication symptom severity only two of the 131 clients with post-procedure complications experienced high-severity ones, representing 0.03 percent of the total 7,386 clients who received services at the participating sites.

The results of the study were thought to reflect good provider training and adherence to procedure protocols and allowed for the integration of a client complication monitoring system into Nepal's existing CAC register under the HMIS.

Recommendations for further reducing complications from safe abortion procedures included checking products of conception after every CAC procedure, either with a light box or by holding a clear container up to a light source to confirm whether or not any tissue remnants remain *in utero*, and ensuring that oral antibiotics are a part of treatment protocols for patients presenting with signs and symptoms of complications that require them (Ipas 2009).

2.6 Maternal Morbidity

The facility based obstetric morbidity data reporting was initiated in three Nepal Safer Motherhood Project districts of Nepal since 1997/98 under the EOC monitoring initiative. Until the year 2008/09 a total of 26 districts reported the EOC monitoring data from basic

and comprehensive EOC facilities. Table 2.3 presents the obstetric morbidity for the period 1997/98 to 2008/09.

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Table 2.3 presents mix of direct (major) obstetric morbidity for the period 1997/98 to 2008/09. The proportion of APH among all direct obstetric composition ranged from 4 percent to 6 percent except for the year 2005/06 which was 3 percent. PPH for the earlier two years (1997/98 and 1998/99) was more than 10 percent while for other years the PPH proportion ranged from a low of 5 percent to a high of 9 percent. The proportion of prolonged/obstructed labour was found to have steadily increasing. In the year 2007/08 the prolonged/obstructed labour accounted for about half of all direct obstetric complications while it was 45 percent in 2008/09. Proportions of Pre-eclampsia/Eclampsia during 1997/98 to 2001/02 and 2006/07 were 10 percent or higher while in the recent period it was 4 to 5 percent. Proportion of women with retained placenta was in a declining trend up until 2004/05 and have remained at around 8 percent thereafter. The proportion of women abortion complication shows erratic fluctuation with a low of 24 percent to 41 percent. Other direct obstetric complications such as ectopic pregnancy, ruptured uterus, postpartum sepsis has remained low compared to other direct obstetric complications.

Table 2.3: Percentage Distribution of Direct Obstetric Morbidities: Selected Districts, Nepal: 1997/98 to 2008/09

Direct obstetric complications	Fiscal Year ⁹											
	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Antepartum haemorrhage	4.5	5.8	4.2	5.6	4.6	4.3	4.4	4.0	2.8	4.2	4.3	3.7
Postpartum haemorrhage	12.9	10.2	5.2	6.5	6.7	6.9	7.1	8.7	6.8	7.7	7.6	7.3
Ectopic pregnancy	0.0	0.0	0.0	0.0	0.6	1.1	0.9	0.8	0.9	0.8	1.0	1.5
Prolonged/obst. Labour	10.5	14.6	15.8	19.5	24.3	30.2	36.3	41.8	43.4	30.3	48.7	45.3
Ruptured uterus	0.9	0.6	0.1	0.1	0.3	0.9	1.5	0.5	2.0	0.5	0.9	0.7
Pre-eclampsia/Eclampsia	16.3	16.8	20.6	16.8	14.6	8.5	7.2	5.3	4.3	10.3	4.4	5.0
Retained placenta	12.3	10.8	16.1	12.1	10.0	9.7	8.5	8.2	8.3	7.7	7.5	8.9
Postpartum sepsis	2.0	3.8	2.1	3.9	4.1	3.2	3.7	2.4	3.0	1.2	1.2	1.2
Abortion complication	40.6	37.5	35.8	35.5	34.9	35.2	30.4	28.3	28.4	43.7	24.3	26.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Malnutrition

Malnutrition is harmful for both the mother and her foetus. Women are at high risk of energy and (micro) nutrient deficiency in Nepal. For example, in the Southeastern plains of Nepal, the prevalence of deficiencies in vitamins A, E and D in early pregnancy were found to be 7, 25 and 14 percent, respectively and only 4 percent had no deficiency (Jiang et al. 2005). Seventy-six percent of women in Bhaktapur, in the Kathmandu Valley, have energy intakes less than the recommended daily 2,200 Kcal (Chandyo et al. 2006). Cultural norms in some households result in women eating whatever food remains after serving other household members (Shakya & McMurray 2001), or there may be a pattern of

⁹ Based on EOC monitoring reports from 3 districts in 1997/98 and 1998/99; 13 districts in 1999/00 to 2005/06; 19 districts in 2006/07; 22 districts in 2007/08 and 26 districts in 2008/09.

discriminating against females in the intra-household allocation of food, such as dietary restrictions during pregnancy (Gittelsohn et al. 1997). Furthermore, they frequently have a high energy expenditure due to demanding daily domestic chores and micronutrient status can vary by season (Jiang et al. 2005).

Vitamin A/Retinol Deficiency and Night-Blindness

Night-blindness¹⁰ is common among pregnant women in rural Nepal, with a prevalence of 16 percent reported in the south-eastern plains of Nepal (Katz et al. 1995). A survey (Linehan et al. 1996) conducted in the Far- and Mid-Western regions of Nepal found that the proportions of women who had ever experienced night-blindness by district ranged from 8 to 46 percent. A nationally representative sample survey in 1998 found that 6 percent of pregnant women were night blind, compared to 5 percent of non-pregnant women, but 17 percent of women had experienced it in their last pregnancy (Gorstein et al. 2003). The risk of night blindness for pregnant women increases with lower socio-economic status (in terms of access to water supply and ownership of household items); if the head of household is illiterate (Katz et al. 1995); in older ages; in lower castes; by geographical location and by season (Starbuck 1993).

Night blindness adversely affects women's daily activity patterns, especially in rural areas where dwellings are often poorly lit and increases dependence of expectant mothers on family members and risk of injury (Christian et al. 1998a). Studies have shown that night blindness during pregnancy in Nepali women increases risk of mortality for up to two years after pregnancy declaration relative to non-night blind pregnant women, or those taking beta-carotene/vitamin A supplements, and increases the relative risk of dying from infection five-fold (Christian et al. 2000). Women with low levels of vitamin A in their blood in the second trimester have an increased risk of puerperal infection and throughout their postpartum period (Faisel & Pittrof 2000). A study in Sarlahi district showed that maternal mortality and morbidity can be reduced with low-dose supplementation with beta-carotene or vitamin-A during pregnancy (Christian et al. 2000). Though vitamin A and beta-carotene supplementation can markedly reduce maternal night-blindness in Nepal, it cannot eliminate it (Christian et al. 1998b).

Ethnographically, Nepalese women may see night blindness as a condition that frequently occurs during pregnancy, and many see it as a normal experience during pregnancy, like morning sickness, for which usually no treatment is usually sought (Christian et al. 1998). It is perceived as something that will cease after giving birth or ceasing breastfeeding. This perception reduces the likelihood of seeking treatment or taking vitamin A supplements. However, women in Sarlahi district ranked it as the second most severe condition to be afflicted by (after vaginal bleeding), therefore, women do perceive it to be a serious and undesirable condition (Christian et al. 1998). Women often attribute the cause of night blindness to pregnancy, weakness, or "hotness"¹¹, rather than poor diet, and thus do not consider diet to be related to the treatment either.

Anaemia

Anaemia is caused by nutritional deficiencies and parasitic/chronic infection, as well as by malarial infection and genetic factors (Dreyfuss et al. 2000; Brooker et al. 2008). It is an indirect cause of maternal mortality in Nepal (GoN 1998) and can lead to increased risk of heart failure, reduced blood reserves against haemorrhage, preventing recovery from haemorrhage or infection (Christian et al. 2008; Kafle et al. 1996). Anaemia can be

¹⁰ Night-blindness, or Xerophthalmia, is a dietary micronutrient deficiency in vitamin A, also known as retinol.

¹¹ Consumption of "hot" foods during pregnancy is thought to be bad, while "cold" food is considered good; from the Asian hot-cold classification system in which the body must be in perfect humoral balance.

debilitating for women as they lack energy to work and to care for their children (Brooker et al. 2008). Anaemia is associated with increased risk of preterm delivery and low birth weight in Nepal (Bondevik et al. 2001).

South Asian countries have the highest prevalence of iron-deficiency anaemia in the world (Chandyo et al. 2006). The NDHS 2006 found that about one third (36%) of women of reproductive age in Nepal are anaemic (NDHS 2006) and 29 percent are mildly anaemic, which represents a decline since 1998 when the National Micronutrient Status Survey (NMSS 1998) estimated it to be 68 percent. (The latter figure must be interpreted with caution, given that survey methodology is different.) Among women of reproductive age, pregnant women are worst affected by any form of anaemia (42%), followed by breastfeeding women (40%) and those who are neither pregnant nor breastfeeding (34%). In the Southeastern plains of Nepal, one third of pregnant women in their first trimester were anaemic (Jiang et al. 2005). The prevalence of anaemia and severe anaemia in pregnant Nepali women was 62 percent and 4 percent (N=2,280) between 1994-5, respectively, in a hospital-based study in Kathmandu (Bondevik et al. 2000). Among healthy women of reproductive age in Bhaktapur, in the Kathmandu valley (N=500), the prevalence of anaemia was 12 percent, the prevalence of depleted iron stores was 20 percent, and the prevalence of iron deficiency anaemia was 6 percent. Over half (54%) of the women in the study ate less than the recommended iron intake and 76 percent had energy intakes lower than the recommended dietary allowance of 2200 Kcal/day (Chandyo et al. 2006). A study of pregnant women in Sarlahi district found that 73 percent were anaemic and 20 percent had moderate to severe anaemia; hookworm infection intensity, vitamin A deficiency and *Plasmodium vivax* malaria infection were predictors of anaemia and iron deficiency (Dreyfuss et al. 2000). The high prevalence of hookworm infection, which causes blood loss, especially *Ancylostoma duodenale* (which causes greater blood loss than other hookworm species) is a risk factor for anaemia in Nepal (Navitsky et al. 1998).

Uterine Prolapse

Uterine prolapse is a common reproductive morbidity in Nepal, with many women suffering in silence, unaware that it can be surgically treated, or lacking access to treatment. "Recent studies have shown that the prevalence of prolapsed uterus ranges from 10 to 40 percent" (UK APPG 2009). In Bhaktapur district, a study found that prevalence of prolapse in women aged 20 years and over was 8 percent (Maharatta & Shah 2003). Of gynaecological patients attending Kathmandu Maternity Hospital, 10 percent suffered of uterine prolapse (Ranabhat 1997). Reportedly, in the Kathmandu Valley, surgery for prolapse is the second most common operation in the gynaecological department of the major hospitals (UNFPA & IOM 2006). A community-based survey in 8 districts of Nepal estimated that 10 percent of reproductive age women examined (N=2,070) had some degree of pelvic organ prolapse (UNFPA & IOM 2006; Gurung et al. 2007), translating into an estimated 600,000 Nepalese women suffering from vaginal prolapse (UNFPA, 2006). In 2003, 51 percent of women presenting at a gynaecological camp at the district hospital in Chainpur had uterine prolapse, and 18 percent of these women had utero-vaginal prolapse, followed by sub-fertility (14%) and reproductive tract infections (RTIs; 14%) (Tuladhar 2005). A cross-sectional study conducted in three health camps in the *terai* region established that pelvic-organ prolapse was the second most prevalent morbidity (after STIs; 30%), with a 20 percent prevalence (Dangal 2008).

A community-based field survey in eight districts of Nepal found that prevalence of uterine prolapse was higher in the *terai* regions of Saptari (28%), Mahottari (7%), Kapilbastu (11%) and Rautahat (45%), where collective prevalence was (9%), in contrast to the Hill regions of Baglung (3.5%), Dadeldhura (18%), Jumla (4%) and Dang (3%), where

prevalence was much lower (1%). The proportion of women from different castes who were suffering from prolapse varied widely, e.g. 11 percent of Newar and Yogi/Giri/Bharati women compared to no women suffering prolapse in the Brahmin and Chhettri from the *terai* castes (UNFPA & IOM 2006; Gurung et al. 2007).

Table 2.4: Prevalence of Prolapsed Uterus

Reference	Date of Study	Location	Study Population	Sample Size	Prevalence of Prolapsed Uterus
UK APPG, 2009	2009				10 to 40%
Dangal, 2008	2008	Three health camps in the Terai region	Women presenting at 3 health camps in Terai region		20.1%
UNFPA and IOM, 2006	2006	Kathmandu Valley	Gynaecological patients attending major hospitals in Kathmandu valley		Surgery for prolapse is the second most common operation
UNFPA and IOM, 2006; Gurung et al. 2007	2006	8 districts	Reproductive age women	2,070	Pelvic organ prolapse: 10% Vaginal prolapse: 600,000 Nepalese women
UNFPA and IOM, 2006; Gurung et al. 2007	2006	8 districts			Saptari: 27.6% Mahottari: 7.4% Kapilbastu: 11.2% Rautahat: 44.5% Terai (Collective): 8.8% Baglung: 3.5% Dadeldhura: 17.7% Jumla: 4.2% Dang: 2.8% Hills (Collective): 1.2%
Maharatta and Shah, 2003	2003	Bhaktapur	Women aged 20 years and over		7.55%
Tuladhar, 2005	2003	Chainpur, Sankhuwasa bha	Women presenting at a gynaecological camp at the district hospital		Uterine prolapse: 51.1% Utero-vaginal prolapse :18.3%
Ranabhat, 1996	1996	Kathmandu Maternity Hospital	Gynaecological patients attending Kathmandu Maternity Hospital		9.6%

Though its exact aetiology is unclear, vaginal prolapse is thought or perceived to be the result of mismanagement of labour from untrained personnel; minimal rest after childbirth; multiparity; rapid succession of pregnancies; early return to heavy agricultural workloads, lifting heavy loads and strenuous activity post-partum; advanced age (incidence rises with age); menopause; instrumental delivery; prolonged second stage of labour causing undue stretching of pelvic floor muscles and congenital weakness of the pelvic floor muscle; excess intra-abdominal pressure; and conditions may be accentuated by wearing tight *patuka*¹² during the postpartum period with the increase in the abdominal pressure compounding factors; (Bonetti et al. 2004; UNFPA & IOM, 2006; Ranabhat 1996; UNFPA and IOM, 2006; Gurung et al. 2007).

A quarter of prolapse cases were found in women below age 35, including 3 percent of cases found in the 15-19 age group. Half of the cases (5%) were in the 35+ age group, with the mean age for first suffering of/noticing prolapse calculated to be 27.9 years. Almost a third (30%) of women first noticed it after their first delivery and 45 percent noticed it after their second and third. Ten percent first had it after their fourth and fifth deliveries" (UNFPA & IOM 2006; Gurung et al. 2007). Worst of all, the mean duration of

¹² The *patuka* is a special piece of cloth worn around the waist in Nepal when carrying heavy loads.

suffering was 7.89 years. Seventy three percent had suffered from prolapse for less than 11 years, but 21 percent had suffered from it for 11-20 years.

“Heavy work during and immediately after pregnancy are major risk factors. Women are able to push their uterus back inside themselves when they are lying down, so their husbands continue to have sex with them and they continue to have babies. When they are pregnant, the uterus expands so that it doesn’t prolapse. When they are not pregnant, they put things like rocks inside themselves to try to stop the prolapse” (UK APPG 2009).

“Women in Nepal have to carry heavy loads – soon after labour – and they also live and work in smoky kitchens where the chronic coughing makes things worse. This is often thought of as a problem of older women, but we have found women as young as 16 and 17, just married, with prolapse. And they can never tell anyone about it; the shame and embarrassment is too much” (UK APPG 2009).

The adverse effects reported included long standing backache; urinary complaints (including difficulty urinating, burning upon urination); abdominal pain; ulcer on the prolapse; painful intercourse; white watery discharge; foul-smelling discharge; itching; difficulty in passing stool; difficulty lifting, sitting, walking and standing (Bonetti et al. 2004; UNFPA & IOM 2006; Gurung et al. 2007).

2.7 Maternal Mortality

The two main sources of data providing national level MMR estimates are the NDHS/NFHS and the World Health Organisation (WHO). Other sources of data on maternal deaths in Nepal include surveillance data from Mother and Infant Research Activities (MIRA) and the government Health Management Information System (HMIS) data.

The 1996 NFHS reported an MMR of 539 maternal deaths per 100,000 live births, with a 95 percent confidence interval¹³ (CI) of 392-686. The 2001 NDHS did not attempt to measure maternal mortality and the 2006 NDHS reported an MMR of 281 maternal deaths per 100,000 live births, with a 95 percent confidence interval of 178-384. The point estimates of the MMR suggest that maternal mortality has declined by 48 percent over the last ten years, i.e. nearly halved. However, the confidence intervals for the two time periods are large, reflecting the limitations of the method used in producing a point estimate, but they do not overlap, and thus suggest that there has been a statistically significant reduction in MMR over the ten year period. Taking the lower end of the 1996 CI (392) and the upper end of the 2006 CI (384) suggests that the minimum amount the MMR has reduced by is 2 percent. Taking the upper end of the 1996 CI (686) and the lower end of the 2006 CI (178) this suggests that the maximum amount the MMR has reduced by is 74 percent. There is a big difference between a reduction of 2 percent and a reduction of 74 percent in MMR over the last ten years, but statistically, the true reduction is most likely to be closer to the difference between the two point estimates, i.e. 48 percent than the outer bands of the confidence intervals.

The DHS estimates have various limitations. The most recent NDHS uses a variant of the sisterhood approach called the *direct sisterhood* method. The sisterhood method obtains information by interviewing a representative sample of respondents about the survival of all of their adult sisters to overcome sample size problems and hence reduce costs. There is a problem with selectivity, since those interviewed have survived themselves, then due

¹³ Instead of just estimating MMR by a single value, the CI provides an interval that the actual MMR is likely to fall into, thus providing a greater reliability of the estimate.

to genetic or family clustering of deaths; they may be less likely to have siblings who have died. A recent study estimated that this may distort and underestimate MMRs by up to 50 percent. The direct approach relies on fewer assumptions and collects more information than the original indirect method, but requires larger sample sizes and the analysis is more complicated. The DHS estimates a MMR for the whole country based on a very small number of maternal deaths: 87 in 1996 and 39 in 2006. The method produces large confidence intervals: 392 to 868 in 1996 NDHS, and 178 to 384 in 2006 NDHS. The data is collected retrospectively and the reference period for both the 1996 and 2006 surveys is 0-6 years before the survey, so the most reliable estimate is for a point at about three years before the survey. Therefore the 1996 and 2006 DHS findings relate more accurately to 1993 and 2003. The sisterhood method is a time of death measure rather than cause of death measure and hence identifies *pregnancy related* deaths rather than maternal deaths. However, this is not likely to change the estimate significantly as the difference between these two measures is likely to be small. Suicides and abortion-related deaths may also be under-reported: relatives may not know that the deceased had an abortion or may not report this if they did know, especially when abortion was illegal in Nepal. However, the problems relating to the under-reporting of suicides and abortion related deaths are not specific to the sisterhood method and are common in most methods trying to estimate maternal mortality.

To estimate the MMR for Nepal WHO estimates the proportion of maternal deaths among all deaths of females of reproductive age (PMDF). In 1995 the PMDF was estimated by WHO to be 23 percent and this produced a MMR of 826, but they failed to provide any confidence intervals/uncertainty bounds. The 1996 NDHS found the PMDF was 27 percent, and if the 1995 WHO estimates were revised to take this into account the estimated MMR would be higher than 826. In 2000 WHO estimated the PMDF to be 24 percent, producing a MMR of 740, with a range of uncertainty from 440-1100. In 2005 WHO estimated the PMDF to be 22 percent, which produced an estimated MMR of 830, with uncertainty bounds was between 290 and 1900. The 2006 NDHS was produced after the WHO 2005 estimate and found the PMDF to be 18 percent. If the 2005 WHO estimates were revised to take this into account the estimated MMR would be lower than 830. To enable a comparison with the 2000 data WHO revised the 2005 estimate using the same methodology and estimates suggest a drop from 740 to 670 from 2000 to 2005. However, no uncertainty bounds were calculated.

Like the DHS estimates, the WHO estimates also have limitations. In 2000 WHO applied the observed PMDF from the sisterhood data to the number of non-HIV female deaths aged 15 to 49, estimated by WHO for the year 2000, to calculate maternal deaths. The MMR was then obtained by dividing total maternal deaths by the estimates of live births as reported in the United Nations Demographic Yearbook. The method is not ideal as the numerator and denominator come from different sources. Furthermore, in order to calculate the number of deaths to women of reproductive age the female mortality schedule used by the Population Division to project the population of the country is used. The age specific death rate obtained from the model life table is open to criticism as not being suitable for this type of estimation. In 2005, Nepal was in Group H - where no reliable/comparable nationally representative estimates are available. In this group the PMDF estimate is derived from a regression model that takes into account national levels of fertility, economic status and the coverage of skilled birth attendants. These selected variables were based on relationships between PMDF and socio-economic and programmatic variables in countries with reliable data for the appropriate time period, not relationships within Nepal. Therefore the contexts of these countries may be different and not applicable to Nepal. Hence there is no guarantee that the country specific point estimates obtained through the statistical model represent the true levels of maternal mortality. The wide lower and upper margins around the estimated figures reflect such uncertainty.

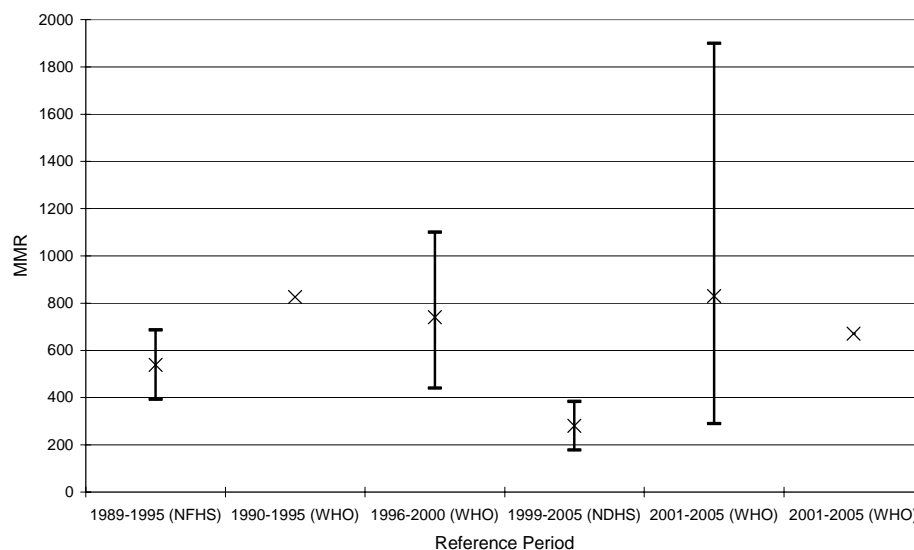
Even within the same context the PMDF is likely to vary over time - as has been found in the DHS in Nepal. The WHO models have the benefit that they do not require any calculation or collection of maternal mortality data. However, they are only as good as the model and the predictor variables they comprise. Many people using the WHO data would be unaware that levels of skilled attendance is already taken into account in the MMR estimation and hence looking at the relationship between the WHO MMR and levels of skilled attendance would be inappropriate. It would be better to estimate MMR without including skilled attendance in order that this relationship can be truly assessed. The availability of data for the five-year window of estimation may distort the estimation, as data towards the latter part of the time period may not be available. WHO uses different methodologies to estimate the MMR in different countries and for different time points depending on data availability. Nepal falls into category C in the 2000 estimates (direct sisterhood estimates) and into category H in the 2005 estimates (no national data). Therefore the 2000 and 2005 estimates are not comparable. The 2005 WHO estimate book cautions *"It should be noted that these findings represent an update of existing information with recent data and methodologies which have improved since the development of previous estimates. Therefore, the figures should not be compared with those from the previous exercise to assess the change in time."* (WHO 2007: 19). The whole purpose of MDG 5 is to look at the reduction in MMR over time. This makes it difficult to use the published WHO estimates if different methodology is used at different time points. The unpublished WHO 2005 revised estimate has used the same methodology as 2000 to enable a comparison to be made. Using the same methodology WHO estimates suggest a drop from 740 to 670 from 2000 to 2005. No uncertainty bounds were calculated, but given that the point estimate of 670 falls within the large uncertainty bounds around the 2000 estimates (440-1,100) it suggests that there is not a significant reduction in mortality.

Table 2.5: Maternal Mortality Data for Nepal, WHO and DHS 1990-2005

Source of data	Reference period	Maternal Mortality Ratio (MMR)	95% Confidence Interval or Uncertainty Bounds	Number of maternal deaths estimate is based on	PMDF***	Method
WHO & UNICEF (1990)	1990	1538	1121-1989	11752****	41%	Regression model used to calculate PMDF
WHO & UNICEF Revised (1990)	1990	1500	-	11000****	na	Regression model used to calculate PMDF
NFHS (1991)	1977-1981	515	Na	613	24%	Sisterhood Indirect
NFHS (1996)	1989-1995	539	392-686*	87	27%	Sisterhood Direct
WHO, UNICEF & UNFPA (1995)	1995	826	-	6332****	23%	Regression model used to calculate PMDF
WHO, UNICEF & UNFPA (2000)	2000	740	440-1100**	6000****	24%	Regression model used to calculate PMDF
NDHS (2006)	1999-2005	281	178-384*	39	18%	Sisterhood Direct
WHO, UNICEF & UNFPA (2005)	2001-2005	830	290-1900	-6500****	22%	Regression model used to calculate PMDF
WHO Revised & unpublished (2005)	2001-2005	670	-	-		Regression model used to calculate PMDF

* 95% Confidence Interval ** Uncertainty Bounds *** PMDF - the proportion maternal among deaths of females of reproductive age **** Estimated number of maternal deaths

Figure 2.5: Maternal Mortality Ratio (MMR) Estimates in Nepal (1996-2005) with Confidence Intervals/Uncertainty Bounds



In regards to surveillance data, the MIRA trial in Makwanpur District measured all maternal deaths prospectively from 2001 till 2003 in a cohort of 28,931 women in 42 VDCs in Makwanpur district. They found an MMR of 341 per 100,000 live births in their control clusters. The limitations of this method are the small sample size and the small geographical area covered, making it difficult to make national level estimates from this data. However, for the area covered, the methodology is far more robust than that used by the DHS or WHO as it is actually measuring MMR prospectively rather than estimating it retrospectively. Therefore for the small area that it covers it is a robust indicator of the actual level of MMR.

HMIS data show a substantial reduction in the MMR over time, from 482 to 148, i.e. far lower than those reported by DHS and WHO (Table 2.6). The maternal mortality 'ratio' estimated for HMIS is not strictly a ratio. The ratio should be the number of maternal deaths divided by the number of live births, however, here the HMIS use the number of women that give birth in hospitals as the denominator. The hospital data in HMIS gives deliveries, live, still births and maternal deaths but is not available for all years. Furthermore, facility based data are not representative as the percentage delivering in facilities is low and those who do end up delivering at facilities may be more likely to be suffering from complications. There is also likely to be some misclassification of maternal deaths, with many likely to go unreported. The numerator, the number of maternal deaths, only includes those women who die at the facility itself and do not cover deaths that occurred after discharge from the facility.

Table 2.6: Nepal HMIS Data on Maternal Mortality 1996-2003

Year	Total pregnant women who give birth in hospitals	Total maternal deaths in hospitals	Maternal mortality 'ratio'
1996/1997	53,105	256	482
1997/1998	73,661	342	464
1998/1999	125,479	277	221
1999/2000	129,583	369	285
2000/2001	136,231	373	274
2001/2002	152,088	300	197
2002/2003	254,999	378	148

Source: HMIS Annual Report.

A review of available data and consideration of their limitations shows that it is very difficult to estimate current, or 1990 baseline, MMR levels, and hence the size of the decline. The DHS estimates suggest a much greater decline and far lower levels of MMR than the WHO estimates. The difference between the DHS point estimates would suggest Nepal is on track to reach the Millennium Development Goal regarding the MMR with a reduction of 48 percent over the last ten years. The difference between the WHO estimates suggests a decline of 19 percent, however uncertainty bounds are not provided, and if they were they would overlap. The data from Makwanpur district, 31st in out of the 75 districts in human development index ranking, suggesting an MMR of 341 per 100,000 live births for the time period 2001 to 2003 this gives further support to the DHS figure. Overall the data over the last ten years suggest a decline in maternal mortality. Against a background of stagnating maternal mortality ratios worldwide and the recent political conflict this is a considerable achievement for Nepal. This decline has taken place despite low percentages of skilled attendance suggesting that other factors have contributed to this decline and stresses the importance of understanding the impact of other factors and not using SA as a proxy indicator of MMR. Access to EOC and C/S has more than doubled over the time period, with the met need for c/s increasing seven-fold, although overall levels are still low. Despite the decline in maternal mortality, doubt still remains over the likelihood of achieving the fifth Millennium Development Goal (MDG 5), cutting the MMR to three-quarters of its 1990 value to 134/100,000 by 2015 (GoN & UN 2005). The ability to generate estimates with higher precision and accuracy and to truly understand any disparities would be greatly facilitated if country civil registration systems were further improved. This improvement would obviate the need to conduct special maternal mortality studies (which are time-consuming, expensive, and of limited use in monitoring trends) or to employ statistical models (that have their own weaknesses). It is also important to remember that when looking at national averages that these can hide wide disparities. Averages give a good sense of overall progress, but can be misleading. Good assessment of progress must go beyond national indicators to understand true situation. Improvement in a national indicator does not mean improvement for all groups. Groups for which progress is fastest seldom represent the disadvantaged people. A country may be on progress for reaching national target yet situation for disadvantaged may be stagnant or deteriorating. Good civil registration systems would enable any disparities to be monitored. To continue to reduce the MMR further, and thus reach MDG 5, groups with the highest MMR will need to be targeted. If disparities widen, the informational value of national rates decreases and may lead to misleading conclusions.

2.8 Maternal Health Care Policies

Safe Motherhood was identified as a priority programme in the GoN National Health Policy 1991. A National Safe Motherhood Policy was formulated and endorsed by the Ministry of Health in July 1998. The policy placed emphasis on strengthening maternity care, including family planning services, at all levels of the health care delivery system; enhancing technical skills of the health care providers at all levels; and strengthening referral services for emergency obstetric care. Table 2.7 summarizes the health policies in Nepal with focus on maternal health issues.

Table 2.7: Maternal Health Policies in Nepal

Plan and Policy	Reference Year	Maternal Health Priorities
Long Term Health Plan - I	1975 - 1990	<ul style="list-style-type: none"> Integrated community health (including maternal health) development through primary health care
National Health Policy	1991	<ul style="list-style-type: none"> Identified safe motherhood as a major component of primary health care and a priority programme for reducing the high maternal mortality ratio in Nepal. Strengthening maternity care including family planning services at all levels of the health care delivery system, enhancing technical skills of the health care providers at all levels and strengthening referral services for emergency obstetric care. Invested in MCHWs and ANMs - grassroots health workers responsible for providing maternal and child health services, obstetric first aid and referrals at the village level.
National Safe Motherhood Plan of Action	1994-97	<ul style="list-style-type: none"> Identified priority activities for Safe Motherhood Recognized high maternal mortality rate as one of the major public health problems and set priority to the Safe Motherhood Programme to reduce maternal deaths and disabilities.
Long Term Health Plan - II	1997-2017	<ul style="list-style-type: none"> Improving health status of vulnerable groups of people including women Ensuring appropriate numbers, types and distribution of technically competent and socially responsible health personnel to provide quality health care
National Safe Motherhood Policy	1998	<ul style="list-style-type: none"> Strengthening maternity care including family planning services at all levels of the health care delivery system; Strengthening technical capacity of maternal health care providers at all levels; and Strengthening referral services for emergency obstetric care.
Safe Motherhood Plan of Action	2001 - 2015	<ul style="list-style-type: none"> Envisages establishment of BEOC and CEOC services in all 75 districts; skilled attendance at birth and increased access to emergency fund and transportation.
National Safe Motherhood Plan	2002 - 2017	<ul style="list-style-type: none"> Envisages establishment of BEOC and CEOC services in all 75 districts National and local advocacy and BCC to keep safe motherhood on the national policy agenda and to influence family and community attitudes Increased access to emergency fund and transportation Increased prioritization of skilled attendance strategy Pilots and scale up of interventions to increase utilization skilled attendance and use of EOC services Strengthen FCHV programme by motivation and educate FCHVs and mothers for the best utilization of available services
Tenth Plan	2002-2007	<ul style="list-style-type: none"> Emphasized on the safe-motherhood program, expanded program of vaccination, family planning, reproductive health program and FCHVs. Proposed for CEOC in 10 hospitals and BEOC in 50 hospitals throughout the nation
Nepal Health Sector Program - Implementation Plan	2004-2009	<ul style="list-style-type: none"> Emphasized provision of round the clock emergency obstetric care Ensuring the presence of skilled attendants at deliveries, especially in the home setting Advocates a multi-sectoral approach in Safe Motherhood Programme to include both health and non-health

Plan and Policy	Reference Year	Maternal Health Priorities
		interventions that promotes access to and utilization of services
National Policy for Skilled Birth Attendants	2006	<ul style="list-style-type: none"> ▪ Addresses the challenges related to human resource development and management; socio-economic and cultural barriers to accessing SBAs; high unmet need for emergency obstetric care; and weak referral back-up. ▪ Emphasizes on the availability, access and utilization of skilled care at every birth for reducing the high MMR. ▪ Ensures that sufficient numbers of SBA are trained and deployed at primary health care levels with the necessary support system; ▪ Strengthens referral systems for safe motherhood and newborn care, particularly at the first referral level (district hospitals); ▪ Strengthens pre-service and in-service SBA training institutions to ensure that all graduates will have the necessary skills; ▪ Develops regulating, accrediting and licensing systems for ensuring that all SBAs have the abilities and skills to practice in accordance with the required core competencies.
National Safe Abortion Policy	2006	<ul style="list-style-type: none"> ▪ Realizes and addresses the causal relationship between abortion and maternal mortality ▪ Protects the rights of women to continue or discontinue an unwanted pregnancy within the legal framework ▪ Calls for incorporating comprehensive abortion care services into the national reproductive health strategy and making the services safe, accessible, affordable and available with equity and equality for all women ▪ Takes initiatives to disseminate the information on legal provision of safe pregnancy termination and the complications of unsafe abortion to policy makers, communities and especially to women of reproductive age. ▪ Identifies and addresses the need of trained human resource for CAC services, role of non-government and private sectors, institutional arrangements and research
Safe Motherhood and Newborn Health Long Term Plan	2006 - 2017	<ul style="list-style-type: none"> ▪ Improved maternal and newborn health and survival especially of the poor and excluded ▪ Improve equity/access, service, public private partnership, decentralization, human resource development (skilled birth attendant strategy), information management, physical asset, procurement and finance.
Three Year Interim Plan	2007- 09	<ul style="list-style-type: none"> ▪ Aims at improving health status of all the Nepalese people with the provision of equal opportunity and quality health care services to all. ▪ Lays a foundation for community health by increasing investment in rural health

Targets for Maternal Health

Table 2.8 presents the GoN targets related to maternal health.

Table 2.8: Maternal Health Targets and their Status by 2008

Plan and Policy	Maternal health indicators/Reference period	Target
National Health Policy (1991)		
Second Long Term Health Plan (1997-2017)	Pregnant women going for more than four ANC visits by 2017	80%
	MMR per hundred thousands live births by 2017	250
National Safe Motherhood Policy (2002-2017)	Establishment of BEOC and CEOC services by 2017	75 districts
	Births attended by skill attendants by 2017	All births
	Increased access to emergency fund and transport services by 2017	
Tenth Plan (2002-07)	Number of CEOC sites	10
	Number of BEOC sites	50
Nepal Strategic Plan for Human Resources in Health Sector (2003 - 2017)	Number of ANM and staff nurse in each health post by 2017	2 ANM 1 staff nurse
	Number of ANM in each sub health post by 2017	2 ANM
Nepal Health Sector Program - Implementation Plan (2004-09)	MMR per 100,000 live births by 2007	340
	MMR per 100,000 live births by 2017	300
	% of deliveries conducted by health workers by 2007	18%
	% of deliveries conducted by health workers by 2017	80%
	% of women attending 4 ANC visits by 2007	25%
National Policy for Skilled Birth Attendants (2006)	% of women attending 4 ANC visits by 2017	40%
	% of deliveries conducted by SBAs by 2015	60%
	Provide safe abortion services by certified provider as provisioned by law	NA
MDG	MMR per 100,000 live births by 2015	134
Three Year Interim Plan	MMR per 100,000 live births	250
	Women receiving 4 times pre-natal care	40%
	Delivery attended by trained health worker	35%
	Contraceptive prevalence rate	53%

2.9 Maternal Health Interventions in Nepal

Table 2.9 summarizes maternal health interventions in Nepal in the last decade. A review of these interventions reveals that the main strategy for demand creation is through community mobilisation and for the supply side strengthening of facility-based health services through training health workers, development of systems, and improving the physical infrastructure.

Table 2.9: Maternal Health Interventions in Nepal

Programme	Agencies involved	Duration	Districts	Strategy	Key achievements
Mother and Infant Research Activities (MIRA)	MIRA	1992 - present	2 districts: Makwanpur, Dhanusha	<ul style="list-style-type: none"> A large scale cluster randomized controlled trial in which one facilitator facilitates a number of women's groups as they move through a four-phase participatory action cycle addressing issues of pregnancy, childbirth and newborn health. 	<ul style="list-style-type: none"> Reduction of 78 percent in maternal mortality and 30 percent in neonatal mortality over a period of three years. Different cadres of health workers, including FCHVs and TBAs, trained in maternal and essential newborn care
Nepal Safe Motherhood Project (NSMP)	FHD, Options & DFID	1997-2004	10 districts: Dadeldhura, Dailekh, Surkhet, Myagdi, Baglung, Parbat, Rupandehi, Nawalparasi, Chitwan, Morang	<ul style="list-style-type: none"> Improve the quality and quantity of midwifery and EOC services through strengthened service provision (infrastructure, equipment/supplies and training) Increase access to services by stimulating demand for EOC services and reducing barriers to access through improving the social context for midwifery/obstetric services Influence and inform government policy and planning processes through the dissemination of lessons learnt 	<ul style="list-style-type: none"> Strengthened 24 hour delivery services, including BEOC and CEOC at community, PHCC and district hospitals. Increased service utilization including met need for CEOC and BEOC Improved clients' knowledge of danger signs and timely referral to appropriate facility Established functional emergency transport, blood and financing schemes in the project areas
Decentralized Action for Children and Women (DACA)	Ministry of Local Development, UNICEF, UNDP	1998 - 2006	15 districts:	<ul style="list-style-type: none"> Community action process and rights based approach was used to enhance the capacity of families and communities to undertake their own development including women's access to maternal health services. 	<ul style="list-style-type: none"> The proportion of women making at least one ANC visit, 4 or more ANC visits and women taking TT injection and iron tablets during pregnancy in the project districts was better than that of the respective eco-development regions. Significant improvement in institutional delivery Government health facilities were visited more often than the private ones. Utilization of postnatal care services in the project districts was higher than the national average.
Strengthening Essential Newborn Practices (SNL)	FHD	2003 - 2004	Kailali	<ul style="list-style-type: none"> FCHVs promoted a focused set of messages through interpersonal communication and interaction with mothers' groups. Messages delivered by FCHVs were reinforced by a multi-media communication campaign. 	<ul style="list-style-type: none"> Large positive changes in household level health practices, behavior and community acceptance.

Programme	Agencies involved	Duration	Districts	Strategy	Key achievements
Increasing Access to Quality Postnatal Care	FHD, SNL	2003 - 2004	Kailali	<ul style="list-style-type: none"> Community based volunteer health workers were trained and supported to provide structured home-based post-delivery care to postpartum mothers and newborns. 	<ul style="list-style-type: none"> Post natal care of reasonable quality was provided to the community people Community acceptance Enhancement of ability and motivation of volunteers
Birth Preparedness Package	FHD, SNL	2003 - 2004	Siraha	<ul style="list-style-type: none"> Community health workers used interpersonal communication to encourage pregnant women and family members to plan for normal pregnancies, deliveries, and postnatal periods, and for managing emergencies if they occur. 	<ul style="list-style-type: none"> 50 percent program coverage Substantial improvement in most aspects of birth preparedness - women's knowledge, utilization of health care, preparation for delivery. Utilization of SAB, however, remained same during the program period.
National Birth Preparedness Package (BPP)	FHD, UNICEF, BNMC, ADRA, CECI, NSMP, EAP and Merlin	2005	34 districts:	<ul style="list-style-type: none"> FCHVs use BPP tools (flip charts and key chains) to communicate health messages to pregnant women and their family members through inter personal communication. 	<ul style="list-style-type: none"> BPP tools are found informative, attractive, handy, and easy to understand and use for health workers and clients Increase in utilization of ANC, delivery and PNC services in program area Families and communities have established functional emergency transport, blood donor and financing schemes In addition to serving as a source of information, the BPP is found to have catalyzed communication between spouses and among family members
Support to Safe Motherhood Program (SSMP)	FHD and Options/DFID	2005 - 2009	70 districts	<ul style="list-style-type: none"> Support technically and financially the Family Health Division of DoHS to implement safe motherhood programs throughout the country. Strengthen both the supply and demand sides to increase access of poor and marginalized people to emergency obstetric care services. 	<ul style="list-style-type: none"> Strengthened policy development and planning Developed and strengthened 36 CEOC and 40 BEOC facilities across the country Supported in construction of 127 sites to enable the provision of 24-hour birthing services and a number of other health facilities Developed a database inventory of existing government health facilities in coordination with DUDBC.

Programme	Agencies involved	Duration	Districts	Strategy	Key achievements
Equity and Access Program (EAP)	FHD, Options/DFID, ActionAid/ New ERA, JHU	2005 - 2009	10 districts Dadeldhura, Dailekh, Surkhet, Myagdi, Baglung, Parbat, Rupandehi, Nawalparasi, Chitwan, Morang	<ul style="list-style-type: none"> Stimulate demand and increase the access of women to maternal and neonatal health services, with particular emphasis on poor and excluded communities. 	<ul style="list-style-type: none"> Increased use of maternal health services by the socially excluded people in the program areas.
Community-based Maternal and Neonatal Care (CB-MNC) Program	FHD, USAID, NFHP	2005 - ongoing	3 districts: Jhapa, Banke, Kanchanpur	<ul style="list-style-type: none"> Contacts between FCHVs and early postpartum women for counseling, dispensing commodities, documentation, assessment and referral as needed. Distribution of misoprostol to pregnant women as protection against PPH Promote birth preparedness Maternal mortality surveillance to assess impact of the misoprostol intervention in Banke district 	<ul style="list-style-type: none"> FCHVs established as a cadre of first contact for a significant proportion of pregnant women and their families Increase in service utilization: births attended by SBAs and institutional delivery; use of commodities like tetanus vaccination, deworming tablet and iron folate Increase in birth preparedness index From November 2005 to December 2007, a total of 34 maternal deaths were identified in Banke district indicating a significant reduction in maternal mortality.
Safe Delivery Incentive Programme (SDIP) formerly known as Maternity Incentive Scheme (MIS)	FHD and DFID	2005	75 districts (All)	<ul style="list-style-type: none"> Increase the demand for maternity services and improve access to such services Encourage women to deliver in health facilities where services are available from SBA. Provide a cash incentive to all women who deliver at a facility to help cover costs incurred in accessing the service; to trained health workers who attend the deliveries in facilities and at home, and provide free delivery services for complications in the most disadvantaged areas in the country. 	<ul style="list-style-type: none"> Increase in births attended by SBAs Increase in institutional delivery The process evaluation of MIS has indicated a need to strengthen the monitoring of MIS
<i>Aama Surakshya Karyakram</i> [Free maternity services]	FHD and DFID	2009 -	All 75 districts	<ul style="list-style-type: none"> Provide free maternity services for all the women attending health facilities for maternity services in addition to a cash incentive to cover transportation costs. Provide cash as per the fixed unit cost to the health facilities providing maternity services 	<ul style="list-style-type: none"> Increased institutional deliveries

Programme	Agencies involved	Duration	Districts	Strategy	Key achievements
SUMATA Initiatives (Maternal and Neonatal Health Program)	Ama Milan Kendra, Yala Urban Health Program		2 districts: Baglung, Lalitpur	<ul style="list-style-type: none"> FCHVs and MCHWs encourage pregnant women and their families to prepare and plan for births and the postnatal period and complications/ emergencies that may occur, through personal communication using birth preparedness package keychain and flipcharts. 	<ul style="list-style-type: none"> Birth preparedness increased with the exception of financial planning. The BPP keychain helped in catalyzing ongoing dialogue in the family and community Radio program served as primary source of information about maternal and neonatal issues in the community.
Increasing coverage of skilled birth attendants (SBAs)	GoN,		All 75 district	<ul style="list-style-type: none"> To increase the coverage of SBAs, as a short term measure, doctors, nurses and ANMs are provided with in-service training; and as a mid-term measure, the pre-service training course for ANMs has been restructured to include 18 months midwifery and six months general nursing. 	<ul style="list-style-type: none"> A total of 159 SBAs have been trained from to date. This shows that 4,528 SBAs need to be trained to achieve the goal of 60% of deliveries to be attended by SBAs by 2015 (SSMP, 2008).
Increasing access to emergency obstetric care (EmOC)	GoN, SSMP, UNICEF		22 districts	<ul style="list-style-type: none"> The GoN has the strategy of developing PHCCs and hospitals as BEOC and CEOC sites. For EOC monitoring, FHD has implemented a system based on the UN process indicators in 26 districts. 	<ul style="list-style-type: none"> A total of 36 CEOC and 40 BEOC facilities are currently officially recognized in Nepal. The EOC monitoring system has been established in 22 of the 75 districts. Public B/CEOC sites and limited number of private/NGO facilities in the districts report to the system.
The Birth preparedness package (BPP)	JHPIEGO		All 75 districts	<ul style="list-style-type: none"> The BPP includes preparation for routine birth by selecting a SBA and delivery location; gathering key items for delivery such as a CDK; knowledge of maternal and neonatal danger signs including when to seek help; knowledge of location of emergency services and providers; planning for finances, emergency transportation and medical care; and identification of potential blood donors. A pictorial chart is being used by a network of NGOs and at the community level. 	<ul style="list-style-type: none"> BPP has been one of the main strategies to bring about behavior change and to improve maternal and neonatal health in Nepal.

Programme	Agencies involved	Duration	Districts	Strategy	Key achievements
Female Community Health Volunteers (FCHVs) Programme	GoN, USAID, NFHP	1995 onwards	All 75 districts	<ul style="list-style-type: none"> Population-based approach (based on the number of households in a ward) and ward-based approach (one FCHV per ward regardless of the population). FCHVs serve as a frontline local health resource, providing community-based health education and services, particularly in rural areas, with special focus on maternal and child health and family planning. FCHVs make community-level antenatal contact with pregnant women and their families; provide antenatal and postnatal counseling and advice on the recognition and treatment of danger signs and financial and transport planning for birth; promote and distribute commodities, like tetanus vaccination, de-worming tablet and iron foliate that improve maternal health. 	<ul style="list-style-type: none"> FCHVs are the key referral link between health services and the community. Currently there are about 47,000 FCHVs in rural areas, covering 97% of rural wards and nearly 3,000 in municipalities making a total of about 50,000 in Nepal. FCHVs are stable, reasonably representative of the people they serve - giving them unique access to the community, and motivated to continue working at current or higher levels
Safe Abortion Initiatives	GoN, SSMP, IPAS		75 districts	<ul style="list-style-type: none"> Increase the availability of comprehensive abortion care (CAC) services. 	<ul style="list-style-type: none"> CAC services have rapidly increased with the increase in comprehensive abortion care (CAC) sites and trained CAC service providers. CAC are now available in 75 districts from 245 listed sites from 704 trained providers.

2.10 Summary of Findings

Since the introduction of the Nepal Safe Motherhood Project (NSMP) in 1997 - a response to the international safe motherhood movement - both the provision and uptake of maternal health services have increased substantially in Nepal. However, more is needed in regards to both increasing demand in the community and improving the quality and availability of services.

The TFR declined from 4.1 (NFHS 1996) to 3.1 (NDHS), a one child reduction over a ten year period. This has partly been due to a small increase of 0.6 years in the median age at first marriage. More noticeably, the current use of modern contraceptives increased from 26 percent in 1996 to 44 percent in 2006, although the total unmet need for family planning remains high at 25 percent in 2006.

Despite legalization, complications from unsafe abortion accounted for 28 percent of obstetric complications in the sample districts in 2005-6. One study found that 90 percent of Nepali women are still unaware that abortion has been legalised.

There have been large increases in antenatal care over the last ten years, with an increase in women having at least one ANC check up from 42 percent in 1996 to 74 percent in 2006, and those making four or more visits rising from 9 percent to 29 percent over the same period. In spite of these advances there is still a long way to go in order to meet the target of 80 percent having four or more ANC visits by the year 2017. Institutional deliveries and births assisted by an SBA have doubled over the last ten years, but overall levels remain very low (19% in 2006), and there is a long way to go to reach the target of 60 percent of deliveries by SBAs in 2015. The conventional preference for home, rather than institutional, delivery remains prevalent at 81 percent. Most deliveries are assisted by unskilled birth attendants, with 50 percent attended by relatives and 19 percent by TBAs; while 7 percent unattended. Utilization of postnatal services remains low at 31 percent for the period 2001-2006. Furthermore, only 22 percent of women who have non-institutional deliveries seek care, in contrast to the 85 percent of those giving birth in a health facility.

There has been a significant increase in the implementation of EOCs, with provision of BEOC now threefold what it was in 2005 and CEOC provision having more than doubled; however, the number of facilities providing these services still falls short of the UN's recommended standards.

CHAPTER 3: METHODOLOGY



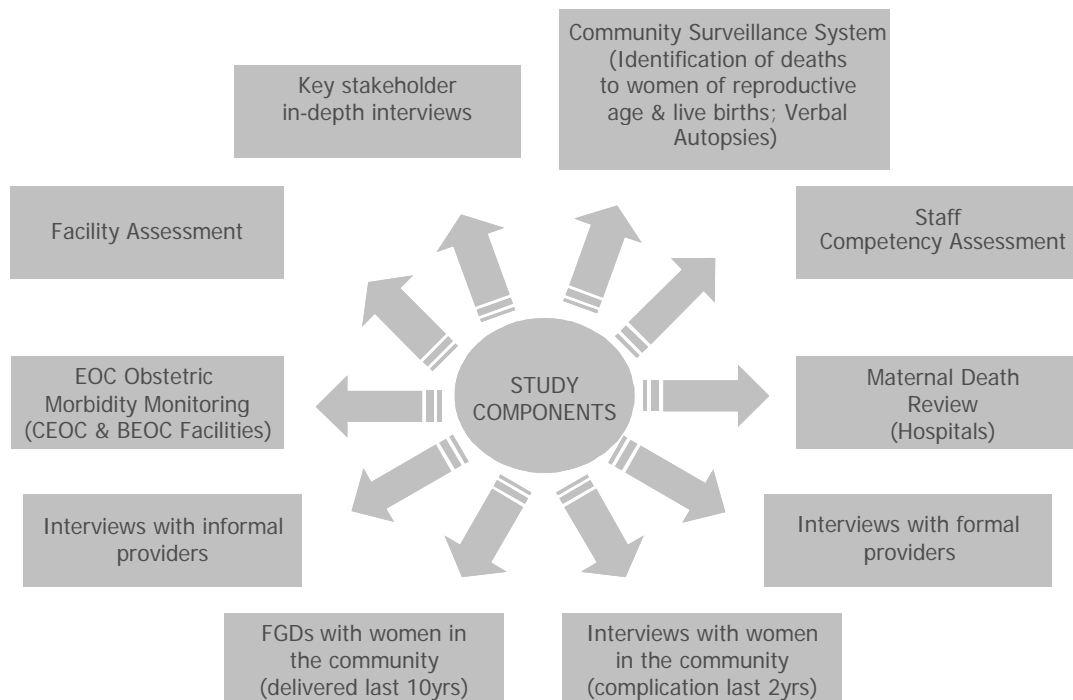
3.0 Introduction

This chapter describes the study components utilised in the study. For each study component the rationale for incorporating it is described, along with the associated methodology, the training and orientation undertaken and the process for data management and analysis.

3.1 Study Components

The MMM study 2008/09 consisted of ten study components (Figure 3.1). Three of these components were in the 1998 MMM study (community verbal autopsy (but no live birth identification); hospital maternal death review and EOC morbidity monitoring) and seven have been introduced for the first time (health facility assessments; staff competency assessments; key stakeholder in-depth interviews; in-depth interviews with formal providers; in-depth interviews with informal providers; in-depth interviews with women who suffered a maternal complication in the last two years and focus group discussions with women who delivered in the last ten years).

Figure 3.1: Study Components



3.2 Community Surveillance System

Objectives

- To identify all deaths to Women of Reproductive Age (WRA)
- To ascertain causes of deaths to WRA
- To identify all maternal deaths (and the % of deaths to WRA that are maternal)

- To ascertain causes of maternal deaths
- To identify and understand factors that may have contributed to maternal deaths.
- To ascertain background characteristics of women who died from maternal causes.
- To identify all live births
- To calculate district level Maternal Mortality Ratios (MMRs)
- To estimate national level MMR, and make comparisons with other data
- To develop community verbal autopsy tools that can be used by the government.

Rationale

Verbal autopsy (VA) is a method of ascertaining the clinical causes of death in a defined population by interviewing those closest to the deceased at the time of death (relatives, friends, neighbours) about symptoms, signs and the circumstances preceding death. This method is very useful to find the cause of death and the factors contributing to the death in countries where majority of deaths occur outside health care facility and where vital registration data are often non-existent, missing, incomplete, inadequate or inaccurate (WHO 1999). The data has shown that medically-certified cause of death data are available only for less than one-third of over 57 million deaths occurring worldwide annually (WHO 2004). The information obtained from VA is useful in development of more comprehensive strategies for prevention of maternal deaths.

Maternal mortality and morbidity study conducted in 1998 had shown that about 80 percent of the maternal deaths had taken place outside the health facility indicating that medically-certified causes of death data are available only for about 20 percent of the maternal deaths in Nepal. Likewise, Nepal Demographic Health Survey 2006 has shown that 81 percent of the deliveries are conducted outside the health facility. Verbal autopsy, therefore, is one of the most appropriate methods of exploring the causes of maternal deaths and the factors that contribute to the deaths in the countries like Nepal where the regular vital registration system is almost non-existent. This study thus, adopted community-based verbal autopsy method to identify deaths to women aged 12-50 years and maternal deaths; ascertain causes of deaths; explore the factors that contribute to the deaths; and assess the socio-demographic characteristics of the women who died from maternal and non-maternal deaths.

Methodology

In Nepal, many maternal deaths occur outside of health facilities and vital registration data is almost non-existent, therefore, a surveillance system was established for the purpose of this study. The surveillance system involves three stages: firstly, identifying live births and deaths to women of reproductive age by community informant and verification; secondly, interviewing relatives using verbal autopsies; and thirdly assigning a cause of death (Figure 3.2). The data collection system has been developed largely utilising government employees and varies slightly between urban and rural areas due to different cadres and responsibilities of government staff.

Stage 1 - Identification of live births and deaths to women of reproductive age by community informant and verification

To identify all maternal deaths we used a process of elimination after first identifying all deaths to women of reproductive age. Female Community Health Volunteers (FCHVs) acted as community informants and identified all deaths to women of reproductive age

and all live births, to those who are 'usually resident' within the eight study districts¹⁴, over a one year period. Each FCHVs covered one ward and were paid an incentive of 30 rupees for every live birth and 50 rupees for every death they correctly identified, along with the necessary contact information.

In rural areas the Mother and Child Health Worker (MCHW¹⁵) visited the FCHVs once a month to collect the information (either on notification cards or verbally), and paid the FCHVs after verification. In urban areas FCHVs were paid an incentive of 150 rupees to visit the nearest government health facility every month to deliver the notification cards, ideally to the Auxiliary Nurse Midwife (ANM). After verification, all payments to FCHVs were made by the ANM. The notification cards were given to the Health Post in Charge (HPIC), who in turn gave them to the District Health Officer (DHO), who in turn gave them to the MMM Study District Coordinator (DC).

Stage 2 - Conduct verbal autopsy for all cause and pregnancy-related deaths

The interviewers (MCHW in rural areas; ANM in urban areas) interviewed those closest to the deceased (relatives, friends, neighbours), preferably those present at the time of death and who knew most about the illness and events leading to the death, individually or in a group, at least 13 days after the death of the woman (to respect the mourning period of the family). In the case of a suspected suicide cases were revisited after 45 days (due to the legal limit).

In the case of all deaths to women of reproductive age, the interviewers asked a series of questions to determine whether the death was pregnancy-related¹⁶ or not (maternal deaths¹⁷ were not ascertained until the cause of death assignment in Kathmandu). Verbal autopsies were used to enable us to collect as much information about the signs and symptoms preceding the death and thus allow a cause of death to be assigned. Furthermore, information was collected on potential underlying factors that may have contributed to the woman's death, as well as their background socio-demographic characteristics. In the case of a non-pregnancy-related death the MCHW or ANM conducted the verbal autopsy, and were paid an incentive of 300 rupees in the hill and terai districts and 400 rupees in the mountain districts per interview. A different verbal autopsy questionnaire was used for the pregnancy-related deaths and these were conducted by the AHW (Auxiliary Health Worker), HPIC, staff nurse, ANM who were paid an incentive of 500 rupees in the hill or terai and 800 rupees in the mountain districts. The MMM District Coordinators attended all pregnancy-related verbal autopsies, and conducted many themselves, to ensure high quality data collection. Furthermore, pregnancy-related verbal autopsies were tape recorded to assist those assigning the cause of death.

Stage 3: Cause of death assignment

For the pregnancy-related verbal autopsies two obstetricians reviewed each completed autopsy questionnaire independently and assigned a cause of death using ICD-10 codes. They were able to listen to the tape recording of the verbal autopsy interview to improve

¹⁴ 'Place of usual residence' has been classified as 'having lived there for the last six months'. If field staff were uncertain, they were advised to include these cases and staffs in Kathmandu were later able to assess whether they should be included or excluded.

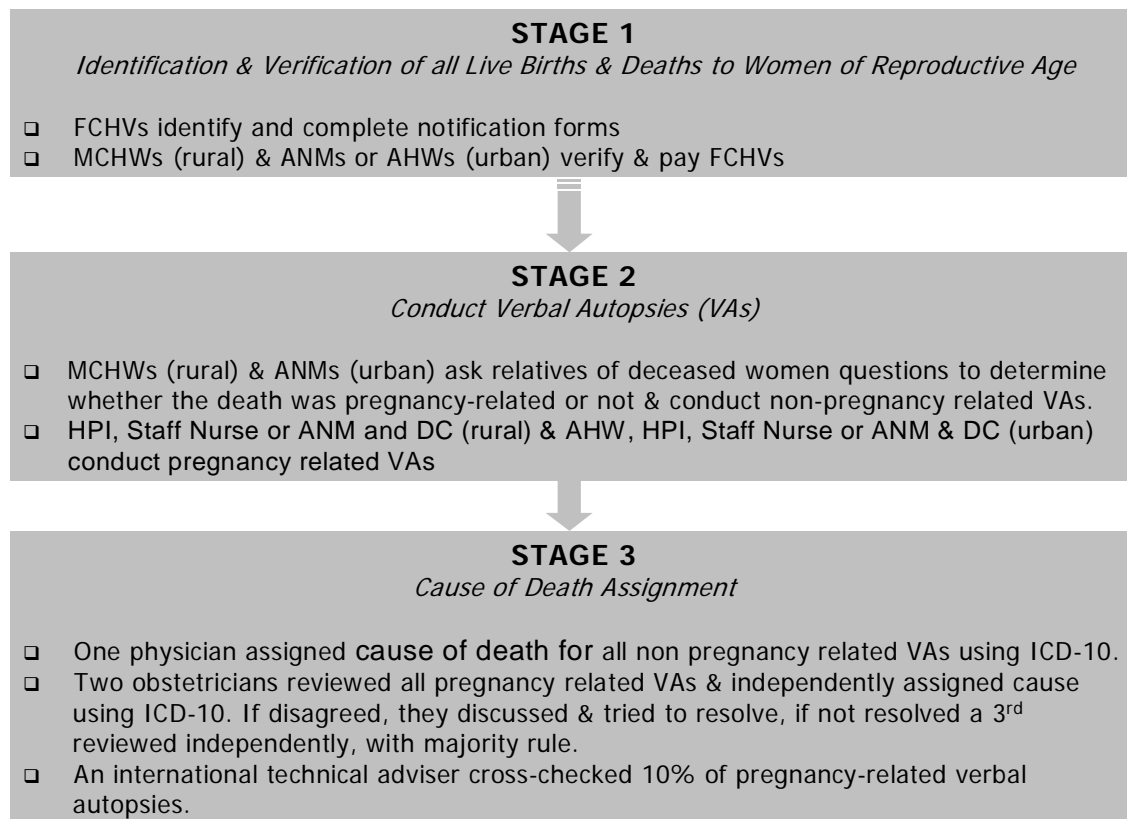
¹⁵ Or VHW if the MCHW was unavailable.

¹⁶ The Tenth Revision of the International Classification of Diseases (ICD-10) defines a pregnancy-related death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death."

¹⁷ ICD-10 defines a maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."

the diagnosis by using the narrative section. They subsequently compared their assigned causes case-by-case. In the event of any disagreement they discussed this and tried to resolve the diagnosis. If disagreement remained they requested an independent review by a third obstetrician, with a majority rule. They also recorded the level of confidence in each assigned cause. The obstetricians followed a manual for each review, containing the diagnostic criteria and ICD-10 terminology for assigning cause of death. They recorded the causal sequence, from the underlying causes to the final cause of death, as recommended by WHO. Only the single underlying cause was used in the final tabulation. The completed verbal autopsy questionnaires and cause of death assignment forms were reviewed on a regular basis and any necessary steps to improve the system were taken. An international technical adviser cross-checked 10 percent of the pregnancy-related verbal autopsies and the associated cause of death assignments, these were purposively selected as the ones the local obstetricians assigned with lower confidence. During the cause of death assignment, the obstetricians were able to distinguish between the pregnancy-related and the maternal causes of death. Additionally, one physician assigned the cause for all non pregnancy-related deaths using ICD-10 codes. The physician consulted the obstetricians if there was any query regarding missed pregnancy-related deaths.

Figure 3.2: The Community Verbal Autopsy Process



Experience of District Coordinators in conducting verbal autopsies

Completing verbal autopsies was an interesting and challenging experience, with many unforgettable moments. We often faced huge difficulties in trying to reach the homes of the deceased, including bandhs (strikes), flooding, snowfall, mountainous terrain, and a lack of roads and transport. It frequently took us a long time to reach a home and sometimes we faced problems that made us fear for our lives.

In many instances the interviews were extremely emotional. Sometimes the whole interview was so emotional that the eyes of the respondents filled with tears and they shared their sufferings and feelings with an obstructed voice. There were stories full of sorrow, sympathy, empathy and a feeling of helplessness at not being able to do anything when the bereaved was in desperate need of assistance. It really was a challenge to listen to their sufferings and feelings about the demise of their loved ones, while at the same time trying to extract comprehensive information for a long questionnaire. We had to ask them so many questions about their painful experience.

Some respondents were reluctant to participate in the study, feeling uncomfortable about sharing their personal sufferings with an outsider. Getting correct, complete and consistent information was a real a challenge, particularly in suicide, murder, abortion and domestic violence cases, as the respondents were hesitant to share information due to legal investigations by the police. Furthermore, respondents were often reluctant when unmarried girls had died due to pregnancy related causes. In some communities in Jumla, Rasuwa and Rupandehi districts communicating with respondents, especially older ones, was often challenging because of the local dialect. In such cases an interpreter, usually a health volunteer/worker or educated member of the family/ neighbour, assisted. Some respondents had raised expectations, requesting compensation for their participation, or financial assistance, particularly to look after the young children of the deceased woman. Some were too busy when we visited the household and thus we had to wait a long time or make repeated visits. In some cases deaths of females below the age of twelve or over fifty, and deaths occurring outside the study period were identified. Some of these were unintentional; however, there was some intentional false reporting because of incentive payments. False reporting were easily identified and excluded during verification.

Each and every death was unique, but many reflected typical problems faced by women in Nepal, such as poverty; low status of women; the culture of silence; multiple referrals; poor attitude of health providers; delays in the community and facilities; and inadequate treatment at health facilities. In many instances, after attending verbal autopsies, we would often reflect that 'the woman could have been saved if'

Administering Verbal Autopsy: Some Unforgettable Moments

- ☞ *During the initial FCHV orientation I noticed one of the participants holding her head down with her eyes filled with tears. Later we discovered that her 12 years' old daughter had died just a few days earlier.*
- ☞ *The community members of one deceased woman, who was murdered by her husband, were demanding and putting pressure on us for his imprisonment.*
- ☞ *It was really difficult to explore the facts behind a father and uncles killing a pregnant daughter and the man with whom she had an affair.*
- ☞ *An eight months pregnant woman died of acute dehydration as she was fasting at Teej festival for a long life and the well being of her husband.*
- ☞ *While asking the relatives of one deceased woman about the events that took place before her death and whether they felt she could have been saved, they felt repentant and expressed that she died because of their negligence and ignorance.*

- District Coordinator, Rupandehi

- ☞ *In one case the respondent requested compensation for the death of his wife from the ANM (the interviewer).*
- ☞ *One of the respondents scolded me for asking questions about his deceased sister in law and walked away without answering the questions.*

- District Coordinator, Baglung

☞ *We had a very difficult time while visiting Odi, a small village on top of a high mountain. While we were returning from the village snowfall started unexpectedly and both of us were almost buried in it. We climbed down the mountain cautiously but my colleague slipped and twisted his leg. Fortunately we found a large canopy tree where we rested till the snowfall abated, but we were numb with cold.*

- District Coordinator, Jumla

☞ *We had gone to Sinja valley and on returning we lost the route in the jungle and it started to get dark. We walked along the footpaths for hours but could not find any sign of human settlement. It was completing black so we lighted a fire on a piece of wood so that we could see the trails. Fortunately we saw a house near by, went there and knocked the door thinking that we will get shelter and something to eat. It was already 8 o'clock in the night, all were slept so nobody responded us for a long time.*

After some time someone opened the door, but the man was pointing a long gun towards us. We were so frightened and terrified that could not speak for a while. Despite our sincere requests the man threatened to shoot us if we did not leave immediately. Seeing no alternative to save our lives we turned and ran away. While running we slipped down and got scratches all over our face and hands. Straying off the route for quite a long time, finally we reached Tatopani and rested at a house that night. It was like starting a new life after defeating death.

- Research Assistant, Jumla

Experience of obstetricians in assigning cause of death from maternal verbal autopsies

Assigning the cause of death from community verbal autopsies is a very challenging job for an obstetrician, as the cause of death assigned is completely based on information about the death of a woman from the community. The information given in the VA, is sometimes not enough to pinpoint the cause of death especially when the death occurs quickly, with few or no symptoms. For example a woman went to bed after dinner with no problems and was found dead the following day. In some cases, the history taking lacks the relevant events that make the cause of death assignment difficult. If non-medical persons are conducting the interviews, they should have close observations from a medical person so that the sequence of events can be appropriately recorded. The reviewers should be involved from the very beginning of the study so that they can give their inputs more effectively.

During the review of the forms we all received a new experience beyond our expectation. The experience of assigning the cause of death made us realise that health related programmes in the community and community awareness raising are necessary to reduce maternal mortality as well as working in a big hospital. In the community, local traditional healers are often the first point of contact for many women with complications, so they need to aware of danger signs and appropriate referral. People see delivery as a normal process and are often unaware of danger signs so the decision to seek medical care may be very late. Women are dying because they are not getting treatment quick enough, even from relatively minor causes, such as gastroenteritis. It was noted that in many cases, the referral was either too late and/or the facility referred them to yet another facility without attempting first aid treatment. In the tarai region, some deceased women were referred to India or Kathmandu because they were unable to get treatment due to late referral by the previous health facilities. Ultimately women often died after visiting two or three facilities and their families spending a lot of money. After reviewing the VA, we have seen many suicide cases, which we were not prepared for and these gave us a view of pregnancy related deaths due to mental illness. Also despite the provision of safe abortion services, governmental and non-governmental, women are still accessing unsafe services.

- Obstetricians

Training and Orientation

A total of 7,595 health volunteers and health workers were provided with training/ orientation for identification of live birth and deaths to women aged 12 - 50 years, and administration of verbal autopsy (Table 3.1). A half day orientation was provided to a total

of 7,071 FCHVs for live birth and WRA death identification and notification in the eight study districts. Similarly, two days orientation was provided to 413 local health workers for administering non-pregnancy related death verbal autopsy questionnaire and 111 health workers for administering pregnancy related death verbal autopsy questionnaire. The training was managed by the core study team. Fourteen short-term Research Assistants were also recruited to assist with the FCHV orientation. Training was staggered by district, and thus start dates varied, but all districts collected live birth and death notifications retrospectively, with the 1st day of the Nepali calendar as the start date (13th April 2008). Data were collected for a period of one year up to 13th April 2009.

Table 3.1: Persons Trained for Verbal Autopsy by District

Type	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
<i>A. For live birth and WRA death identification and notification (½ day orientation)</i>									
FCHVs	1153	1530	997	745	864	980	245	557	7071
<i>B. For non-pregnancy related verbal autopsy (2 days training)</i>									
MCHWs	39	52	31	32	38	29	8	8	237
VHWs	3	4	0	8	7	7	1	10	40
ANMs	17	11	15	12	12	14	6	12	99
AHWs	1	1	0	7	3	2	2	21	37
Total	60	68	46	59	60	52	17	51	413
<i>C. For pregnancy related verbal autopsy (2 days training)</i>									
HPI/HA/Sr. AHW	16	13	13	12	18	11	6	9	98
Staff nurse/ANM	1	4	2	1	2	0	2	1	13
Total	17	17	15	13	20	11	8	10	111
Grand total	1230	1615	1058	817	944	1043	270	618	7595

VDC Secretaries did not receive any training/orientation in VAs. However, the DCs coordinated with the secretaries for verification of live births and deaths.

Data Management and Analysis

The pregnancy related and non-pregnancy related verbal autopsy questionnaires were reviewed in Kathmandu by the core study team members prior to data entry. They were returned to District Co-ordinators for correction and clarification, and repeat visits were made to the household of the deceased where necessary. Data entry was completed by two data entry personnel using Microsoft Access and cleaned by the core study team members.

Three obstetricians were trained by Professor Lynn Sibley to review the pregnancy related verbal autopsy questionnaires and assign the cause of death and corresponding ICD 10 three digit codes. A physician who was involved in reviewing and assigning the cause of death for the Nepal burden of disease study reviewed the non-pregnancy related verbal autopsy responses. A one page format was completed, which includes a unique ID code, along with the identified underlying and contributory causes of death, and the level of confidence with which the causes were assigned. The information in these forms was entered into a cause of death template developed in Microsoft Excel.

The data from Access and Excel were converted into STATA and SPSS for analysis by the core study team members.

Intensive Verification

At the end of the study period an intensive verification study was under taken in a sample of wards within the study area with the primary objective to assess the accuracy of the data collected under the system described above.

The verification study used population and household information provided by the Population Census 2001 as the sampling frame. It included 2 percent of the households in each of the study districts, covering a total of 9756 households. A representative sample was taken from urban (municipalities) and rural (VDC) areas, covering a total of 7971 (82%) households from rural areas and 1785 (18%) households from urban areas. Table 3.2 shows the number of households sampled in each district, broken down by urban/rural status. The ward was the primary sampling unit (PSU) for this study and all households within selected wards were visited.

The sample for the study is based on a two-stage, urban (municipality) and rural (VDC), representative sample of households. In the first stage, 10 percent of the VDCs were randomly selected from the list of VDCs in each district. One municipality was also selected randomly in the districts where there was more than one municipality.

In the second stage of sampling, wards were selected randomly until the required numbers of households was reached (2% of the households in rural area). Likewise, the urban wards were also randomly selected to get two percent of the households in urban area in the district. All households within the selected wards were visited.

The tool for this study collects information on the name and caste of the household head; address; caste/ethnicity; whether any woman in the household aged 12-50 years died within the study period - and if so, the date of death; their age at death, and timing of death (pregnant, delivering, aborted or 42 days postpartum at the time of death); whether any live and still birth had taken place at that household, date of birth, name of mother, present status of the baby, and if died, date of death.

The DCs of the respective districts were responsible for monitoring and supervising the fieldwork in the district. In addition, MMMS team as a quality check visited about 50 percent of sampled wards and cross checked the information collected.

Table 3.2: Sampling Frame for Intensive Verification

	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Total hhds - District	120,295	117,856	94,430	30,121	53,565	50,691	8,696	12,147	87,801
Total hhds - VDCs	86,636	92,121	76,370	30,121	48,708	43,519	8,696	12,147	398,318
Total hhds - Municipalities	33,659	25,735	18,060	0	4,857	7,172	0	0	89,483
% of VDC hhds	72.0	78.2	80.9	100.0	90.9	85.9	100.0	100.0	81.7
% of Municipality hhds	28.0	21.8	19.1	0.0	9.1	14.1	0.0	0.0	18.3
2% of hhds - District	2,406	2,357	1,889	602	1,071	1,014	174	243	9,756
2% of hhds - VDC	1,732	1,843	1,528	602	974	871	174	243	7,971
2% of hhds - Municipality	674	514	361	0	97	143	0	0	1,785
Number of VDCs	49	69	42	56	59	50	18	30	373
Number of Municipalities	3	2	2	0	1	1	0	0	9
Total wards - District	479	649	401	504	542	462	162	270	3,469
Total wards - VDCs	441	621	378	504	531	450	162	270	3,357
Total wards - Municipalities	38	28	23	0	11	12	0	0	112
Number of VDC wards selected	9	12	8	10	11	9	3	5	67
Number of Municipal wards selected	1	1	1	0	1	1	0	0	5
Number of VDCs selected	4	6	4	5	5	5	2	3	34
Number of Municipalities selected	1	1	1	0	1	1	0	0	5

Recruitment, Training and Orientation

A total of 31 interviewers were recruited from the New ERA pool of experienced field researchers. The number of interviewers in each district reflected the number of households to be interviewed and the time allocated for fieldwork. The fieldwork in all the 8 study districts was carried out simultaneously. They received three days orientation on the purpose of the study and how to complete the tool. They were also given an instruction manual to assist them in completing the tool.

Data Management and Analysis

The data were entered into CS Pro software, and subsequently converted into STATA and SPSS for analysis. The deaths to women of reproductive age and live births identified during the intensive verification were crosschecked with the original identifications. This included verifying the names of the deceased, names of women who gave birth, VDC/Municipality, ward number, name of the head of the household, and the date of death.

3.3 Maternal Death Review (MDR)

Objectives

- To ascertain maternal deaths in hospitals (and the % of hospital deaths of WRA that are maternal)
- To determine causes of maternal deaths in hospitals
- To increase the number of hospitals implementing the MDR process
- To put systems in place to make MDR a routine, sustainable activity
- To modify the government PMDR tool, where necessary
- To provide the contact details for family of all WRA, that hospital staff are aware of, who died (as a check for VA identification)

Rationale

Although most maternal deaths occur in the community, an estimated 21 percent occur in facilities in Nepal (GoN 1998), and despite the overall maternal mortality ratio reducing, there has been no reduction in the reported number of hospital maternal deaths (Sharma et al. 2007). However, it is likely the number of clients visiting hospital with an obstetric morbidity has also increased (DoH Annual Health Reports 1998-2007). Facility based deaths may result from poorly managed deliveries, especially when complications occur. Treatments for obstetric complications are well established and appropriate emergency obstetric care (EOC) can prevent most maternal deaths. EOC is often compromised by problems related to health-service management, including the failure to offer 24-hour services; lack of drugs and supplies and staff attitude. Every maternal death is unique and provides useful lessons, while it is also important to explore common and avoidable factors across several deaths.

The Maternal Death Review (MDR) is a process for reviewing maternal deaths that occur in health facilities. It enables providers to understand why mothers die by learning from in-depth investigations of maternal deaths in their facility. The World Health Organisation (WHO) strongly promotes its use in resource-poor settings and it is becoming routine practice in both developed and developing countries. It is easy to implement, does not require external expertise, and is designed to improve obstetric services and make pregnancy safer. It is one of the oldest, and the most documented, methods that can be effective in improving EOC and maternal outcomes. It can lead to changes in

organisational structure, which improve life-saving interventions and maternal outcomes, and is one of the most effective methods to improve the performance of health workers. The review can be used as a mechanism for assessing and improving the quality of care and provokes discussion between colleagues about identifying ways to improve clinical care and reduce maternal deaths. It enables facilities to identify avoidable factors and take possible corrective actions so that in future maternal deaths do not occur, as often they are due to the same avoidable factor.

Delays in reaching facilities also contribute to maternal deaths. Therefore, as well as identifying facility related factors, the MDR also gathers supplementary information about community factors which may have contributed towards her death. It is vital that women do not experience delays in reaching a health institution and receive high quality care once there.

Definition of MDR:

“A qualitative in-depth investigation of the cause and circumstances surrounding maternal deaths occurring at health facilities. It is particularly concerned with identifying the combination of factors at the facility and in the community that contributed to death and which ones are avoidable” (WHO 2004)

Background

In Nepal the MDR process, initially called the maternal death audit, was first initiated in Paropkar Maternity Hospital, Kathmandu in the early 1990s and the system is still in place at the facility. The MDR was one of the components in the 1998 MMM Study and implemented in one hospital in each of the three study districts (Kailali, Rupandehi and Okhaldhunga) for one year (1996-97). There was no effort to continue the process in these hospitals at the end of the study. In 2002/03 DFID funded Nepal Safer Motherhood Project and UNICEF contracted the Nepal Society of Obstetric and Gynaecology (NESOG) to train doctors and nurses in their supported districts (Okhaldhunga, Sunsari, Nuwakot, Dhanusha, Baglung, Rupandehi, Surkhet, Banke, Dadeldhura, Kailali) in MDR and the MDR system was implemented in six referral hospitals in 2004 (Maternity Hospital, Patan Hospital, TU Teaching Hospital, Seti Zonal Hospital, Sagarmatha Zonal Hospital, Lumbini Zonal Hospital). In 2006 the MDR was implemented in an additional eight referral hospitals with funding from WHO (Koshi Zonal Hospital, Mechi Zonal Hospital, Mahakali Zonal Hospital, Bheri Zonal Hospital, Nepalgunj Medical College, BPKIHS). A two day training on the MDR process including how to complete the form was provided to Obstetrician/Gynaecologists, Nurses and Medical Recorders in the 12 hospitals selected for implementing the MDR system (Maternity Hospital, Patan Hospital, TU Teaching Hospital, Seti Zonal Hospital, Sagarmatha Zonal Hospital, Lumbini Zonal Hospital, Koshi Zonal Hospital, Mechi Zonal Hospital, Mahakali Zonal Hospital, Bheri Zonal Hospital, Nepalgunj Medical College, BPKIHS). The implementing hospitals are required to send the completed forms to the Demography Section of the FHD. The FHD is then responsible for compiling, analysing and providing feedback to the hospitals. After the orientation not all of the hospitals have fully institutionalised the MPDR system. A national-level MPDR committee was formed to provide technical guidance in 2003.

Methodology

Identify maternal deaths:

One focal person (usually a nurse) is responsible for ensuring that all maternal deaths occurring in their facility are identified as soon as possible after the death occurs. To do

this they may have to check the patient records in all wards in the hospital as maternal deaths may occur outside the Obstetrics and Gynaecology department.

Complete forms:

The FHD MPDR tool is based on a South African tool. The FHD MPDR tool has been slightly modified for the purposes of this study to create a MDR tool. Facilities are instructed to complete the MDR form immediately. One focal person (usually a nurse) is responsible for completing the review form. To complete the forms the focal person reviews patient hospital records, interviews health personal who attended to the deceased and, where possible, interviews family members.

MPDR/MDR committee:

One obstetrician (where possible) from each facility is responsible for convening the MPDR/MDR committee within 72 hours of a maternal death occurring. The information from the MPDR/MDR form is presented and discussed. The facility obstetrician determines the cause of death during this review process. The committee assess the quality of the care provided, along with any avoidable factors and make recommendations for any necessary corrective action. The committee need to ensure that they follow-up at a later date to assess whether their recommendations have been implemented and that they re-evaluate the quality of care delivered. The facility keeps one copy of the review and passes one copy onto the DC who in turn sends to Kathmandu.

Data entry:

A web-based MPDR database management system has been developed and facility staff have been orientated in how to input data at their facility. However, the web-based system is yet to be fully operational due to lack of access to the internet; unreliable internet access; or the lack of a computer. Therefore forms received by the FHD are being entered into the web-based system in Kathmandu.

Data analysis:

The Demography section of the FHD analyse the data received. However, some of the hospitals where the system is in operation are failing to complete the forms and others are not doing it consistently.

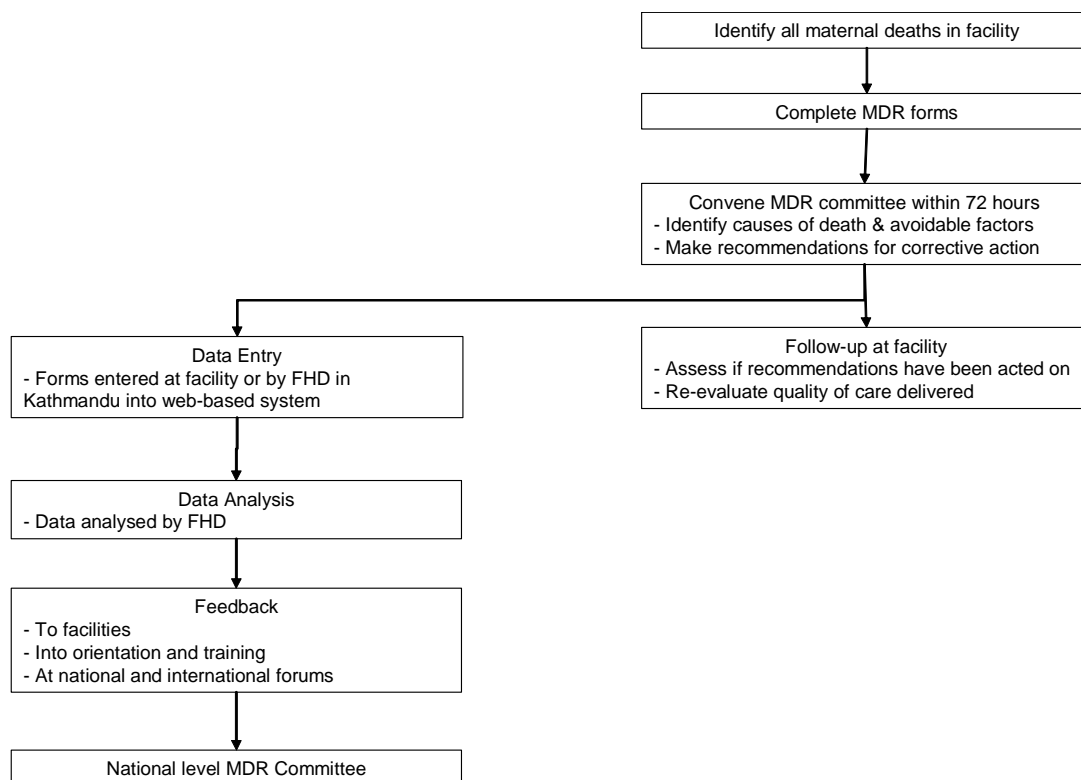
Feedback:

The FHD provide regular feedback from the analysis to the implementing hospitals. They particularly focus on the completeness and consistency of the forms received and are still waiting for the input of an obstetrician to enable feedback on the cause of death. The information has also been fed back into the training and orientation of health personnel and disseminated at national and international forums.

National MPDR Committee (NMPDRC):

As part of implementing a MPDR system it is necessary to have a functioning national-level MPDR review committee. In Nepal a committee was formed in 2000 and is due to meet annually. However, the committee is non-functional and the FHD has initiated the process for a new committee.

Figure 3.3: The MDR Process



Feedback from obstetricians conducting maternal death reviews

Obstetricians reported that they found the MDR form time-consuming to complete and the format was not user friendly. If the format was improved it would make them more willing to be involved in the process and would improve the overall quality of the data submitted. They felt the form was too long, and information can not be copied directly from the hospitals records as the required information differs from what they routinely collect, and format differs. Poor referral systems mean that clients often arrive without referral slips, or poorly completed referral slips, and hence the facility completing the MDR only knows limited information about the deceased woman. The space for open-ended responses are not utilised. The cause of death categories should be revised. Ensuring emergency cases receive the care they need takes priority over collecting information, and hence information is not recorded due to limited human resources. Maternity wards often find they do not have the capacity to complete the form and organise a committee review meeting immediately following the death. The nurse in charge of the hospital should co-ordinate the whole process and emphasise the need to complete these forms and submit them to the FHD. The FHD needs to be more proactive in ensuring the forms are filled completely, immediately after a maternal death and sent to them to review.

Location of MPDR/MDR

This study aimed to ensure that the MDR is introduced in all CEOC facilities in the study districts, and in at least one facility per district. Prior to the 2008/09 MMM Study, the FHD had already introduced MPDRs in three CEOC facilities (Sunsari, Kailali and Rupandehi) in the study districts (Table 3.3). This study introduced the process into a further nine CEOC facilities. Furthermore, since there is no CEOC facility in Rasuwa the tool has been introduced into the BEOC District Hospital to ensure all eight districts have at least one

facility conducting MDRs, making a total of 13 EOC facilities within the eight study districts.

Table 3.3: Location of MPDR/MDR

District	Name of facility	Type of facility	MPDR in place before MMM 08/09	MDR introduced by MMM 08/09
Okhaldhunga	Okhaldhunga Community Hospital (Missionary), Okhaldhunga	CEOC	No	Yes
Sunsari	BPKIHS, Dharan	CEOC	Yes	No
Jumla	District Hospital, Jumla	CEOC	No	Yes
Kailali	Seti Zonal Hospital, Dhangadhi	CEOC	Yes	No
Surkhet	Mid-western Regional Hospital, Birendranagar	CEOC	No	Yes
Rupandehi	Lumbini Zonal hospital, Butawal	CEOC	Yes	No
	Amda Hospital, Butawal	CEOC	No	Yes
	Universal College of Medical Science, Siddharthanagar	CEOC	No	Yes
	Devdaha Medical College*, Devdaha	CEOC	No	Yes
	Butwal Hospital (Private), Butawal	CEOC	No	Yes
	Siddhartha Nursing Home, Butawal	CEOC	No	Yes
Baglung	District Hospital	CEOC	No	Yes
Rasuwa	District Hospital, Dunche	BEOC	No	Yes
Total	13	12 CEOC 1 BEOC	3	10

Recruitment, Training and Orientation

The training aimed to ensure that all trainees understood the importance of the MDR process, and the importance of it as an intervention in its own right to improve maternal health care. An obstetrician and a midwife explained the process and how to complete the MDR form. The training lasted for two days, and 9 Doctors, 12 Medical Recorders/Statistical officers/assistants and 14 Staff Nurses were trained. In Jumla a Senior AHW was trained in place of the medical recorder (Table 3.4).

Table 3.4: Training for Hospital Based Maternal Death Review

	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Doctor	0	4	0	0	1	2	1	1	9
Staff nurse	0	5	0	1	1	5	1	1	14
MR & SO/A	0	7	0	1	1	1	1	1	12
Total	0	16	0	2	3	8	3	3	35

Problems faced when implementing the MDR/MPDR

- It is difficult to identify maternal deaths occurring in non-maternity wards, such as emergency, and facilities often miss these.
- Some MPDR implementing hospitals are not reviewing deaths because there is no additional incentive for the staff involved; they report the form is too long; and have not formed a review committee.
- Completed forms not always returned to Kathmandu.
- Forms are not always completed correctly.
- Handwriting sometimes unclear, especially for the case summaries.
- Frequent transfer of trained staff.
- Lack of access to the internet; unreliable internet access; or the lack of a computer makes data entry using the web based system in the districts difficult.
- The lack of a functional MPDR committee has resulted in no clinical feedback regarding the cause of death to FHD.

3.4 Emergency Obstetric Care (EOC) Morbidity Monitoring

Objectives

- To calculate the UN process indicators:
 - Proportion of births in Basic Emergency Obstetric Care (BEOC) and Comprehensive Emergency Obstetric Care (CEOC) facilities
 - Population-based met need for treatment for direct life-threatening obstetric complications (septic abortions, ectopic pregnancy, pre-eclampsia and eclampsia, antepartum and postpartum haemorrhage, obstructed labour and ruptured uterus, postpartum and post-abortion sepsis)
 - Population-based Caesarean Section (C/S) rates and met need for C/S
 - EOC facility case fatality rates

Rationale

It is often quoted that 15 percent of pregnancies will have direct obstetric complications, since an estimated 75 percent of maternal deaths are due to direct obstetric complications (antepartum and postpartum haemorrhage, sepsis, pre-eclampsia, obstructed labour, abortion complications, ectopic pregnancy), and that an estimated 5 to 15 percent of pregnancies require caesarean section, although it is not universally agreed. All direct obstetric complications can be managed in BEOC or CEOC facilities and hence the UN has made the following recommendations:

- 1 CEOC and 4 BEOC facilities per 500,000 population
- At least 15 percent of deliveries should occur in a CEOC or BEOC facility
- Met need of direct obstetric complications should be 100 percent (assumes that 15 percent of pregnancies will have direct obstetric complications)
- At least 5 percent of deliveries require a caesarean section
- Case fatality rate is less than 1 percent

EOC morbidity recording and reporting is used to monitor the EOC services provided by the CEOC and BEOC facilities. It enables the following set of UN recommended process indicators to be generated to monitor maternal health and maternal health services:

1. % of deliveries in a BEOC or CEOC facility
2. Population-based met need for direct obstetric complications
3. Caesarean section rate
4. Case Fatality Rate

This set of UN process indicators are considered to be a proxy for MMR, based on the assumption that if all direct obstetric complications (i.e. 15% of pregnancies) are treated (met need), and caesarean section is provided to all of those who need it, and no one dies from obstetric complications or caesarean section then the MMR can be reduced by 75 percent.

Background

EOC morbidity recording and reporting was initiated by the Nepal Safer Motherhood Project (NSMP) in 1997 in three districts (Baglung, Surkhet and Kailali) as a part of baseline data collection, prior to the implementation of NSMP. The 1998 MMM Study implemented the EOC monitoring system in 3 hospitals in the three study districts (Rupandehi, Okhaldhunga and Kailali). In 2001 NSMP increased its support of EOC

monitoring by scaling up to 13 districts (nine supported by DFID and four supported by UNICEF) and shifted its management to the FHD. Since then the EOC morbidity recording has been introduced into more districts by DoHS initiative and before MMMS 22 districts were submitting EOC monitoring reports. Currently, this is already being implemented in 19 districts (all UNICEF, all UMN, and some Equity and Access (ActionAid) Districts) (one existing and four proposed districts are included in these 19).

Methodology

The FHD EOC monitoring system utilises a Maternity Register for all deliveries and maternal complications, which is subsequently aggregated into a monthly Tally Sheet. The existing register has been slightly adapted since the one used in the 1998 NMMS. The register classifies all deliveries by type. It classifies morbidities by direct obstetric morbidity, other obstetric morbidity and non-obstetric morbidity based on the final diagnosis. It records the type of obstetric procedures provided and the outcome for the mother and infant. The following background information is also collected: caste, ethnicity, age, gravida, parity, and address. In three districts (Lalitpur, Parsa and Rupandehi) they are currently piloting the inclusion of these indicators in the Health Sector Information System (HSIS) and this has meant revising the tools to include social inclusion monitoring. This study aimed to introduce the EOC monitoring system into all CEOC and BEOC facilities in the study districts, if not already in existence. The study utilised the existing FHD tools, and where the system was not already in place introduced the latest version of the register with the social inclusion monitoring.

Location of EOC Monitoring

The FHD had already introduced EOC monitoring in four CEOCs and three BEOCs in four of the study districts (Kailali, Surkhet, Rupandehi, Baglung) before the MMM study commenced. This study has introduced this process into a further seven CEOC and fifteen BEOC facilities within the eight districts (Table 3.5). The names of four health facilities which were already in the EOC monitoring and the additional 22 CEOC and BEOC facilities are provided in the Table 3.5. A total of 30 facilities are included in the eight study districts they include public private and NGO facilities.

Table 3.5: District, Basic and Comprehensive EOC Facilities in the EOC Monitoring System

District	Name of facility	Type of facility	EOC monitoring already in place	EOC monitoring introduced by MMMS
Okhaldhunga	Okhaldhunga Community Hospital (Missionary), Okhaldhunga	CEOC	No	Yes
	PHCC, Rumjatar	BEOC	No	Yes
Sunsari	BPKIHS, Dharan	CEOC	No	Yes
	District Hospital, Inaruwa	BEOC	No	Yes
	PHCC, Itahari	BEOC	No	Yes
	LKGDC Hospital, Duhabi	BEOC	No	Yes
	Family Planning Centre, Itahari	BEOC	No	Yes
Kailali	Seti Zonal Hospital, Dhangadhi	CEOC	Yes	No
	PHCC, Tikapur	BEOC	Yes	No
	PHCC, Chaumala	BEOC	No	Yes
	PHCC, Bhajani	BEOC	No	Yes
Surkhet	Mid-western Regional Hospital, Birendranagar	CEOC	Yes	No
	PHCC, Mehalkuna	BEOC	No	Yes
	PHCC, Dasarathpur	BEOC	No	Yes
Jumla	District Hospital, Jumla	CEOC	Yes	No
Rupandehi	Lumbini Zonal Hospital, Butawal	CEOC	Yes	No
	Amda Hospital, Butawal	CEOC	No	Yes
	Universal College of Medical Science, Siddharthanagar	CEOC	No	Yes
	Devdaha Medical College, Devdaha	CEOC	No	Yes
	Butwal Hospital (Private), Butawal	CEOC	No	Yes
	Siddhartha Nursing Home, Butawal	CEOC	No	Yes
	PHCC, Lumbini	BEOC	Yes	No
	PHCC, Dhakdhai	BEOC	Yes	No
	PHCC, Motipur	BEOC	No	Yes
	PHCC, Rayapur	BEOC	No	Yes
	Bhim (District) Hospital, Siddharthanagar	BEOC	No	Yes
Baglung	Dhaulagiri Zonal Hospital, Baglung	CEOC	Yes	No
	PHCC, Galkot	BEOC	No	Yes
	PHCC, Burtibang	BEOC	No	Yes
Rasuwa	District Hospital, Dunche	BEOC	No	Yes
Total	30	18 BEOC 12 CEOC	8	22

Recruitment, Training and Orientation

Where EOC monitoring was not already implemented, a two-day orientation training was conducted for district level staff (Table 3.6). Various categories of staff from District Public Health Office, BEOC and CEOC facilities were trained in EOC monitoring. A Senior AHW participated in the training instead of the Medical Recorder in Jumla and an AHW replaced the Staff Nurse in Rupandehi. Furthermore statistical assistants from four districts received training in EOC monitoring by MMM Study, and assistants from three districts had been trained previously.

Table 3.6: Training for EOC Monitoring

Type	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Staff nurse/ANM	12	7	2	2	2	2	1	1	29
MR and SA	7	5	0	3	0	2	1	1	19
PHN/FPO/PHI	1	1	0	1	0	0	0	0	3
Total	20	13	2	6	2	4	2	2	51

Data Management and Analysis

The basic and comprehensive EOC facilities included in the EOC monitoring were required to submit the monthly EOC report to Family Health Division, DoHS. The Computer Officer

in the Demography Section, FHD entered the data into the Microsoft Excel template broken down by month and by facility for each district. Any inconsistencies were checked with the public health nurse in the DPHO office and concerned facilities by telephone. The data analysis was done in Excel.

3.5 Facility Assessments

Objectives

- To assess whether EOC facilities perform all necessary BEOC/CEOC activities.
- To assess whether the designated HPs and SHPs performed necessary birthing centre activities.
- To document and assess the condition of facilities (including the infrastructure, state of repair).
- To document and critically assess the capacity of facilities (including key elements of service delivery such as human resources; opening hours; access to and availability of essential drugs, supplies and equipment).
- To assess procedures followed when problems occur (e.g. stock outs/equipment breakage).
- To assess the referral of complications.
- To document user charges (official and unofficial).
- To assess the extent to which evidence based practices are implemented.
- To assess health information systems - (i.e. what data is collected; the quality of the data collected; how the data that is collected is used).

Rationale

One-fifth of maternal deaths occur in health facilities, and some of these may be due to inefficient management and treatment of obstetric complications. Problems, including health service management, including failure to discharge 24 hour services; lack of essential drugs, supplies and equipment; and staff attitude, may affect utilization of services and contribute to poor maternal outcomes. The purpose of this assessment is to provide information on the quality of maternal health care; vital for monitoring and improving facility level performance and the delivery of high quality care.

Methodology

A rapid situation assessment of selected CEOC, BEOC and birthing center (BC) facilities (public, private and NGO) was conducted to examine the capacity of facilities, staff availability and quality of EOC services.

Three obstetricians were recruited to undertake the staff competency and two midwives for the facility assessments. The obstetricians assisted with the facility assessment where necessary. The obstetricians and midwives were informed about which facilities to assess prior to visiting each district (see Table 3.8). One obstetrician and one midwife visited each district and they received support from the respective MMM study District Coordinators.

The assessment tool consisted of seven sections: human resources; services; infrastructure; essential equipment; essential drugs and supplies; evidence based care; record keeping and utilization of services. In order to complete the facility assessment the midwives conducted interviews with labour room in-charge, medical superintendent, medical recorder and other related persons. They also made their own observations. The

time taken to collect the necessary information was usually between half a day and a full day.

Location of EOC Facility Assessments

The facility assessments were conducted in 43 facilities across the eight study districts: 10 CEOC facilities, 11 BEOC facilities and 22 BC facilities. This included eight government hospitals, six NGO or private hospitals, 16 PHCCs, 12 health posts, and one sub-health post (Table 3.7). The number of facilities selected per district ranged from three in Rasuwa to nine in Rupandehi. All government hospitals and referral centres (two in Rupandehi, and one in each of the remaining districts, except for Okhaldhunga) and a selection of private and NGO hospitals (three in Rupandehi, two in Sunsari and one in Okhaldhunga) in the study districts were assessed. Furthermore, a selection of PHCCs and HPs were assessed. There are 27 PHCCs within the eight study districts, ranging from one to six per district. In districts with one to two PHCCs, one PHCC was selected, and in those with three to four, two PHCCs were selected and those with above five PHCCs, three were selected. A sample of health posts were selected, one in each of the following four districts - Sunsari, Okhaldhunga, Rasuwa, and Rupandehi and two in each of the following four Districts - Baglung, Surkhet, Jumla and Kailali. One sub health post was selected in Okhaldhunga because it is functioning as a birthing centre. The selection of PHCCs, HPs and SHPs were purposively selected with the consultation of DHOs/DPHOs.

Table 3.7: Location of Facility and Staff Assessments

District	Name of facility	Type of facility	Government, NGO or private	Type of facility	Number of staff assessed
Okhaldhunga	Okhaldhunga Community Hospital, Okhaldhunga	CEOC	NGO	Hospital	6
	PHCC, Rumjatar	BC	Government	PHCC	2
	Thulachhap	BC	Government	HP	1
	Ketuke	BC	Government	SHP	1
Sunsari	BPKIHS, Dharan	CEOC	Semi - Govt	Hospital	2
	District Hospital, Inaruwa	BEOC	Government	Hospital	2
	PHCC, Itahari	BC	Government	PHCC	2
	LKGDC Hospital, Duhabi	BEOC	NGO	Hospital	2
	PHCC, Chatara	BC	Government	PHCC	2
	PHCC, Madhubhan	BC	Government	PHCC	2
	HP, Baklauri	BC	Government	HP	1
Kailali	Seti Zonal Hospital, Dhangadhi	CEOC	Government	Hospital	2
	PHCC, Tikapur	BEOC	Government	PHCC	2
	PHCC, Chaumala	BEOC	Government	PHCC	2
	PHCC, Bhajani	BEOC	Government	PHCC	2
	HP, Pahalmanpur	BC	Government	HP	1
	HP, Baliya	BC	Government	HP	1
Surkhet	Mid-western Regional Hospital, Birendranagar	CEOC	Government	Hospital	7
	PHCC, Mehalkuna	BEOC	Government	PHCC	3
	PHCC, Dasarathpur	BEOC	Government	PHCC	2
	HP, Lekhparsa	BC	Government	HP	1
	HP, Lekhagaun	BC	Government	HP	1
Jumla	District Hospital, Jumla	CEOC	Government	Hospital	2
	PHCC, Kalika Khetu	BC	Government	PHCC	2
	HP, Depal Gaun	BC	Government	HP	1
	HP, Haku	BC	Government	HP	1
Rupandehi	Lumbini Zonal Hospital, Butawal	CEOC	Government	Hospital	2
	Amda Hospital, Butawal	CEOC	NGO	Hospital	2
	Universal College of Medical Science, Siddharthanagar	CEOC	NGO	Hospital	2
	Bhim Hospital	BEOC	Government	Hospital	3
	Lumbini Nursing Home	CEOC	NGO	Hospital	1
	PHCC, Lumbini	BC	Government	PHCC	2
	PHCC, Dhakdhai	BEOC	Government	PHCC	2
	PHCC, Motipur	BEOC	Government	PHCC	2
	HP, Parahawa	BC	Government	HP	1
Baglung	Dhaulagiri Zonal Hospital, Baglung	CEOC	Government	Hospital	2
	PHCC, Galkot	BC	Government	PHCC	2
	PHCC, Kusmisera	BC	Government	PHCC	2
	HP, Hilla	BC	Government	HP	1
	HP, Resha	BC	Government	HP	1
Rasuwa	District Hospital, Dunche	BEOC	Government	Hospital	2
	PHCC, Jib Jibe	BC	Government	PHCC	2
	HP, Syaphru Besi	BC	Government	HP	1
		10 CEOC 11 BEOC 22 BCs	37 govt. 1 Semi govt 5 NGO	14 Hospitals 16 PHCCs 12 HPs 1 SHP	83

Recruitment, Training and Orientation

The three obstetricians and two midwives received three days orientation covering the tools for the facility and staff competency assessments. This consisted of an orientation to the MMM study and the facility assessment tool on the first day; an orientation of the staff competency tool on the second day, including practicing in pairs using a model and checklist in a role-play scenario; and on the final day they field-tested the tools at Methinkot PHCC of Kavre Palanchowk district.

Data Management and Analysis

The facility assessment data was collected by the staff nurses and Senior Researcher of this study. Inconsistencies were corrected in consultation with the assessors' notes which they took during the assessment. The data entry was done in the CS Pro software which later on was converted into STATA and SPSS for analysis.

3.6 Staff Competency Assessments

Objectives

- To critically assess the knowledge and competency and practice of providers (including doctors and nurses) delivering antepartum, intrapartum and postpartum care.
- To critically assess provider capability in the management of life threatening obstetric complications.

Rationale

Staff competency assessments evaluate the skills of health professionals delivering antepartum, intrapartum and postpartum care in facilities that manage normal deliveries and obstetric complications. The definition of staff competency includes the possession of knowledge, skills and staff attitude to comply with pre-defined clinical standards (Kak et al. 2001). Staff competency is generally assessed using a written test and an observational checklist. It is important to triangulate the information between what health personnel report they do and what they actually do in practice.

Studies show that often among health workers officially classified as "skilled birth attendants" competency levels are sometimes quite low (Harvey et al. 2004; Harvey et al. 2007). In Nepal there is limited evidence about the competency of SBAs at managing labour, delivery and the immediate post-partum period, or at managing the most common life-threatening obstetric complications and competent attendance can have a significant impact on maternal and neonatal outcomes. The findings from this component can be fed into advocacy for resource mobilization; policy development; and commitment to design and implement quality improvement initiatives directed at maternal and neonatal health.

Methodology

The staff competency assessment in the MMM Study comprises a written knowledge test and an assessment of staff EOC skills. Usually the staff competency assessments were conducted by obstetricians, but in two districts (Surkhet and Okhaldhunga) the midwife conducted the staff competency for the nursing personnel. In most of the facilities, midwives attend the majority of institutional deliveries. Doctors or medical officers tend to supervise midwives and assist in the case of complications, but they rarely serve as primary birth attendants.

Tool:

The staff competency assessment comprises of the following components:

- Knowledge Assessment (20 question multiple choice test related to clinical knowledge on the antenatal examination, birth preparedness plan, management of normal labour/delivery and common obstetric complications plus immediate postpartum care for the mothers and newborns).
- EOC Skills (assessing whether the participant received training; whether they performed the procedures in last 6 months and whether the procedures were performed confidently or not).
- Case study: Partograph (to check the ability using a partograph as decision making tool in the labour and delivery. Participants were asked to find out fetal heart rate, fetal distress, progress of labour, action for as plotted in the partograph).
- Case study: Post Partum Hemorrhage (participants were requested to fill in the blanks and question and answer).

The knowledge assessment checklists were adapted from Jhpiego tools.

Location of EOC Staff Competency Assessments

The staff competency assessments were conducted in the same 43 facilities as the facility assessments. Staffs were selected if they were on duty at the time of the assessment. At HPs and SHPs one member of staff was selected, while a minimum of two were selected at all other facilities, with highest numbers at SBA training centres. A total of 83 staff were assessed. At each facility the number of staff assessed ranged from one to seven. Those assessed included 13 MOs; 2 MDGPs; 6 obstetricians/gynaecologists; 17 SNs; 42 ANMs; 1 HA and 2 AHWs.

Recruitment, Training and Orientation

As stated in facility assessment section, the three obstetricians and two midwives received an orientation on assessing the competency of staff by using a model and checklist in a role-play scenario. The tool was field-tested at Methinkot PHCC of Kavre Palanchowk district.

Data Management and Analysis

The staff competency assessment data was collected by obstetricians. Inconsistencies were corrected in consultation with the assessors' notes which they took during the assessment. The data entry was done in the CS Pro software which later on was converted into STATA and SPSS, and tables generated.

3.7 Qualitative Components

Rationale

Five components of the MMM study employed qualitative research using two commonly used qualitative tools: in-depth interviews (IDI) and focus group discussions (FGD). These two qualitative methods were chosen to gather detailed information on the current situation of maternal health, focusing on care seeking behaviour during pregnancy, delivery and postpartum period; socio-cultural practices; quality of care; barriers and challenges in providing and seeking care; and changes over the past 10 years. The five qualitative study components are:

1. IDIs with formal health service providers (BEOC and CEOC facilities)
2. IDIs with informal birth attendants (attended at least five deliveries in last ten years)
3. IDIs with key stakeholders (district and central level)
4. IDIs with women who had complication (during antepartum, intrapartum or the postpartum periods) in the last 2 years
5. FGDs with women who have delivered in the last 10 years

Objectives

- To explore factors that affect care seeking and care behaviour during pregnancy, delivery and the post natal period, both under 'normal' circumstances and in the event of complications.
- To explore whether there have been changes in maternal health care seeking behaviour over the last 10 years, and if so to understand what these changes are and why they have occurred.
- To explore perceptions of different types of maternal health services and health care providers, with a particular focus on government institutional deliveries.
- To understand perceptions regarding how maternal health service utilisation can be increased in the future.
- To explore the main barriers in accessing and providing maternal health care, and what could be done to improve the provision and utilisation of maternal health services in the future.
- To understand the perceptions of key stakeholders regarding the delivery and impact of local and national level interventions have been implemented to try to improve maternal health.
- To understand key stakeholder views on current national levels of maternal mortality and morbidity and local variations.

Methodology

In-depth Interviews with Formal Health Service Providers

The study conducted 48 IDIs with formal health service providers. The providers were selected from the government hospitals, PHCCs and health posts that conduct deliveries. Most providers were selected from facilities that were officially recognized as birthing centres, however, in places where there were no official birthing centres, providers were selected from health posts that conducted deliveries, but were not official birthing centres. Of the 39 service sites selected for service provider interviews, six health posts from Sunsari, Okhaldhunga, Baglung and Kailali were not official birthing centres but conducted deliveries. In each study district one doctor and one nurse from each government hospital, one nurse from one to two PHCCs and one ANM from two health posts were selected for interview. In the case that there was more than one eligible respondent in the facility, the one who was recorded as having conducted the higher number of deliveries or managing complications was purposively selected for interview. Of the 48 service providers interviewed, eight were doctors, 11 were nurses, 26 were ANMs and three were Auxiliary Health Worker and Health Assistants.

In-depth Interviews with Informal Birth Attendants

The study conducted 24 IDIs with informal birth attendants. Informal birth attendants who had attended more than 5 deliveries in the last 10 years were identified with the help of community level health workers.

In-depth Interviews with Key Stakeholders

The study conducted IDIs with 46 purposively selected stakeholders; 25 at district level and 21 at central level. The key stakeholders included policy makers, representatives of donor agencies and NGOs/INGOs at the central level as well as district public health officer (D/PHO), public health nurse, head of maternity unit and active members of the reproductive health coordination committees from the eight study districts.

In-depth Interviews with Women who had Complication in the last 2 Years

24 IDIs were conducted with women who had complication during the antepartum, intrapartum or the postpartum periods in the last 2 years. Women who had a complication were identified through two approaches. Firstly, the maternity registers kept in the zonal hospitals, district hospitals, PHCCs, HP and birthing centres in the study districts were reviewed by the RAs and name, address of the women and details of the complications were noted down. Then the RAs travelled to the address and contacted the FCHVs or community health workers and confirmed on the details of the women. The FCHVs, informal birth attendants or the community health workers (AHW, MCHW) were requested to explain the study purpose and seek consent from the women to participate in the study. Those women who agreed to participate were contacted by RAs and full verbal consent was obtained and interviews were carried out. Secondly, women were also identified through informal talks with FCHVs, informal birth attendants and other community level health workers. Name and address of the women who had been referred or had complication in the last 2 years and known to community level formal or informal service providers were noted down and the woman were traced and selected for the study. A range of complications during pregnancy, labour and postpartum (e.g. retained placenta with prolonged labour, postpartum haemorrhage, ante-partum haemorrhage, eclampsia, sepsis etc.) cases were covered in the interviews.

FGDs with Women in the Community who Delivered in the Last Ten Years

16 FGDs were conducted with women who have delivered in the last 10 years (two per district). The participants for FGD were selected in the following ways:

1. District level stakeholders and district coordinators of the MMM study were consulted at the district headquarters. They assisted in identifying high concentration of index ethnic communities. The index ethnic communities for FGD for each district were decided in Kathmandu based on the population distribution by ethnicity in the sampled districts. Table 3.8 presents the ethnic communities covered in the FGD by districts.
2. After identifying areas of high concentration of index ethnicity, distance to the health facility was also taken into consideration while selecting villages for FGDs. In each district, one FGD was conducted in close proximity to a health facility and another FGD was conducted in an area which was at least 3 hours walking distance from the facility.

3. Upon reaching the area where FGD was to be conducted, RAs met with female health community volunteers (FCHV), ANMs, informal birth attendants and other local key informants and explained the study objectives, methodology including the type of participants needed for conducting FGD in that village. A list of 10-15 potential participants (women who had delivered in the last 10 years and belonged to the index ethnicity) was prepared with the help of female health community volunteers (FCHVs), ANMs, informal birth attendants and other local key informants in the area.
4. The researchers visited potential participants, explained the objectives of the study and requested their participation in the FGD. Once the consent to participate in the discussion at the designated venue and time was obtained from the desired number of women (8-12), no further effort was made to contact the remaining women on the list. A special consideration was also made to include deliveries that were spread out over 10 years and had normal and complicated deliveries. Once the participants gathered, verbal consent was sought from them and FGD was conducted.

Table 3.8: Ethnicity Covered in the FGD by District

District	Ethnicity covered in FGD
Jumla	Brahmin, Chhetri and Dalit
Surkhet	Brahmin, Chhetri and Dalit
Kailali	Magar and Tharu
Rupendehi	Muslim and Dalit (terai)
Baglung	Magar and Dalit
Rasuwa	Tamang and Brahmin
Sunsari	Rai and Dalit
Okhaldhunga	Newar and Rai

Recruitment, Training and Orientation for all Qualitative Components

Eight female research assistants (RAs) were recruited from the experienced pool of researchers utilised by CREHPA. The selected RAs were university graduates, had experience in collecting qualitative data on reproductive health, were familiar with the study districts and fluent in speaking local dialects. The RAs were given 5 days of intensive orientation, including an overview of the study, participant selection, in-depth interviewing and FGD techniques, documentation, and issues surrounding confidentiality and ethical procedures during data collection. The training involved short lectures, mock interviews, role-plays and field-testing to ensure they were fully competent with the entire FGD procedure.

The training was conducted by the core research team at CREHPA, with the presence of an international consultant. Representative from Family Health Division (FHD) and SSMP/OPTIONS were invited in the training to explain the government policy and strategy on safe motherhood, current maternal health situation, objectives and importance of conducting the study in the country.

Data Collection and Quality Control for All Qualitative Components

A guideline was prepared for each of the five study components. All guidelines were first drafted in English and then translated into Nepali. In most cases, especially at the district level, Nepali language instruments were used. Pre-testing of research instruments was carried out in a village in Lalitpur district to check the appropriateness and comprehensibility of the language used, the ability to recall information, and the

sequence and structure of the instruments. The results of the pre-tests were reviewed carefully and changes required in the research instruments were incorporated.

The fieldwork was carried out between 13 December 2008 and 2 February 2009. There were four field teams, each comprising one supervisor and one research assistant (both females). Each team covered two districts. In most of the cases the supervisors moderated the FGD sessions and also conducted IDIs. Research assistants mainly helped in taking notes and transcribing the interviews/discussions. Almost all district level and all central level IDIs were conducted by the core study team members.

Participants (women, health service providers, informal birth attendants and key stakeholders) involved in this study were fully informed about the nature of the study, the study objectives, and the confidentiality of the data. The potential benefit and risk in participating in the study was explained to all study participants. Participants were informed that they may skip any questions they do not wish to answer and are always given the opportunity to comment or ask any questions to the researchers. The informed consent form was written in simple Nepali language. This was read out to the participants and verbal consent was obtained. Ethical guidelines developed by the WHO for reproductive and sexual health research was the basis of the informed consent. No names were entered into the computerised data base and no personal identifications were used in the analysis or dissemination of results.

The field team was closely supervised by the core team members in order to ensure the quality of their work. The core team members accompanied the team during the initial period of the fieldwork (except in Okhaldhunga and Jumla) and spent three to four days in the district to monitor the fieldwork and conduct interviews with district level stakeholders. The core team members reviewed transcription of interviews/discussion, observed the FGDs and provided on-the-spot feedback to the RAs. Telephonic communication (wherever available) with the RAs was maintained to monitor the progress and quality of the data collection. For quality control, no more than five individual interviews were conducted per day by each enumerator. IDIs and FGDs were recorded (with the consent of respondents) and field notes were also kept as much as possible. Transcription and expanding of field notes were done before moving on to the next interview/discussion. All transcriptions were reviewed by the core team members and word by word translation into English was carried by the translators. The quality of the translation was further examined by the core study team members and corrections were made if required.

Experience of Conducting In-depth Interviews with Key Stakeholders

It was great learning experience to have the opportunity to conduct key stakeholder interviews at both district and national level on the qualitative part of MMMS. I had travelled to 4 of the study districts namely Rasuwa, Sunsari, Surkhet and Kailali. Conducting in-depth interviews with key stakeholders at both national and district level brought along challenges and rich experience of in-depth interviewing with major players.

Methodologically, the study had five different respondent categories which allowed collecting rich information from beneficiaries, service providers at different levels and policy makers. Having views of such diverse range of categories in itself is an interesting prospect as the data could be triangulated within the respondent categories and with the quantitative data. I felt that interview with women who had complication not only revealed interesting and significant experiences but also made the study findings stronger. I had the opportunity to interact with health workers working at grass-root level, service users to policy makers. This gave me clear outlook on how policy is translated into practice and where the gaps are on implementation.

Reflecting on my experience, the most difficult task I faced at the district level was arranging time for the interview of the stakeholders. It was really hard to arrange even 30 minutes of their time for reasons best known to them. Repeated requests had to be made to some of the stakeholders for fixing time for interview. Once the interview had been started I found most of the stakeholders keen to express their opinion and experiences. Some of the stakeholders disclosed their views off the record especially on health service management constraints. They made request on not to quote things that had been said off the record. However, I had obtained response on such important issues by asking appropriate probing questions and examples. It was observable during few interviews that whenever district level stakeholders made negative comments on health institutions or on service they often tried to pacify it with some positive comments. Interestingly, very few of the stakeholders asked incentive for lending us time to participate in the interview.

Other practical challenges that I faced was, Bandas (Strikes) followed me wherever I went and I am not sure whether to blame it for the political situation at that time or for my luck. Despite the Bandas, whether it was by walking 4 hours to a PHCC in Rasuwa or travelling in the back of a truck for a bumpy ride or travelling in jeep which was without rear brakes in Chatara of Sunsari I had my assigned task completed.

- Field coordinator, CREHPA

Overcoming Language Barriers in Qualitative Data Collection and Data Management

The study districts had different ethnic communities where people spoke many different languages including Awadhi, Maithili, Tharu, Hindi and Nepali. Besides those languages, Nepali spoken in Jumla also has many terminologies which are not understood by people from other region. The language barrier was expected for the study because of the study districts and ethnic communities selected for the district. To overcome the language barrier, number of strategies was adopted for data collection and data management.

Primarily, Research Assistants Selected for the study were based on their language ability. Hence, the study team comprised of at least one person in a team who was knowledgeable in the local language. This helped in data collection in all the study districts. For instance, in Rupandehi the language spoken was of mixed kind that included Awadhi, Tharu and Hindi. Our Research Assistant was from the region and could speak the local language well. So, she conducted and transcribed the interviews and discussion in local language. Regarding data management, interviews and discussions conducted in the local language were first transcribed in the local language. Then it was translated into Nepali by Research Assistants. After which, the translated interviews were again translated into English by in house and temporary translator hired for the study purpose. To maintain data quality some of the translated data were back translated by a third person into Nepali, then into the local language. Thus, language was one of the major challenges for the study which consumed considerable amount of time and resources for data management.

- Field Co-ordinator, CREHPA

Data Management and Analysis for All Qualitative Components

All IDIs and FGDs were tape-recorded with the consent of the participants. Data were analyzed using content analysis technique. First, all textual data were transcribed from audio-tape (or expanded from the notebook) and translated into English. After reviewing the transcripts, the major themes and concepts were identified. The main themes that emerged from the data were developed into codes for organizing and analyzing subsequent interviews/discussions. Two researchers developed an initial code book independently based on early interviews/discussions. Similarity and dissimilarity between two researchers in assigning the codes in early interviews/discussions were checked by a third person (a core team member) who had resolved the discrepancies before coding the remaining interviews. Modifications to the code book were made in cases where the existing codes were not adequate and the updated code book was used in analyzing subsequent interviews/discussions. In the next step, all the interviews/discussions were coded and linked with the background characteristics of respondents. Once the transcripts were coded, relevant quotations that illustrated emerging themes were integrated with the background characteristics of the participants in a single report. From these reports, the ranges of views expressed within themes were explored, as well as the relationship(s) between themes. Finally, the relevant quotations were extracted and interpretation was carried out. The computer programme Atlas/ti was used to follow the above steps.

CHAPTER 4: ALL CAUSE MORTALITY TO WOMEN OF REPRODUCTIVE AGE (15-49 YRS.)



4.0 Introduction

This chapter presents the key findings related to all deaths to women of reproductive age, with a more detailed focus on pregnancy related and maternal deaths in the next chapter. The data presented in this chapter come from the community surveillance system and the associated verbal autopsies for all cause deaths to women of reproductive age (aged 15-49). Comparisons are made throughout to other sources of data, where appropriate, namely to the 1998 Maternal Mortality and Morbidity (MMM) Study. First of all, levels of all cause mortality among women of reproductive age are explored for the eight study districts. The causes of death are presented by ICD-10 chapter (World Health Organization, 1993) as well as for the leading individual causes. The chapter also explores the place of death and the background characteristics of women who have died. The chapter also summarises the views of members of the community and providers regarding their perceptions of what could have saved the women's lives.

4.1 Levels of All Cause Mortality among Women of Reproductive Age

A total of 1496 women of reproductive age (15-49) died in the eight study districts within the one year study period in a total population of 861,312 women of reproductive age, thus giving an overall death rate of 174 deaths per 100,000 women of reproductive age (Table 4.1). The death rate varied by district, with the lowest rates recorded in Baglung (120) and Okhaldhunga (138) and the highest rates in Kailali (219) and Jumla (310). The rate in Jumla was over double that of three of the other districts. Okhaldhunga has a relatively low rate given its ranking in the HDI. Excluding the pregnancy related deaths, the overall rate was 154 per 100,000 women of reproductive age and the variation between districts was similar to that for all deaths.

Table 4.1: Levels of All Cause Mortality among Women of Reproductive Age

District	Number of women of reproductive age (15-49) 2008/09*	Number of deaths to women of reproductive age (15-49 yrs)	Number of non-pregnancy related deaths to WRA (15-49yrs)	Death rate for WRA per 100,000 WRA	Non-pregnancy related death rate per 100,000 WRA
Sunsari	199,080	327	300	164	151
Rupandehi	216,795	340	290	157	134
Kailali	190,635	417	370	219	194
Okhaldhunga	44,360	61	56	138	126
Baglung	82,993	100	89	120	107
Surkhet	89,161	153	134	172	150
Rasuwa	12,451	18	15	145	120
Jumla	25,837	80	70	310	271
Total	861,312	1,496	1,324	174	154

Source: *HMIS section, Management Division, DoHs.

Note: Population estimates are based on the TFR of 3.3 for year 2006 and the fast fertility decline by CBS.

4.1.1 Comparisons to Other Studies

The overall death rate for women aged 15-49 for the same three districts declined from 214 per 100,000 in the 1998 MMM study to 181 in this study, and correspondingly the rate for non-pregnancy related deaths declined from 177 to 158 per 100,000. Kailali has the highest rate in 1998 and 2008/09, however, this district has seen the most prominent

decline, as the death rate has reduced from 305 to 219 per 100,000. Rupandehi has seen little change in the death rate for WRA, 156 per 100,000 women in 1998 and 157 in this study, and when pregnancy related deaths are removed the rate actually increases from 125 to 134.

Table 4.2: Comparison of Death Rate in 1998 and 2008/09 MMMS

District	Death rate for WRA per 100,000 WRA		Non-pregnancy related death rate per 100,000 WRA	
	1998	2008/09	1998	2008/09
Kailali	305	219	254	194
Okhaldhunga	150	138	133	126
Rupandehi	156	157	125	134
Total	214	181	177	158

Both the Nepal Family Health Survey (NFHS 1996) and the NDHS 2006 obtained information on sibling mortality (male and female by age) from female respondents as a part of the process for estimating the maternal mortality ratio. The surveys then provided age specific death rates for women and men. The death rate for women aged 15-49 for 1991-1996 was 364 death per 100,000 women (NFHS 1996) and 209 per 100,000 for 2001-2006 (NDHS 2006), showing a large decline over the ten year period. The overall rate for the eight districts in this study indicates further decline, with a rate of 174 per 100,000. However, there is a large variation within eight individual districts; ranging from a low of 120 in Baglung and a high of 310 in Jumla (Table 4.1).

4.2 Cause of Death among Women of Reproductive Age

4.2.1 Cause of Death by ICD-10 Chapter

The overall leading ICD-10 chapter for deaths to women of reproductive age (15-49 years) was 'External Causes of Morbidity and Mortality' (Chapter XX), comprising a quarter of all deaths, with a low of 13 percent in Jumla and a high of 39 percent in Okhaldhunga (Table 4.3). This was the leading chapter in all study districts except for Jumla, where the leading cause was "Certain Infectious and Parasitic Diseases" (Chapter I), 16 percent. Within this chapter suicide was very prominent, and as suicide has emerged as the leading cause of death, this is discussed further in Section 4.2.2. 'Symptoms, Signs and Abnormal Clinical and Laboratory Findings not Elsewhere Classified' (Chapter XVIII) was the second highest (12%). 'Pregnancy, Childbirth and Puerperium' (Chapter XV) was third (11%). 'Pregnancy, Childbirth and Puerperium' contributed to the highest proportion of deaths to women of reproductive age in Rasuwa (17%) and lowest in Sunsari and Okhaldhunga (8%). The fourth leading cause of death was 'Neoplasm' (Chapter II), at 11 percent. The percentage of deaths due to 'Diseases of the Nervous System' (Chapter VI) was found to be very high in Okhaldhunga compared to the other districts, while the percentage of deaths due to 'Diseases of Respiratory System' (Chapter X) was higher in Rasuwa and Jumla compared to the other six districts. It should be noted that both Rasuwa and Jumla are mountain districts with extremely cold climates, particularly during winter. The percentage of deaths due to 'Injury, Poisoning and Certain Other Consequences of External Causes' (Chapter XIX) was found to be very high in Baglung compared to other districts.

Table 4.3: Cause of Death, by ICD-10 Chapter, for All Deaths to Women of Reproductive Age, by District

Ch	ICD 10 Chapter Heading	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
I	Certain Infectious & Parasitic Diseases	10.1	10.3	12.2	6.6	8.0	5.9	16.7	16.3	10.4
II	Neoplasm	14.1	7.4	11.3	4.9	14.0	10.5	0.0	10.0	10.6
III	Disease of the Blood & Blood Forming Organ	0.0	0.9	1.7	0.0	1.0	2.6	0.0	0.0	1.0
IV	Endocrine, Nutritional & Metabolic Diseases	2.4	1.5	1.0	0.0	1.0	0.0	5.6	0.0	1.3
V	Mental & Behaviour Disorder	0.6	1.5	1.4	1.6	3.0	0.7	0.0	0.0	1.2
VI	Diseases of Nervous System	4.0	2.9	3.8	13.1	3.0	2.6	5.6	5.0	3.9
IX	Diseases of Circulatory System	9.5	7.6	7.0	4.9	7.0	7.8	0.0	13.8	8.0
X	Diseases of Respiratory System	7.3	4.4	5.5	4.9	8.0	5.9	11.1	10.0	6.1
XI	Diseases of Digestive System	4.0	2.1	2.2	3.3	2.0	3.9	5.6	3.8	2.9
XII	Diseases of the Skin & Sub-Cutaneous Tissue	0.3	0.3	0.2	0.0	0.0	1.3	5.6	0.0	0.5
XIII	Diseases of Musculoskeletal System & Connective Tissue	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.3
XIV	Diseases of Genitourinary System	2.8	0.9	2.9	4.9	1.0	2.6	0.0	2.5	2.3
XV	Pregnancy, Childbirth & Puerperium	7.6	13.8	10.3	8.2	11.0	11.1	16.7	11.3	10.7
XVIII	Symptoms, Signs & Abnormal Clinical and Laboratory Findings Not Elsewhere Classified	10.4	17.1	10.8	6.6	7.0	11.8	0.0	15.0	11.9
XIX	Injury, Poisoning & Certain Other Consequences of External Causes	4.0	4.4	3.6	1.6	10.0	3.3	0.0	0.0	3.9
XX	External Causes of Morbidity & Mortality	22.6	24.1	26.1	39.3	24.0	30.1	33.3	12.5	25.0
Total		327	340	417	61	100.0	153	18	80	1496

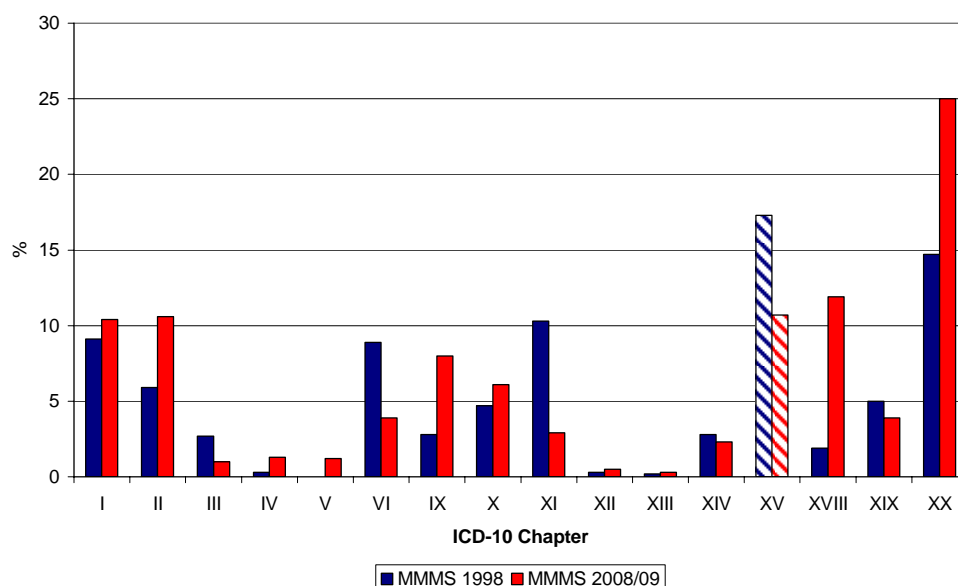
4.2.2 Comparison of Cause of Death by ICD Chapter with 1998 MMM Study

Table 4.4 compares the results for the 1998 and 2008/09 MMM Studies by ICD-10 Chapter, (also illustrated in Figure 4.1). Chapter XV 'Pregnancy, Childbirth and Puerperium' was the leading ICD-10 Chapter in 1998, accounting for 17 percent of deaths (excluding deaths due to accidental and incidental causes), however, the percentage contribution dropped to 11 percent in 2008/09, making it the third highest chapter. 'External Causes of Morbidity and Mortality' (Chapter XX) was the second highest, at 15 percent, in 1998, and became the leading chapter, comprising a quarter of deaths in 2008/09. As one would expect, the percentage contribution of some causes will have increased over time, and reduced for others. The percentage of deaths due to 'Symptoms, Signs and Abnormal Clinical and Laboratory Findings Not Elsewhere Classified' (Chapter XVIII) increased six fold between 1998 and 2008/09. 'Certain Infectious and Parasitic Diseases' (Chapter I) comprised a similar percentage in both studies, while the percentage of deaths due to 'Neoplasm' (Chapter II) almost doubled during the ten year period. The percentage of deaths due to 'Disease of the Nervous System' (Chapter VI) and 'Diseases of the Digestive System' (Chapter XI) declined considerably over the decade while the Disease of the Circulatory System (Chapter IX) increased significantly from 3 percent in 1998 to 8 percent in 2008/09.

Table 4.4: Comparison of Cause of Death, by ICD-10 Chapter, for All Deaths to Women of Reproductive Age between MMMS 1998 and MMMS 2008/09

ICD 10 Chapter	ICD 10 Chapter Heading	MMMS 1998	MMMS 2008/09
I	Certain infectious & parasitic diseases	9.1	10.4
II	Neoplasm	5.9	10.6
III	Disease of the blood & blood forming organ	2.7	1.0
IV	Endocrine, nutritional & metabolic diseases	0.3	1.3
V	Mental & behaviour disorders	-	1.2
VI	Diseases of the nervous system	8.9	3.9
IX	Diseases of the circulatory system	2.8	8.0
X	Diseases of the respiratory system	4.7	6.1
XI	Diseases of the digestive system	10.3	2.9
XII	Diseases of the skin and subcutaneous tissue	0.3	0.5
XIII	Diseases of the musculoskeletal system & connective tissue	0.2	0.3
XIV	Diseases of the genitourinary System	2.8	2.3
XV	Pregnancy, childbirth & puerperium	17.3	10.7
XVIII	Symptoms, signs & abnormal clinical & laboratory findings not elsewhere classified	1.9	11.9
XIX	Injury, poisoning & certain other consequences of external causes	5.0	3.9
XX	External causes of morbidity & mortality	14.7	25.0
	Unknown	13.1	-
Total		640	1,496

Figure 4.1: Comparison of Cause of Death, by ICD-10 Chapter, for All Deaths to Women of Reproductive Age between MMMS 1998 and MMMS 2008 /09



4.2.3 Leading Individual Causes of Death

The top twenty leading causes of death account for 72 percent (Table 4.5). Overwhelmingly, the leading cause of death among women of reproductive age was suicide, comprising 16 percent of all deaths. Accidents were the second leading cause (9%) and tuberculosis was third (5%). Three maternal causes were in the top twenty: haemorrhage at number 11 (3%), eclampsia was twelfth equal (2%) and maternal infectious and parasitic diseases at eighteenth equal.

Table 4.5: Top Twenty Individual Causes of Death, for All Deaths to Women of Reproductive Age

Rank	Cause	Number	Percent
1	Suicide	239	16.0
2	Accidents	135	9.0
3	Tuberculosis	76	5.1
4	Uterine cancer	59	3.9
5	Fever (unknown origin)	58	3.9
6	Chronic obstructive pulmonary disease	57	3.8
7	Stroke (not haemorrhage or infarction)	50	3.3
8	Abdominal & pelvic pain	42	2.8
9	Diarrhoea & gastroenteritis	41	2.7
9=	Heart disease	41	2.7
11	Haemorrhage (APH&PPH)	37	2.5
12=	Eclampsia	35	2.3
12=	Jaundice	34	2.3
14	Renal failure	31	2.1
15	Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	28	1.9
16	Toxic effect of contact with venomous animals	27	1.8
17	Fibrosis & cirrhosis of liver	25	1.7
18=	Other pulmonary heart diseases	23	1.5
18=	Pneumonia (organism unspecified)	23	1.5
18=	Maternal infectious & parasitic diseases	23	1.5
			72.3

Table 4.6 shows the ranking of the top ten causes for the eight districts, suicide was the leading cause of death in all districts, with the exception of Baglung, where it was second (and accidental deaths were the leading cause) and in Jumla where it was ranked 9th (and TB was highest). Accidental deaths accounted for a high proportion of deaths in Okhaldhunga, Baglung and Rasuwa. Accidental deaths were first equal with suicide in Rasuwa, and second in five districts. Tuberculosis was the third leading cause in Baglung, Surkhet and Rasuwa. Uterine cancer was the third leading cause of death in Kailali and the fourth leading cause in Baglung and Surkhet. In regards to high ranking maternal causes: haemorrhage was the 3rd highest cause in Rasuwa; 7th in Jumla and 7th in Kailali, while eclampsia was the 4th highest in Okhaldhunga and 7th in Sunsari and Jumla.

Case study 4.1: Accidental Death

Neeta, 16, was an unmarried Hindu. Her clothes caught fire while she was cooking rice at about 10 o'clock in the morning. The fire spread quickly on her silk clothes from her neck to her knee. She jumped up and rolled over on the soil to put the fire out. Her family members removed the clothes attached to her body with the help of a knife.

They softly massaged her burnt skin with Coconut oil. She was taken to the district hospital at about 2 o'clock (four hours later). She was given 10-12 bottles of IV drip and a white coloured cream/paste to apply on the burnt skin, and received one injection each day.

Her condition still had not improved after 12 days in the hospital so she was taken to the Mission Hospital, paying Rs. 2,200 for ambulance. On admission she was given injections, IV drips and some medicines, and her urine was passed through a urinary catheter. Her father donated blood to her. She was admitted for 33 days but passed away while still receiving treatment. It cost around Rs. 100,000 for her treatment.

Case study 4.2: Death Due to Tuberculosis

Rekha, was an illiterate 43 year old Hindu. Sixteen months before she died she complained of a burning sensation and back pain. She gradually developed paraesthesia in her backside, for which she had her back sponged with water. Initially she had fever but it subsided later. After fifteen days she became paralysed below the waist. She was first attended to by a faith healer, and then by an AHW who referred her.

Family members had to arrange money for her treatment by selling jewellery and borrowed some money from an AHW. She was taken to Surkhet hospital she was diagnosed with Bone Tuberculosis and was given medicine for one month. She took it for 15 days but stopped taking the rest as she saw no progress and was having difficulty moving and walking. Later she was taken to Kohalpur teaching hospital where she had a blood transfusion and received four pints of blood. She was informed that she had a gal stone and needed an operation.

She returned home from the hospital by walking but again she suffered from back stiffness. After that she received acupuncture treatment, but it went in her vein, and there were holes in her whole body by pricking, and muscles protruded from the pricked wounds. Then she developed a distended abdomen and was not able to urinate so she was taken to a nursing home in Lucknow (India) where they gave medicine but did not diagnose the disease. After returning home her health started further aggravating. All her body was black due to pricking and wound was outgrowth and foul smelling. Day by day she became lean and thin and finally paralyzed her hands. After becoming aphasiac for two days she died at her own home.

For her treatment they spent about 75 thousand rupees. *"It was not decided to treat her in the health facilities earlier otherwise she could have been saved"* narrated her relative.

Table 4.6: Top Ten Individual Causes of Death, for All Deaths to Women of Reproductive Age, by District

Causes of death	Sunsari		Rupandehi		Kailali		Okhaldhunga		Baglung		Surkhet		Rasuwa		Jumla	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Suicide	12.8	1	17.9	1	18.9	1	18.0	1	7	2	20.9	1	16.7	1=	3.8	9=
Accidents	9.2	2	6.5	2	8.2	2	16.4	2	17	1	8.5	2	16.7	1=	7.5	4
Tuberculosis	4.9	5	5.0	4	4.3	4	3.3	7=	5	3	5.2	3	11.1	3=	11.3	1
Uterine cancer	3.1	10	4.4	6	5.0	3			4	4=	4.6	4=				
Fever (unknown origin)	3.4	7=	6.2	3	2.9	7=			3	7=	3.3	7			6.3	5=
Chronic obstructive pulmonary disease	3.7	6			4.1	5	3.3	7=	3	7=	4.6	4=			8.8	2=
Stroke (not haemorrhage or infarction)	6.4	3	3.8	7	2.4	10=			4	4=						
Abdominal & pelvic pain	3.4	7=	3.5	8=											6.3	5=
Diarrhoea & gastroenteritis	5.8	4			2.4	10=	3.3	7=					5.6	6=	3.8	9=
Heart disease					3.4	6									3.8	9=
Haemorrhage (APH&PPH)			3.2	10	2.9	7=							11.1	3=	5.0	7=
Eclampsia	3.4	7=					4.9	4=							3.8	9=
Jaundice			4.7	5							2.6	8=				
Renal failure					2.6	9	3.3	7=			2.6	8=				
Other maternal diseases			3.5	8=												
Fibrosis & cirrhosis of liver													5.6	6=		
Other pulmonary heart diseases							4.9	4=			4.6	4=			8.8	2=
Pneumonia (organism unspecified)									3	7=			11.1	3=		
Stomach cancer															5.0	7=
Breast cancer									3	7=						
Unspecified HIV					2.4	10=										
Epilepsy							6.6	3							3.8	9=
Complications of surgical and medical care									4	4=						
Other nutritional anaemias											2.6	8=				
Meningitis							4.9	4=								
Bone cancer							3.3	7=								
Symptoms and signs involving digestive system & abdomen							3.3	7=								
Other maltreatment syndromes							3.3	7=	3	7=						
Brain cancer									3	7=						
Local infections & subcutaneous tissue													5.6	6=		
Unspecified protein-energy malnutrition													5.6	6=		
Hemiplegia													5.6	6=		
Medical Abortion													5.6	6=		
Total Top 10 causes	237		283		279		50		71		106		18		64	
Total all causes	327		340		417		61		100		153		18		80	
% Top 10 causes	72.5		83.2		66.9		82.0		71.0		69.3		100.0		80.0	

4.2.4 Comparison of Leading Causes of Death with 1998 MMM Study

To make an accurate comparison with the 1998 MMM Study ICD 10 three-digit codes were assigned to the original data set. There were 84 deaths (13%) in the 1998 data for which the underlying cause was 'unknown'. Suicide was the leading cause of death, accounting for 10 percent of deaths, followed by tuberculosis (8%) and 'encephalitis' (8%).

Table 4.7: Comparison of Top 5 Individual Causes of Death for All Deaths to Women of Reproductive Age between MMMS 1998 and MMMS 2008/09

Cause	1998			2008/09		
	N	%	Rank	N	%	Rank
Suicide	65	10.2	1	239	16.0	1
Accidents	-	-	-	135	9.0	2
Tuberculosis	53	8.3	2=	76	5.1	3
Uterine cancer	-	-	-	59	3.9	4
Fever (unknown origin)	-	-	-	58	3.9	5
Encephalitis	53	8.3	2=	-	-	-
Haemorrhage	48	7.5	4	-	-	-
Hepatitis	31	4.8	5	-	-	-

Regarding maternal causes Haemorrhage was the 11th leading cause of death accounting for 3 percent of all deaths; retained placenta at 3 percent was 12th; maternal infectious and parasitic; obstructed labour was 16th; eclampsia was 17th and puerperal sepsis was 19th also featured in the top twenty cause of death of women of reproductive age. This is in contrast to the top 20 cause of death found in MMMS 2008/09.

Suicide

Suicide was the leading cause of death overall in the study area and in six of the study districts. Out of a total of 1496 deaths of women aged 15-49 in eight districts there were 239 suicide deaths (16%). The percentage contribution of suicide to deaths to women of reproductive age ranged from 4 percent in Jumla to 21 percent in Surkhet. The proportion of deaths due to suicide varies by age (Table 4.8). Suicide accounted for a quarter of all deaths to women aged 15-34 (24%) compared to just 8 percent of women aged 35-49. Furthermore, 63 percent of the suicide deaths occurred to women aged 15-29. Seventy three percent of women who committed suicide were married, however this reflects the fact that most women of reproductive age in Nepal are married. It is perhaps more interesting that suicide accounted for a quarter of deaths to unmarried women of reproductive age (25%), compared to 15 percent of married and 14 percent of widowed/separated/divorced. Ninety three percent of women who committed suicide were Hindu, again reflecting the higher proportion of Hindu's in the study population. Although percentages were higher for Kirant and Christians, the sample sizes were small. The different proportions of ethnic groups within the study area is reflected in the breakdown of suicide deaths by ethnic grouping and the sample sizes were again too small to look at Muslims and Newars. However, suicide accounts for a lower proportion of deaths in Dalits (9%), compared to Janjati (20%); Brahmin (17%) and Terai/Madhesi (15%). Those who received no schooling and are illiterate accounted for 44 percent of suicide deaths, however, this also reflects the characteristics of women within the study area and hence the larger number of deaths within this group. In contrast the suicide accounted for over double the proportion of deaths among those who went to school (27%) compared to those who did not (12%), however, it is possible that those who did not attend school may be more likely to die from other causes.

Table 4.8: Characteristics of Women Who Died from Suicide

Characteristics	Number of suicide deaths	Number of deaths to WRA	% of deaths to WRA due to suicide	% of suicide deaths
Age group				
15-19	51	202	25.2	21.3
20-24	52	203	25.6	21.8
25-29	47	202	23.3	19.7
30-34	31	137	22.6	13.0
35-39	21	221	9.5	8.8
40-44	16	194	8.2	6.7
45-49	21	337	6.2	8.8
Marital Status				
Married	174	1,191	14.6	72.8
Unmarried	50	197	25.4	20.9
Separated/Divorced/Widowed	15	108	13.9	6.3
Religion				
Hindu	221	1,378	16.0	92.5
Muslim	4	58	6.9	1.7
Buddhist	6	36	16.7	2.5
Christian	4	13	30.8	1.7
Kirant	4	11	36.4	1.7
Ethnic Group				
Janjati	109	548	19.9	45.6
Brahmin/Chhetri	67	385	17.4	28.0
Terai/Madheshi/Other Caste	29	188	15.4	12.1
Dalits	25	281	8.9	10.5
Muslim	4	65	6.2	1.7
Newar	3	19	15.8	1.3
Others	2	10	20.0	0.8
Education				
No schooling illiterate	105	893	11.8	43.9
No schooling literate	31	210	14.8	13.0
Grade 0-5	40	149	26.8	16.7
Grade 6-9	36	154	23.4	15.1
SLC passed or higher	27	84	32.1	11.3
Don't know		6		
Total	239	1,496	16.0	100.0

It is difficult to be certain about the underlying factors related to suicides, and indeed in 37 percent of cases no underlying factor could be identified. In others there were often many inter-related factors, but Table 4.8 gives a picture of the main underlying factors. Issues related to marriage, families and relationships were linked to 41 percent of suicide deaths (Table 4.8). Various members of families were identified as quarrelling with or abusing the deceased before she died. Overwhelmingly the involvement of the husband was identified in over half of the suicides linked to family/marriage or relationship issues, and linked to over one fifth of all suicides (21%). Given that the husband was frequently the respondent for the verbal autopsy and that there was insufficient information to identify underlying factors in 37 percent of cases, this figure is also likely to be an underestimate.

'Maisari and her husband did not have good relation since last 2-3 years. They usually quarrelled with each other and husband used to beat her. Her husband usually stayed in India and sometimes visited her but never gave money even for household expenses. Maisari sold household utensils to pay school fees for her children. Her husband beat her for selling those utensils. She took poison and tried to lie in bed but fell down.'

- Verbal Autopsy Respondent

In 7 percent of cases there were underlying factors related to males from outside the family, in many of these cases the married and unmarried deceased women were romantically involved, while in others it was unclear. Romantic relationships were linked to many of the younger women who committed suicide, with women being unable to marry the man of their choice or being forced into an arranged marriage against their will. It was in such circumstances that arguments with parents also played a role.

'She was in love with a boy in the village. When her parents came to know about the relationship her father scolded her and slapped her twice. However, her mother agreed they could get married if he accepts. She proposed to the boy, but he said he would go for foreign employment and marry her only on his return. On hearing this she hanged herself on a tree while cutting grass in the jungle.'

- Verbal Autopsy Respondent

'Mamata Khatri went to see Jatra in Jumla bazaar with her friends. There she met her classmate who requested her to accompany with him to have tea and snacks. Mamata along with her other two girlfriends went to a nearby hotel. As they were eating their snacks, Mamata's husband came and scolded her and even slapped her classmate on his face twice. He further threatened her to discuss this issue at home. After this incident, Mamata disappeared, went to the jungle and hanged herself informed her mother.'

- Verbal Autopsy Respondent

Illness (excluding mental health problems) was an underlying factor in 9 percent of cases, where the deceased sometimes thought they were going to die anyway so why waste resources in trying to save them; were embarrassed of their problem; or just felt they could no longer cope. Specified illnesses included HIV, epilepsy, TB, heart disease and problems related to menstruation.

'[She] was patient with epilepsy and she used to have epileptic attack once in every 12-18 months. She had consulted traditional healers and hospitals in India. But it was not healed. Whenever she had attack she used to say; "it is better to die rather than living with this disease". On the day of her death [her] family members searched her and found her breathing loud in next room. She was taken to the hospital but died on the way. The hospital certified that she had ingested poison.'

- Verbal Autopsy Respondent

Mental health problems were recognised as underlying factors in 8 percent, although with the exception of depression in 1 percent of cases (postpartum depression was reported in one case) the type of mental illness was not specified.

'[She] had a mental illness since last five years. She used to have symptoms like shouting and being unconscious. It last for one hour to whole day. "During that period she did not used to take food, did not talk and used to sleep" says her mother. She was frequently taken for check-up to governmental hospital. She was also taken to India for treatment. Her family member also consulted faith healer but none of the measure worked. On 10th of Magh, at around 11am, when nobody was at home she locked the room and hanged herself.'

- Verbal Autopsy Respondent

Various underlying causes resulted in the deceased women being mentally stressed including financial difficulties; bereavement of husband or infant; being unmarried and

quarrelling with their employer. Some of the younger deceased were suffering from stress related to studying.

'Mother of 5 babies was from a family with poor financial condition. In the name of property she had owned only a small hut. Her husband used to work as rickshaw puller. She was sick and tired with her life under poverty, frequent clash with her husband and full of struggle. She decided to commit suicide and wolfed poison.'

- Verbal Autopsy Respondent

'She had lost her seven month baby so she used to be in tense...she started showing unusual behaviour like crying, shouting, singing song remembering her son, dancing, talking about baby. She used to grave where her child was buried [and] say "take me with you" and "I will hang myself". Suddenly she took the poison and started vomiting and died within 20minutes so we could not took her anywhere" says her relatives.'

- Verbal Autopsy Respondent

Table 4.9: Underlying Factors for Suicide Related Deaths

Underlying Cause	Number	percent
Family/Marital/Relationship	97	40.6
- Husband	50	20.9
- In-laws	6	2.5
- Parents	12	5.0
- Son / daughter	6	2.5
- Brother	2	0.8
- Second wife	1	0.4
- Family (unspecified)	4	1.7
- Male outside family	16	6.7
Illness	21	8.8
Mental Health	19	7.9
- Depression	3	1.3
- Unspecified	16	6.7
Mental stress	14	5.9
- Financial	3	1.3
- Studying	3	1.3
- Bereavement	3	1.3
- Unmarried	1	0.4
- Unspecified	3	1.3
- Quarrel with employer	1	0.4
N/A	88	36.8
Total	239	100.0

The two main methods used by women to commit suicide were consuming poison (mainly pesticides), accounting for over half of all suicide deaths (57%), and hanging themselves, accounting for over one-third of deaths (39%) (Table 4.10). There was some district variation in the relative contribution of the two methods; in Rupandehi and Sunsari poison was more common, with 70 percent and 67 percent respectively; in Kailali, Surkhet and Okhaldhunga the split was fairly even; whereas all suicide deaths in Baglung and Rasuwa were due to hanging, and two-thirds in Jumla (67%), although these last three districts had small sample sizes. Alternative methods were only identified in Rupandehi, with a small number of women setting fire to themselves and drowning, and the method was unknown in just four cases.

Table 4.10: Methods Used for Suicide Related Deaths

Methods Used	Number	Percent
Consumed poison	135	56.5
Hanging	93	38.9
Burning	4	1.7
Drowning	3	1.3
Unknown	4	1.7
Total	239	100.0

Case Studies of Suicides Linked to Mental Health Problems

Manu, 38, had suffered from mental illness for the last five to six years, but the only care she received was from traditional healers. She didn't receive any formal medical care. She had tried to commit suicide earlier. On her last attempt she told her family she was going to the jungle to the toilet. When she had still not returned by the evening her family members went to look for her and found her dead body hanging in the jungle.

Rekha, 37, had suffered from mental illness for the last two and a half years. She suffered from symptoms such as standing near the bed when she was asleep, shivering lips, clenching her hands, and didn't talk much. Her husband took her for a check up at a mental hospital in Kathmandu after one month of symptoms. The doctor prescribed her some medicine for two years on the basis of her symptoms. With the medicine, she gradually improved. However, the doctor did not advice for any follow up visit, so she never had another check-up. She had stopped taking her medicine for the last five months, even though it wasn't very expensive. On the day of her death she went to her bedroom and hanged herself with a shawl.

From the second month of Jestha, it was known that Renu, 40, was sick. She used to shout the name of God. Initially a traditional healer was consulted, but later, thinking that it was mental illness, the family decided to seek treatment and she was taken to BPKIHS. After 9 months of treatment in BPKIHS, although she was taking her medicine, she committed suicide by swallowing poison.

Narmada, 47, had a mental disorder and her child was also mentally retarded. She had come to the village from a neighbouring town and earned her living by begging. She stayed in the compound "Peti" of a nearby house from few days before death. One night she suddenly hanged herself in a mango tree with her own shawl however the villagers knew about her death only in the morning.

One year preceding her death, Neetu, 17, had a check up in private clinic knowing that she was sick. The doctor informed her that she had a brain disorder and she followed his advice and started taking medicine. She was getting better. However, on the day of her death, she went to a nearby village and while returning swallowed some poison. She sat down in the passage near her room and pretended to eat the rice she was given. Suddenly she started vomiting repeatedly. Her family members suspected she had consumed poison and called the AHW from the village. By the time the AHW arrived she was semi-conscious, and the AHW agreed that she had probably ingested poison, so her family members took her to the hospital on their motorbike. As soon as she reached the hospital the doctor declared her dead. "We don't know why she took poison, but doctor told us that she was having mental disorder," her mother said.

Dolma, 25, had been tense for the three to four months before her death. She had symptoms such as talking less with members of her family, spending time on her own, and not showing any interest in work. Her family could not understand what made her so sad. She committed suicide by hanging herself in the jungle near her home.

Case Studies of Suicides Linked to Relationship, Marriage and Familial Issues

Maisari and her husband had not had a good relationship for the last two to three years. They often quarrelled with each other and her husband used to beat her. Her husband usually resided in India, visiting occasionally, but never giving her money even for household expenses. Maisari sold household utensils to pay school fees for her children. At night on 22nd of Chaitra her husband beat her for selling those utensils. On 23rd in the early morning she went to market and brought a bottle of poison. She returned home and told her children to go downstairs so that she can clean the room. But instead of cleaning room she took poison and tried to lie in bed but fell down. Hearing the sound the daughter thought that their parents had fought again and went to see. When she reached upstairs Maisara was brought outside her room by her husband and he informed villagers that she had taken poison. But the husband and mother-in-law did not take her to health centre. Then villagers took her to medical hall where health worker told that he could do any treatment. So they took her to Mehelkuna. However in absence of relative the health worker denied starting treatment and when the villagers took the responsibility, she was given saline but she died during treatment.

Pasang, 24, had lived in the town with her husband and son for the last eight years. She knew her husband was having an affair with a girl and because of this they used to quarrel. She did not like her husband taking his girlfriend on his motorcycle. One day, her husband and his girlfriend went to Kathmandu on his motorcycle. When he returned in the evening, he quarrelled violently with his wife and she left their home. The next morning she was found hanging below the staircase of a hotel in the bazar.

19 year old Sita was studying in grade 9 and had a boyfriend. However, her family had arranged for her to marry someone else against her will. When she heard about it, she went to her boyfriend, explained everything and asked him to marry her. However, he told her that she needed to wait for four years until he could marry her. She returned to her home stating that she is not in a position to wait for even four minutes, let alone four years. On the same evening after having dinner she consumed poison but no one in the family noticed. The next day members of her family found her dead, before there was anything they could do to intervene.

Shanti, 33, was a victim of domestic violence. She was treated ruthlessly by her family members. After one quarrel with her husband and mother-in-law, she went to her maternal home in another district and stayed there. After two months, when she had still not returned to her marital home, her husband went to take her back but refused. So he left her there. One month later her father-in-law tried to bring her back, but again she refused. After five months of staying at her maternal home, message came of her death. She had committed suicide by hanging. Her neighbours collectively requested a post-mortem, and her dead body was brought to her house and funeral rituals were conducted.

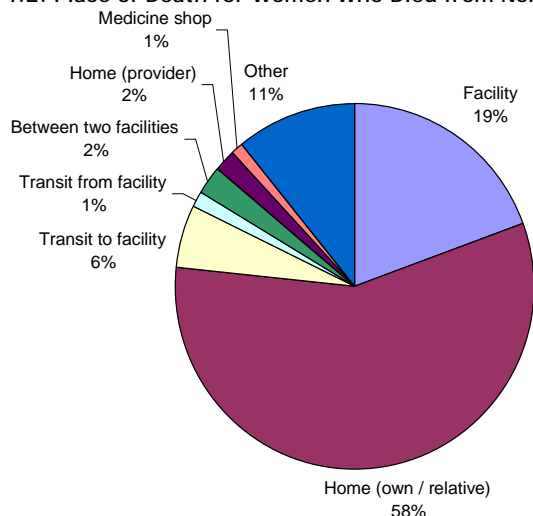
19 year old Sheelu belonged to a middle class family, and her husband was in the army. She did not have a pleasant relationship with her husband. She frequently used to argue with him and was staying at her maternal home. One night she again quarrelled with her husband, went to her maternal home and set herself on fire. Immediately a family member from her maternal home called her husband and collectively they called an ambulance and took her to the Zonal Hospital. She was immediately admitted and her treatment started. But after 3 days there was no satisfactory improvement in her health so she was referred to Kathmandu. Her husband was able to get her admitted to an army hospital in Kathmandu where she received the best service available. However, her entire body was covered in burns so she couldn't recover, and in spite of 3 months of tireless efforts made by doctors, she ultimately died at the facility.

Bishlawoti was newly married at the age of 17. After marriage she was mentally stressed as she was unhappy in her new house. Every morning there was frequent quarrelling regarding her dowry with her in-laws. Her husband started to be influenced by his parents' demands and he started to neglect her. On the day of her death, after their evening meal she went to her room to sleep and took a sulphas tablet. After three hours, when her husband went to go to sleep, he found her lying in the bed. He tried to wake her up but couldn't. There was a frothy discharge coming from her mouth and she started vomiting. With the help of other villagers, a vehicle was arranged and she was taken to hospital. When they reached the emergency department she was declared dead and her body was taken for post-mortem.

4.3 Place of Death for Women Who Died from Non-pregnancy Related Causes

Overall for the eight districts 60 percent of deaths to women of reproductive age, who died from non-pregnancy related causes, occurred at home (58% at their own home or that of a relative and 2% at a provider's home); 19 percent occurred in facilities (10% in government facilities - 9 percent in hospitals and 1 percent at lower level facilities); 7 percent in teaching hospitals; 2 percent in private hospitals; and 1 percent in missionary hospitals (Figure 4.2). Nine percent of deaths occurred in transit, with most of these (6%) occurring between the home and facility, 2 percent between facilities and 1 percent from a facility. One percent of deaths occurred at a pharmacist.

Figure 4.2: Place of Death for Women Who Died from Non-pregnancy Related Causes



There is quite a lot of district level variation; however, some of this is due to the small sample size, especially in Rasuwa (Table 4.11). The percentage of deaths occurring at home ranged from 48 percent in Rupandehi to 71 percent in Jumla, while the percentage occurring in a facility ranged from 7 percent in Rasuwa to 31 percent in Rupandehi. Some district variation was due to the presence of specific facilities: Rupandehi have three medical colleges with teaching hospitals; and Sunsari has a large medical college with a teaching hospital. Deaths in transit ranged from 4 percent in Jumla to 13 percent in Rupandehi.

Table 4.11: Place of Death for Women Who Died from Non-pregnancy Related Causes by District

Place of death	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Home	60.0	48.3	60.8	58.9	56.2	66.4	53.3	71.4	58.5
Own, relative	58.7	46.9	58.6	53.6	53.9	64.2	53.3	68.6	56.6
Provider	1.3	1.4	2.2	5.4	2.2	0.0	2.2	2.9	2.0
Facility	21.7	30.7	14.3	17.9	21.3	15.7	6.7	15.7	20.3
PHCC, HP, SHP	0.0	0.0	1.9	3.6	1.1	0.7	0.0	1.4	0.9
Public hospital	7.7	12.1	8.1	0.0	7.9	11.2	6.7	14.3	9.1
Teaching hospital	12.3	15.5	1.9	1.8	4.5	1.5	0.0	0.0	7.3
Private, Mission hospital	1.7	3.1	2.4	12.5	7.9	2.2	0.0	0.0	3.0
In transit	9.0	12.8	10.8	5.4	6.7	4.5	6.7	4.3	9.3
Home to facility	5.7	9.0	6.8	0.0	2.2	1.5	6.7	2.9	5.7
Between two facilities	2.3	2.8	2.7	3.6	3.4	0.7	0.0	0.0	2.3
From facility to home	1.0	1.0	1.4	1.8	1.1	2.2	0.0	1.4	1.3
Medicine shop	1.3	0.7	0.5	1.8	2.2	3.0	0.0	0.0	1.1
Others	8.0	7.6	13.5	16.1	13.5	10.4	33.3	8.6	10.7
Forest, road, field, etc.	5.3	5.2	9.5	8.9	11.2	9.0	20.0	7.1	7.6
Camp (flood displaced)	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Temple, hotel, etc.	1.0	1.0	3.2	3.6	1.1	0.7	13.3	1.4	1.9
Hospital in India	0.0	1.4	0.5	3.6	1.1	0.7	0.0	0.0	0.8
Don't know	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2
Total (n)	300	290	370	56	89	134	15	70	1324

4.4 Characteristics of Women Who Died from Non-pregnancy Related Causes

Overall there were 1.54 deaths per thousand women aged 15-49 across the eight study districts. As would be expected, the highest death rate occurred in the oldest age-group 45-49 (4.93 per 1,000 women) and lower rates were seen for those under 35 (Table 4.12). The age specific death rates for the 2001 Census (CBS 2003) showed that the adult mortality from the MMMS 2008/09 are similar to the rates from the census. Higher rates were found for most age groups in the NDHS 2006, with the exception of the 45-49 age group.

Table 4.12: Age Specific Death Rates for MMMS 2008/9, 2001 Census and 2006 NDHS

Age group	Number of women	Number of deaths	Death rate MMMS 2008/09 (per 1,000 women)	Death rate Census 20011 (per 1,000 women)	Death rate NDHS 20062 (per 1,000 women)
15-19	183,316	174	0.95	1.02	3.03
20-24	165,706	163	0.98	1.21	1.83
25-29	142,626	163	1.14	1.39	3.16
30-34	120,493	114	0.95	1.54	2.68
35-39	100,128	193	1.93	1.89	2.92
40-44	81,718	185	2.26	2.08	3.41
45-49	67,325	332	4.93	3.36	3.9
15-49	861,312	1,324	1.54	Na	2.09

1 Population Monograph, 2003, Central Bureau of Statistics. 2 NDHS 2006, Main Report.

Table 4.13 presents the demographic characteristics of all women of reproductive age who died due to non-pregnancy related causes, by district. The characteristics may reflect differences in number of women in each category and thus are not necessarily an indication of higher risk (Table 4.12 shows the risk by age-group). The percentage of deaths for eight districts was highest (25%) in the oldest age group 45-49. and lowest (9%) in age group 30-34. The percentage is consistently lower in all eight districts for the 30-34 age groups.

Of those women who died more than three quarters of them (77%) were currently married. This reflects the marital status of WRA in Nepal as 77 percent of WRA were currently married (NDHS 2006). Overwhelming, the majority of deaths were among Hindus. This reflects the 2001 census which revealed that 81 percent of Nepalese people were Hindus. The district level variation is consistent with the religious composition in the districts. Rasuwa's populations are overwhelmingly Tamang and Sherpa (Janjati) who worship Buddhism (Census 2001). Overall in the eight study districts there was a higher percentage of deaths due to Janjati's (38%) than any other ethnicity and caste groups, reflecting the greater number of this group within the study area. Brahmins and Chhetris comprised the second highest percentage (26%). Within the study districts there is a lot of variation in the ethnic/caste composition (see Chapter 1) which is reflected in the differences in the percentage of deaths in each group.

Table 4.14 presents the socio-economic characteristics of all women of reproductive age who died due to non-pregnancy related causes, by district. The characteristics may reflect differences in number of women in each category and thus are not necessarily an indication of higher risk. Sixty two percent of the women of reproductive age who died had received no formal schooling and were illiterate, while 13 percent had received no formal schooling but were literate. Nine percent attended school at Grade 0-5, 10 percent reached grade 6-9 and 6 percent passed their school leaving certificate. Seventy one percent of women came from households where a member owned agricultural and 28 percent had a member of the household employed overseas.

Table 4.13: Demographic Characteristics of Women Who Died from Non-pregnancy Related Causes, by District

Demographic Characteristics	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Age-group									
15-19	8.3	9.0	11.4	16.6	21.4	13.4	14.3	20.0	13.2
20-24	8.7	13.5	14.3	12.8	17.9	14.9	13.2	26.7	12.7
25-29	10.0	15.7	17.1	11.4	12.5	11.2	11.9	6.7	11.8
30-34	7.7	10.1	7.1	8.6	7.1	10.4	9.5	6.7	8.8
35-39	16.7	19.1	12.9	13.4	8.9	15.7	12.4	26.7	14.4
40-44	17.0	11.2	11.4	15.5	14.3	13.4	12.2	6.7	14.0
45-49	31.7	21.3	25.7	21.7	17.9	20.9	26.5	6.7	25.1
Marital Status									
Married	81.7	80.9	78.6	76.2	71.4	80.6	74.6	46.7	77.3
Unmarried	11.0	12.4	12.9	16.9	23.2	14.9	15.1	20.0	14.7
Separated/divorced	2.7	3.4	0.0	2.1	3.6	3.7	1.9	26.7	2.6
Widowed	4.7	3.4	8.6	4.8	1.8	0.7	8.4	6.7	5.4
Religion									
Hindu	88.0	97.8	100.0	92.1	85.7	94.8	98.6	0.0	92.7
Muslim	8.7	0.0	0.0	4.8	0.0	0.7	0.3	0.0	3.2
Buddhist	0.7	1.1	0.0	2.8	8.9	1.5	0.0	93.3	2.4
Christian	0.3	1.1	0.0	0.3	1.8	3.0	1.1	0.0	0.9
Kirant	2.3	0.0	0.0	0.0	3.6	0.0	0.0	6.7	0.8
Caste/Ethnicity									
Janjati	41.3	34.8	2.9	27.2	55.4	21.6	51.4	100.0	37.8
Brahman/Chhetri	7.7	34.8	61.4	18.6	25.0	43.3	32.7	0.0	26.0
Dalit	16.3	27.0	34.3	14.5	14.3	32.8	14.9	0.0	18.6
Terai/Madheshi other caste	20.0	1.1	0.0	32.4	0.0	0.0	0.3	0.0	11.8
Newar	2.7	2.2	0.0	1.7	5.4	0.0	0.0	0.0	1.4
Muslim	10.0	0.0	0.0	5.5	0.0	1.5	0.3	0.0	3.7
Others	2.0	0.0	1.4	0.0	0.0	0.7	0.5	0.0	0.8
Total (n)	300	89	70	290	56	134	370	15	1324

Table 4.14: Socio-economic Characteristics of Women Who Died from Non-pregnancy Related Causes by District

Demographic Characteristics	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Education									
No schooling illiterate	70.0	46.1	78.6	55.5	37.5	55.2	67.6	66.7	62.1
No schooling literate	11.7	16.9	10.0	12.4	26.8	13.4	12.7	0.0	13.1
Grade 0-5	4.0	9.0	4.3	10.3	12.5	10.4	10.8	6.7	8.7
Grade 6-9	6.3	18.0	4.3	13.4	17.9	17.2	5.9	26.7	10.3
SLC passed or higher	8.0	10.1	2.9	8.3	5.4	3.7	3.0	0.0	5.9
Household Assets									
Electricity/solar power	59.7	57.3	60.0	70.3	44.6	30.6	53.2	60.0	56.5
Bed	82.0	79.8	50.0	94.1	76.8	64.9	86.8	86.7	82.3
Radio	62.7	74.2	37.1	59.7	51.8	67.9	69.5	80.0	63.6
Bicycle	76.7	0.0	7.1	81.7	1.8	10.4	63.5	0.0	54.5
Clock	63.0	64.0	17.1	57.2	55.4	31.3	54.9	46.7	53.4
Chair	61.3	42.7	11.4	55.5	17.9	31.3	45.4	13.3	46.3
Table	59.7	44.9	7.1	52.1	16.1	35.1	47.8	20.0	46.1
Dhiki/janto	34.3	76.4	34.3	24.5	92.9	55.2	40.0	60.0	41.5
TV	42.0	21.3	10.0	47.2	3.6	15.7	27.8	20.0	31.6
Cupboard	35.0	37.1	21.4	35.9	25.0	15.7	25.4	26.7	29.5
Mobile phone	35.7	28.1	5.7	52.1	5.4	14.2	20.5	26.7	29.4
Fan	40.0	4.5	2.9	47.6	3.6	11.9	23.0	0.0	27.7
Sofa	15.7	11.2	2.9	20.7	1.8	5.2	5.9	6.7	11.3
Phone (other than mobile phone)	9.3	2.2	2.9	11.4	0.0	6.7	5.1	6.7	7.1
Refrigerator	7.0	4.5	0.0	10.7	1.8	3.0	3.5	0.0	5.6
Motorbike	8.0	0.0	0.0	10.0	0.0	0.7	4.6	0.0	5.4
Computer	4.7	3.4	0.0	4.1	0.0	2.2	3.5	0.0	3.4
Any member of household own any agricultural land	49.0	83.1	91.4	73.8	94.6	74.6	74.9	93.3	71.2
Any member of household employed overseas	20.3	37.1	21.4	28.3	26.8	29.1	33.2	26.7	28.1
Total (n)	300	89	70	290	56	134	370	15	1324

4.5 Care Received Prior to Death

Care Seeking

Overall in eight districts 73 percent of women received care before death (Table 4.15). Care seeking ranged from a low of 64 percent in Okhaldhunga to a high of 77 percent in Rupandehi. One third of respondents gave the reason for not seeking care that they 'did not see a need' (33%), while 11 percent expressed that they could not afford to or got money in time (Table 4.15).

Place of Care

Overall, of those women who received care, 34 percent received care from public hospital followed by teaching hospital (19%), private hospital and medicine shop/pharmacy (11% each) and very few dying in the PHCC and Missionary hospital (Table 4.14). It is, however, should be noted that Missionary hospital deaths was very high (51%) in Okhaldhunga as this district has only this hospital. Only 7 percent received care at health/sub-health post.

Care Provider

Overall in eight districts 65 percent women received care from a doctor and 8 percent received care from government auxiliary health worker (AHW) while 7 percent received care from government health assistant (HA) or Sr. AHW. It should be noted that these paramedical health workers work in the SHP and HP. These are the institutions available within reasonable distance in the rural areas. In Nepal each VDC has a SHP or higher level health institution while HP or higher level institution is available in an *ilaka* level. A district is divided into 9 *ilakas*.

Table 4.15: Care Received by Women Who Died from Non-pregnancy Related Causes by District

	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Care received before death	75.7	77.2	73.2	64.3	68.5	64.9	73.3	75.7	73.3
Total (n)	300	290	370	56	89	134	15	70	1324
Last place received care									
Sub-health post/Health post	2.6	2.7	3.7	24.3	20.0	9.3	20.0	25.5	6.9
Primary health care center	0.9	1.3	5.5	2.7	5.0	8.1	0.0	0.0	3.2
Public hospital	32.0	39.7	35.3	2.7	18.3	36.0	30.0	54.5	34.4
Private hospital	10.1	8.0	14.3	2.7	11.7	14.0	0.0	7.3	10.7
NGO facility	0.4	1.8	0.4	0.0	3.3	3.5	0.0	0.0	1.1
Missionary facility	0.0	2.2	1.1	51.4	10.0	0.0	0.0	1.8	3.5
Teaching hospital	32.5	28.6	8.5	5.4	11.7	8.1	0.0	5.5	18.5
Medicine shop/pharmacy	7.9	8.5	16.9	8.1	8.3	14.0	20.0	1.8	10.9
Home of service provider	0.9	0.0	0.4	2.7	3.3	0.0	10.0	0.0	0.7
Other home (own/relative)	0.4	0.0	0.7	0.0	0.0	1.2	0.0	0.0	0.4
Others	11.8	7.1	12.1	0.0	8.3	5.8	20.0	3.6	9.3
Don't know	0.4	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.4
Total (n)	228	224	272	37	60	86	10	55	972
Last person(s) received care from									
Doctor	74.3	74.6	66.4	39.0	52.2	49.1	27.3	52.4	64.9
HA/Sr. AHW (Govt)	3.3	5.8	7.9	8.5	6.0	16.7	0.0	12.7	7.3
HA/Sr. AHW (Non-govt)	2.0	3.1	2.2	13.6	4.5	1.9	0.0	0.0	2.9
ANM/SN (Govt)	4.5	5.0	2.2	5.1	3.0	2.8	9.1	1.6	3.7
ANM/SN (Non-govt)	2.4	1.9	1.1	10.2	9.0	0.0	0.0	3.2	2.6
AHW (Govt)	3.3	5.0	4.7	10.2	16.4	17.6	18.2	27.0	8.2
AHW (Non-govt)	5.7	3.5	6.9	1.7	4.5	4.6	27.3	1.6	5.0
MCHW/VHW	1.2	0.0	2.2	8.5	1.5	2.8	9.1	0.0	1.7
FCHV	0.4	0.0	0.4	1.7	0.0	1.9	0.0	0.0	0.5
Others	2.9	1.2	6.1	1.7	3.0	2.8	9.1	1.6	3.2
Total (n)	245	260	277	59	67	108	11	63	1090

Table 4.16: Reason for Not Receiving Care before Death by District

	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Found dead/died suddenly/died in transit	27.5	31.7	45.4	10.6	63.4	51.0	40.0	16.7	37.8
Did not see a need to	43.4	39.4	29.9	57.9	16.7	17.6	40.0	29.2	33.2
Could not afford to/get money in time	13.1	10.6	11.3	10.5	13.3	7.8	0.0	20.8	11.6
Not enough time	2.6	3.0	2.1	0.0	0.0	9.8	0.0	16.7	4.1
Not able to go alone	1.3	3.0	1.0	10.5	3.3	5.9	0.0	0.0	2.7
Family did not permit	1.3	0.0	4.1	0.0	0.0	3.9	20.0	0.0	2.2
Sought informal care	0.0	3.0	2.1	5.3	0.0	0.0	0.0	4.2	1.6
Transportation not available/took too long	0.0	4.5	1.0	0.0	3.3	0.0	0.0	4.2	1.6
Distance to health facility too far	2.6	0.0	0.0	0.0	0.0	2.0	0.0	4.2	1.1
Carelessness	0.0	1.5	1.0	5.3	0.0	0.0	0.0	4.2	1.1
Concern about security/safety	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Due to mental illness	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Lack of awareness	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Lived alone	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total (n)	76	66	97	19	30	51	5	24	368

Care Recommended and Received

Over all for eight districts, of those deceased WRA who received care by the service provider most (65%) was told to have IV fluid followed by blood test, antibiotics and other drugs (all 55%) (Figure 4.3). Oxygen was suggested for 28 percent women and 27 percent was suggested to take the woman to a higher facility. Blood transfusion was needed for 26 percent women, 13 percent was told that iron injection was needed while 12 percent was told that surgery was needed. There was wide variation among districts in the type of care or service suggested by the service provider (Table 4.17).

Overall for eight districts almost all of those who were told to have IV fluid, blood test, antibiotics and other drugs received these care or services. Large gap between what was recommended and what was received was found in critical life saving interventions such as blood transfusion and surgery. There was great deal of variation in the service received among districts and in some district it might be due to small sample (Table 4.17).

Figure 4.3: Treatments Recommended and Received Prior to Death by Women Who Died from Non-pregnancy Related Causes

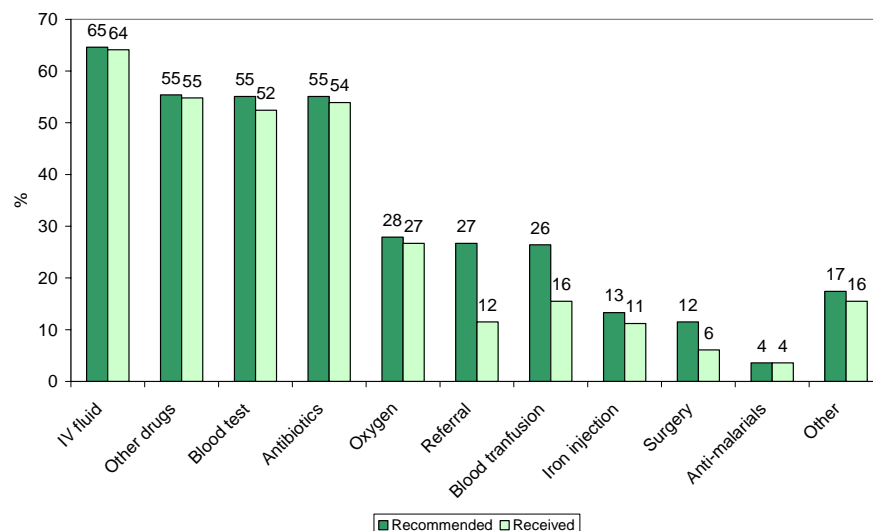


Table 4.17: Treatments Recommended and Received Prior to Death by Women Who Died from Non-Pregnancy Related Causes by District

	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total
Recommended									
IV fluid	55.5	75.4	83.0	75.4	59.5	62.4	58.9	60.0	64.6
Other drugs	58.1	36.1	71.7	68.8	37.8	48.2	47.8	60.0	55.4
Blood test	62.6	57.4	54.7	49.1	43.2	58.8	55.2	20.0	55.1
Antibiotics	61.7	60.7	71.7	45.1	62.2	64.7	49.3	60.0	55.1
Oxygen	24.7	32.8	45.3	41.5	21.6	25.9	16.7	20.0	27.9
Referral	26.0	31.1	41.5	15.6	45.9	32.9	27.0	50.0	26.7
Blood transfusion	29.5	31.1	34.0	22.3	16.2	23.5	27.4	10.0	26.4
Iron injection	8.8	19.7	20.8	12.5	8.1	9.4	15.9	40.0	13.3
Surgery	13.2	26.2	18.9	7.1	2.7	11.8	10.4	0.0	11.5
Anti-malarials	1.8	3.3	3.8	3.6	2.7	7.1	4.1	10.0	3.6
Other	15.4	8.2	3.8	19.2	16.2	5.9	26.7	0.0	17.4
Received									
IV fluid	56.8	65.6	81.1	75.4	62.2	63.5	58.1	50.0	64.1
Other drugs	58.1	37.7	66.0	68.8	37.8	47.1	47.0	50.0	54.8
Blood test	59.5	45.9	50.9	48.2	48.6	56.5	52.6	10.0	52.4
Antibiotics	59.0	59.0	77.4	45.1	59.5	60.0	48.1	60.0	53.9
Oxygen	24.2	29.5	34.0	41.1	21.6	25.9	16.3	10.0	26.7
Referral	13.7	8.2	9.4	6.7	16.2	17.6	12.2	10.0	11.5
Blood transfusion	15.4	16.4	18.9	15.2	10.8	17.6	15.2	10.0	15.5
Iron injection	9.3	11.5	11.3	9.8	5.4	10.6	13.7	40.0	11.2
Surgery	5.7	16.4	7.5	4.0	0.0	12.9	4.4	0.0	6.1
Anti-malarials	2.6	3.3	1.9	2.7	5.4	8.2	4.1	0.0	3.6
Other	13.7	8.2	3.8	15.6	16.2	7.1	24.1	0.0	15.5
Total (n)	227	61	53	224	37	85	270	10	967

4.6 Verbal Autopsy Respondent

The main respondents who assisted with completing the verbal autopsies were carefully selected in regards to being: best able to describe the circumstances leading up to the woman's death, and any symptoms and medical consultations prior to her death; present at the time of death; closely related to the deceased; and available and willing to be interviewed. In 35 percent of cases the deceased women's husband was interviewed; in 21 percent other family members or relatives; in 14 percent the mother-in-law or father-in-law; in 14 percent mother or father; in 10 percent son or daughter; in 6 percent it was friend or neighbour. Two thirds of those interviewed were present at the time of death (66%).

4.7 What could have saved the women's lives?

4.7.1 Perspectives of Members of the Community

The main respondents for the verbal autopsies were asked whether they felt the life of the deceased could have been saved and, if so, what could have saved her. Thirty eight percent felt her life could have been saved (compared to 54% of maternal deaths in Chapter 5); 49 percent didn't and 13 percent were uncertain. The reasons given by respondents regarding what could have potentially saved the lives of the deceased were overwhelming related to not being able to receive appropriate treatment - accounting for 59 percent (this included factors such as lack of transport; facility too far away; incorrect diagnosis; delayed referral, etc.); lack of financial resources (23%); women not sharing her problem (3%); non-compliance to the medical advice given (3%); and other (11%).

4.8 Summary of Findings

The all cause death rate was 174 deaths per 100,000 women of reproductive age, ranging from 120 in Baglung to 310 in Jumla. Excluding the pregnancy related deaths the overall rate was 154 per 100,000 women of reproductive age and the variation between districts

was similar to that for all deaths. Suicide was the leading cause of death among women of reproductive age comprising 16 percent of all deaths. Accidents were the second leading cause (9%) and Tuberculosis was third (5%). Three maternal causes made it into the top twenty: haemorrhage (3%), eclampsia (2%) and maternal infectious and parasitic diseases (1.5%). 'Pregnancy, childbirth and puerperium' was the leading ICD-10 chapter in 1998, comprising over one-fifth of all deaths (21%), however it became the third leading chapter, comprising 11 percent of all deaths in 2008/09.

'External causes of death' (Chapter XX) was the second highest ICD chapter, at 13 percent, in 1998, but became the leading chapter, comprising a quarter of deaths, in 2008/09. The percentage of deaths due to 'Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified' increased six fold between 1998 and 2008/09 and became the second highest chapter. Fifty nine percent of deaths to women of reproductive age, who died from non-pregnancy related causes, occurred at home, 19 percent occurred in facilities, and 9 percent occurred in transit.

4.9 Discussion

The results presented in this study are for women of the standard reproductive age group 15-49 years. In the study all deaths to women aged 12-50 are recorded to ensure there is no under-reporting of maternal deaths due to imposed age restrictions, as early marriage is common in this setting and many people do not know their exact age. Those aged 12-14 and 50 were subsequently excluded from the analysis as no maternal deaths were found at these ages.

A harrowing, and unexpected, finding that emerged from the 1998 MMM Study was that suicide was the main cause of death to women of reproductive age, accounting for one in ten deaths (MMMS, 1998). However, this finding has received little attention and a decade later, not only is suicide the leading cause of death in the eight study districts, it accounts for nearly one-fifth of all deaths to women of reproductive age (17%).

This study found that 41 percent of suicide cases were linked to relationship, marriage and familial issues, and this is commonly reported in other Asian studies (Khan, 2002; Vijayakumar, 2004; Kanchan *et al.* 2008). In European countries being single and divorced, as opposed to married, incurs a higher risk of female suicide, whereas it is married women in India and Pakistan who are said to have a more elevated suicide rates (Brockington, 2001). A woman's marital status itself is not thought to be the important risk factor, it is more the fact that most societies are patriarchal and thus women become a part of their husband's family after marriage. Therefore higher suicide rates for married women are more heavily influenced by family and social integration rather than simply whether they are married or not (Brockington, 2001; Khan, 2002; Vijayakumar *et al.* 2005). In Bangladesh factors associated with a greater likelihood of married women committing suicide include early marriage and motherhood; infertility; absence of male offspring; lack of autonomy in choosing marital partner; and economic dependence on husband (Khan, 2002). Marital and family conflict, particularly with in-laws and husbands, emerges as an important factor contributing to suicidal behaviour among young married women in Asia (Khan and Reza 1998; Ahmed *et al.* 2004), as well as in other developing countries such as Iran (Ahmadi, 2007) and findings from this study support this. Furthermore some reported suicides may actually be misclassified homicides, as seen in this study. In Matlab, Bangladesh, quarrels and serious tensions with husbands or other relatives contributed to nearly half (46%) of suicide deaths of reproductive aged women (Ahmed *et al.* 2004). Likewise, as in this study, unacceptable marriages and pre-marital affairs also played a role (Ahmed *et al.* 2004). It is also suggested that being responsible for children may be protective against suicide for women, but not for men, as the former are not the primary

caregivers (Beautrais, 2002; WHO, UNFPA, 2009). In Bangladesh, female suicide has also been linked to dowry disputes, as well as to escape the psychological aftermath and stigma of rape (Ahmed et al., 2004).

A global review of literature on mental health aspects of women's reproductive health found that adolescent girls with unplanned pregnancies, and women suffering from fistula, are at an elevated risk of suicide (WHO, UNFPA, 2009). The former have suicide rates up to 25 percent higher than men where data are available. Suicide may be a last resort measure for women with an unwanted pregnancy (WHO, UNFPA, 2009; Rizzi *et al.* 1998). This may be for a variety of reasons linked to the local 'moral climate', such as single women being unable to legally buy contraceptives; unavailability or illegality of safe pregnancy termination; fear of parental or social sanction; and lack of money to pay for an abortion (Brockington, 2001). Some reported suicides may actually be misclassified self-induced abortions, such as consuming poison or jumping from a high place.

In contrast to developed countries, mental illness is rarely reported as a cause of suicide in Asia. However, in this study it was reported in 8 percent of cases. Some suggest the more family-centred structure of Asian societies, compared to Western ones, cushions individuals from mental illness, thus suggesting levels of mental illness are lower; while others suggest that the social stigma towards mental illness and lack of understanding leads to it being underreported (Bhatia *et al.* 1987) and being treated within the family environment, as opposed to a health facility (Sherer, 2002; Vijayakumar, 2005*b*). However, unipolar depressive disorders were the fourth leading cause of disease-adjusted life-years (DALYs) globally in 2002 and are projected to rank third in low income countries by 2030, (Mathers and Loncar, 2006). This indicates that mental illness is set to become an important cause of global morbidity and mortality in developing countries, requiring greater amounts of health expenditures. Indicators of poverty and adversity are associated with common mental disorders in low- and middle-income countries and the most common association is between mental disorders and illiteracy or poor education, but not always with low income levels (Patel and Kleinman, 2003; Saxena *et al.* 2007). The association is thought to be mediated by factors such as the experience of insecurity and hopelessness, rapid social change and the risks of violence, poor housing and physical ill-health. Relative poverty and inequality within a community can also increase the risk of mental health problems (Saxena *et al.* 2007). In rural Tamil Nadu, India, poverty is associated with postpartum depression regardless of an antepartum onset or not (Chandran *et al.* 2002). In turn, mental ill-health can worsen economic conditions, thus perpetuating a vicious cycle.

Methods employed to commit suicide, as reported in other Asian studies, include hanging, drowning, burning, or ingestion of insecticides/pesticide (Khan, 2002; Vijayakumar, 2004; Kanchan *et al.* 2008). The proportion of suicide attempts resulting in death is often high in Asia due to the lethality of the methods employed, in particular with self-poisoning by pesticides, which are easily available in farming communities and quick to take effect (Pearson *et al.* 2002; Fleischman *et al.* 2005; WHO, UNFPA, 2009; Vijayakumar, 2005*b*). This study found poison to be the most common method employed. Self-immolation (often using kerosene as an accelerant) is a common means of female suicide in Asia as well as in other developing countries such as Iran (Ahmadi, 2007). It is a frequently reported method used by Indian women (Brockington, 2001; Sanghavi *et al.* 2009) who are typically young (under 25 years) and have been married for less than a decade (Kumar, 2003). They often commit the act owing to onerous dowry expectations on their family which cannot be met, giving rise to harassment and discrimination from the husband's family, with whom they live (Kumar, 2003). In this study however, only a very small percentage of women set fire to themselves, and they all resided in one district.

CHAPTER 5: MATERNAL MORTALITY AND ACCIDENTAL/ INCIDENTAL PREGNANCY RELATED DEATHS



5.0 Introduction

This chapter presents the key findings related to pregnancy related and maternal mortality. These include overall estimates of the levels of pregnancy related and maternal mortality within the eight study districts, as well as institutional based levels, and a summary of key stakeholders views regarding current levels and changes over time. The causes of death are explored in regards to the division between accidental/incidental, direct and indirect causes, as well comparing the contributions of individual causes, and a consideration of the level of confidence in the cause of death assignment. All cause of death assignment is based on the ICD-10 classification (WHO 1993). The chapter also looks at the timing of deaths, in regards to whether they occurred during the antepartum, intrapartum or postpartum period, as well as place of death. The background characteristics of women who have died are also presented, including variations in levels of maternal mortality by age and ethnicity. The chapter also considers the views of members of the community and providers regarding their perceptions of what could have saved the women's lives. A fuller exploration of possible contributory factors behind these deaths is focused on in more detail in later chapters in this report. The data presented in this chapter come from the community surveillance system and the associated pregnancy related verbal autopsies; the hospital based maternal death reviews; the EOC obstetric morbidity monitoring data; and qualitative in-depth interviews with key stakeholders. Comparisons are made throughout to other sources of data, where appropriate, namely to the 1998 Maternal Mortality and Morbidity (MMM) Study.

5.1 Levels of Mortality

5.1.1 Levels of Pregnancy Related Mortality

The overall percentage of deaths to women of reproductive age that are pregnancy related is 12 percent (Table 5.1). The percentage contribution ranges from 8 percent in Sunsari and Okhaldunga to over double in Rasuwa at 17 percent. The overall ratio of pregnancy related deaths is 247 per 100,000 live births. This ranges from 153 per 100,000 live births in Okhaldhunga to nearly double that at 305 in Jumla. On the whole the ranking of the districts by the pregnancy related mortality ratios reflects the ranking of the Human Development Index (HDI), with the highest levels seen in the two mountainous districts that are also ranked the highest in the HDI (Rasuwa and Jumla). The two exceptions are Okhaldunga, which has a relatively low ratio relative to its HDI ranking, and Rupandehi which has a relatively high ratio relative to its HDI ranking.

Table 5.1: Levels of Pregnancy Related Mortality by District

District	Number of deaths to women of reproductive age (15-49 yrs)	Number of live births	Number of pregnancy related deaths	% of deaths to WRA that are pregnancy related	Ratio of pregnancy related deaths (per 100,000 live births)
Jumla	80	3,275	10	12.5	305
Rasuwa	18	996	3	16.7	301
Rupandehi	340	17,165	50	14.7	291
Kailali	417	16,331	47	11.3	288
Surkhet	153	8,839	19	12.4	215
Sunsari	327	13,826	27	8.3	195
Baglung	100	6,075	11	11.0	181
Okhaldhunga	61	3,268	5	8.2	153
Total	1,496	69,775	172	11.5	247

5.1.2 Levels of Maternal Mortality

The overall percentage of deaths to women of reproductive age that are maternal is 11 percent (Table 5.2), the same as for pregnancy related. The percentages also range from 8 percent in Sunsari and Okhaldhunga to over double that level in Rasuwa (17%). The proportion for these eight districts (11%) is lower than the national figure estimated by the 2006 DHS (18%), and the district variation from 8 percent to 17 percent illustrates that this is context-specific. The results from this study are strong for the related districts given that all deaths to women of reproductive age were identified and maternal ones were verified from these. Maternal causes comprised a high percentage of pregnancy related deaths, accounting for 100 percent in three districts (Okhaldhunga, Rasuwa and Baglung) and ranging from 89 percent to 94 percent in the other districts. The overall maternal mortality ratio for the eight districts combined is 229 per 100,000 live births. This ranges from 153 per 100,000 live births in Okhaldhunga to nearly double that at 301 in Rasuwa. Given that maternal deaths comprise most of the pregnancy related deaths, it is not surprising to see a similar relationship with the HDI, with most districts reflecting the HDI ranking with the exception of relative low MMR in Okhaldhunga and a relatively high MMR in Rupandehi.

Table 5.2: Levels of Maternal Mortality by District

District	Number of deaths to women of reproductive age (15-49 yrs)	Number of pregnancy related deaths	Number of maternal deaths*	Number of live births	% of deaths to WRA that are maternal	% of pregnancy related deaths that are maternal	MMR (per 100,000 live births)
Rasuwa	18	3	3	996	16.7	100.0	301
Jumla	80	10	9	3,275	11.3	90.0	275
Rupandehi	340	50	47	17,165	13.8	94.0	274
Kailali	417	47	43	16331	10.3	91.5	263
Surkhet	153	19	17	8,839	11.1	89.5	192
Sunsari	327	27	25	13,826	7.6	92.6	181
Baglung	100	11	11	6,075	11.0	100.0	181
Okhaldhunga	61	5	5	3,268	8.2	100.0	153
Total	1,496	172	160	69,775	10.7	93.0	229

Note: *Appendices 5.1 to 5.8 show the GPS location of maternal deaths in eight study districts.

The proportion of deaths to women of reproductive age that are maternal varies by age-group (Table 5.3). Maternal deaths comprise a higher proportion of deaths to women in their twenties, comprising 22 percent for women aged 20-24 and 24 percent for those aged 25-29. It should be noted that this reflects the higher proportion of women becoming pregnant in these age-groups, rather than an increased risk for an individual woman in this age group becoming pregnant (Table 5.23 shows the risk of maternal death by age-group).

The variation in the proportion by age indicates that the overall proportion of maternal deaths to women of reproductive age will be affected by the age-structure.

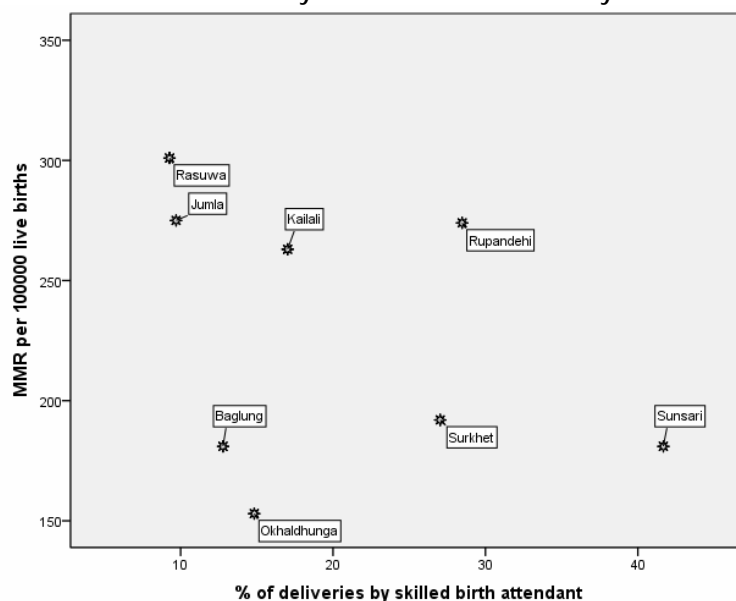
Table 5.3: Proportion of Maternal Deaths by Age-group

Age group	Number of deaths to women of reproductive age	Number of maternal deaths	percent of maternal deaths
< 20	175	23	13.1
20-24	168	37	22.0
25-29	156	38	24.4
30-34	116	23	19.8
35+	709	39	5.5
Total	1,496	160	10.7

Relationship between levels of maternal mortality and possible contributory factors

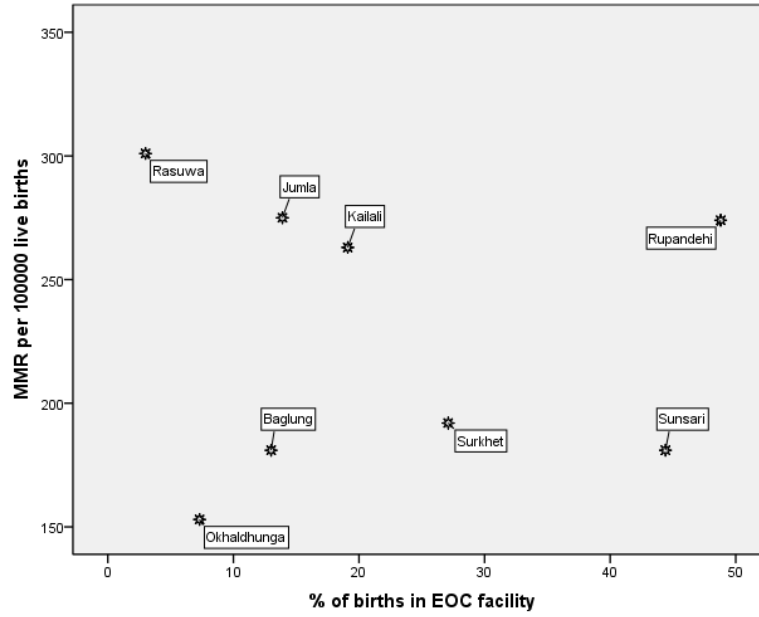
District level HMIS data showing the percentage of deliveries by a skilled attendant; percentage of births in an EOC facility; met need for EOC; and caesarean section rate have been compared to the MMR results. The results are shown in Figures 5.1 to 5.4. At the district level for these eight study districts the association between all of these variables and maternal mortality was weak. Figures 5.5 to 5.7 show stronger relationships between the district level MMR and the human development index and female literacy, with the strongest being for GDP.

Figure 5.1: District Level MMR by % Deliveries Attended by Skilled Attendant



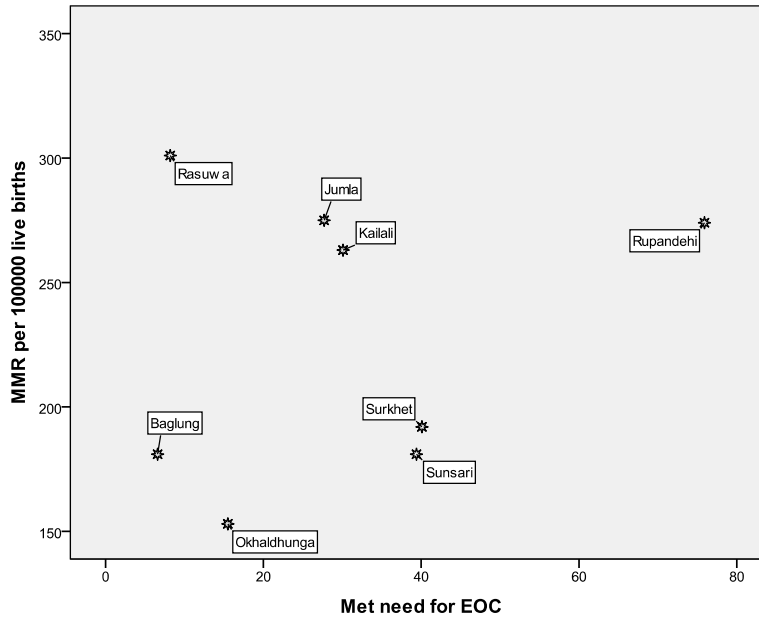
$R^2 - 0.117; p > 0.005$

Figure 5.2: District Level MMR by % Births in an EOC Facility



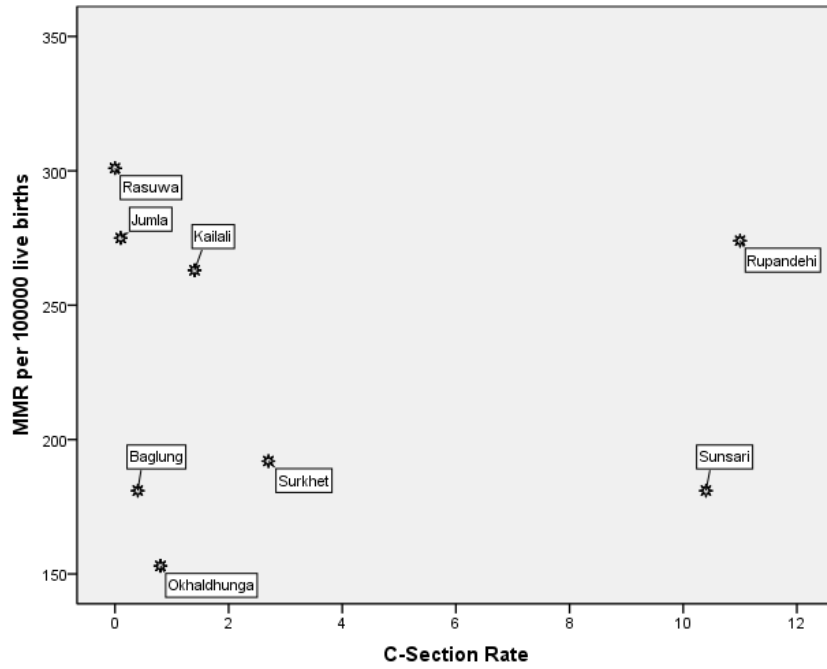
$R^2 - 0.003$; $p > 0.005$

Figure 5.3: District Level MMR by Met Need for EOC



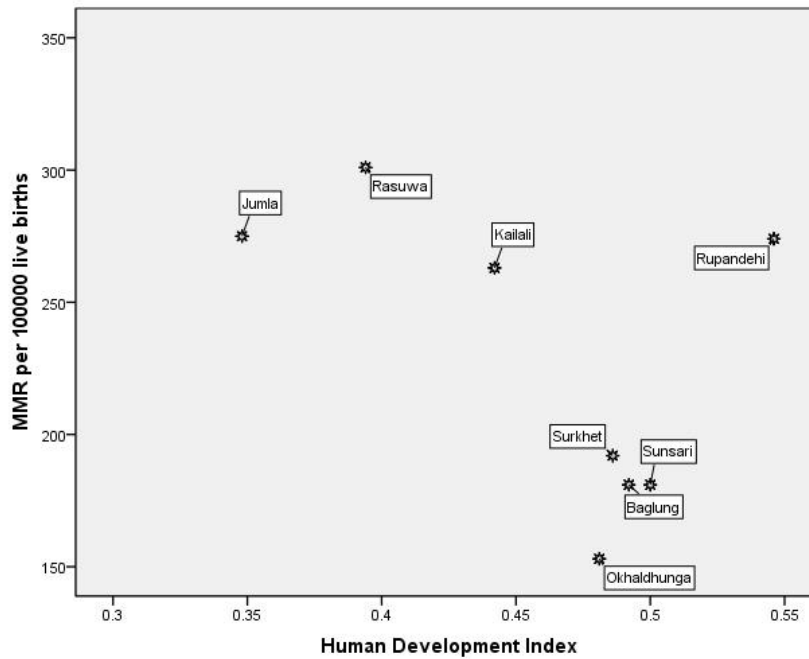
$R^2 - 0.041$; $p > 0.005$

Figure 5.4: District Level MMR by Caesarean Section Rate



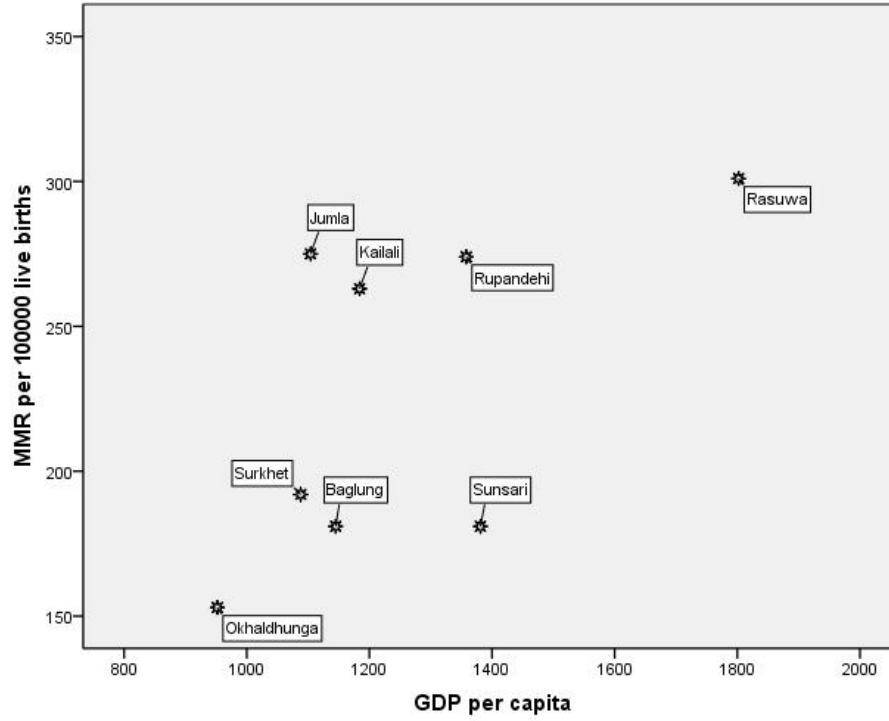
$R^2 = 0.003$; $p > 0.005$

Figure 5.5: District Level MMR by Human Development Index



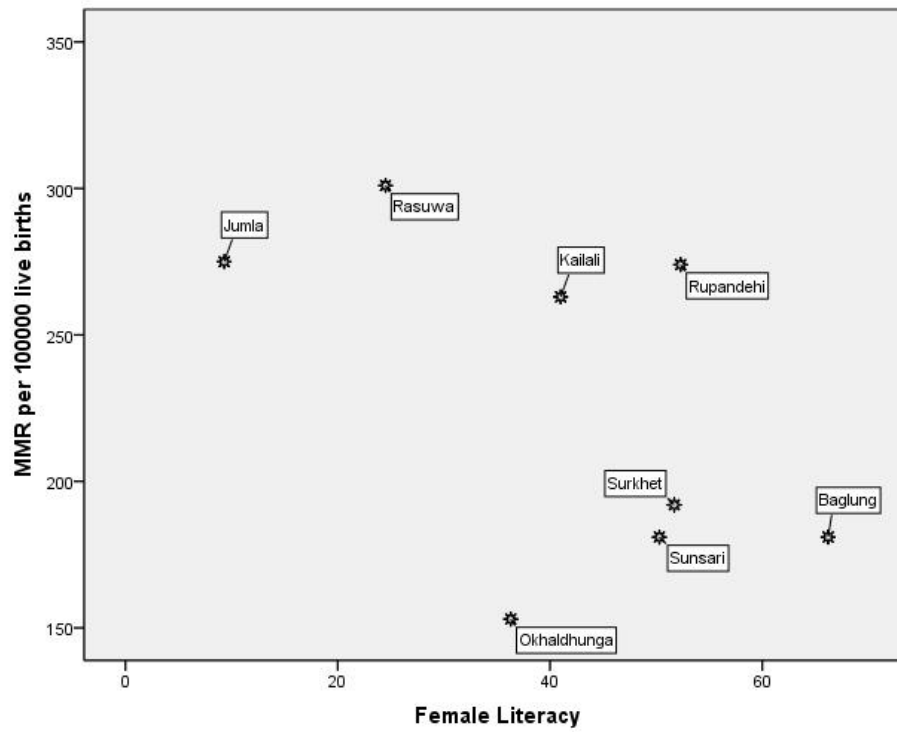
$R^2 = 0.254$; $p > 0.005$

Figure 5.6: District Level MMR by GDP



$R^2 = 0.369$; $p > 0.005$

Figure 5.7: District Level MMR by Female Literacy



$R^2 = 0.117$; $p > 0.005$

5.1.3 Comparisons to Other Pregnancy Related and Maternal Mortality Data

This study measured an overall MMR of 229 maternal deaths per 100,000 live births for all eight districts over the period of one year. This is a markedly lower finding compared to the revised, but unpublished, WHO estimate of 670 per 100,000 live births for 2005 shown in Table 5.4 (with the earlier, higher estimate made prior to the publication of the NDHS 2006). This large disparity is not too surprising given the WHO estimate uses a regression model to estimate the level, rather than actually measuring maternal deaths. Within this regression model the percentage of skilled birth attendants is one of the independent variables and hence without a sizeable increase in the number of deliveries attended by skilled birth attendants, the WHO MMR estimate for Nepal will remain high using this methodology.

The finding from this study has more similarity to other maternal mortality data that are based on actual measurement of maternal deaths. The 2006 NDHS found a MMR of 281 per 100,000 live births. This is just slightly higher than our finding, and one should note that this reflects an earlier reference period (1999-2005); a smaller sample size; is a national estimate; uses the direct sisterhood method; and measures pregnancy related rather than maternal deaths. The MMM study results of 247 pregnancy related deaths and 229 maternal deaths per 100,000 live births, fall within the NDHS 95 percent confidence interval of 178-384. For the purposes of monitoring the impact of a community based trial MIRA used an intensive prospective closed cohort surveillance system to measure maternal deaths from 2001-2003 in parts of Makwanpur District, where births and deaths were highly unlikely to have been missed (Manandhar et al. 2004). As the trial had a significant impact at reducing maternal mortality the best comparison would be the control areas, which had a MMR of 341 per 100,000 live births. One should note this is for a relatively small geographical area in just one district and an earlier timeframe, but the figure is reliable for this area and also falls within the NDHS 95 percent confidence intervals.

Table 5.4: Estimates of Maternal Mortality from Other Data Sources

Source of data	Reference period	Maternal Mortality Ratio (MMR)	95% Confidence Interval	Population covered	Number of maternal deaths estimate is based on	% maternal deaths of all deaths to WRA	Method
WHO (2005) Revised & unpublished	2001-2005	670	-	Estimated for national population	-		Regression model
NDHS (2006)	1999-2005	281	178-384	41,947 nationally representative sample	39	18%	Sisterhood Direct
MIRA (2004)	2001-2003	341		13,497 hhds; 14,047 WRA. Parts of Makwanpur District	11 (3226 live births)		Prospective Closed Cohort Surveillance

5.1.4 The Opinion of Key Stakeholders Regarding Levels of Maternal Mortality

During their in-depth interviews, stakeholders were asked their opinion regarding current levels, and changes over time, in maternal mortality in Nepal. Though most participants were uncertain about the exact level of maternal mortality for the country as a whole, as well as variations within the country, stakeholders perceived there has been a reduction in maternal mortality over the last decade. They believed that this was attributed not only to interventions specifically targeted at improving maternal health but also to other dynamics such as decreased fertility rate, increased CPR, overall development and expansion of service.

“... I think it has definitely gone down. You can see that the fertility rate has decreased as well. So it's normal. With every decrease of fertility rate you have a decrease in maternal mortality. We can't say the system has become more effective but it is the family planning which has played an important role. On the other hand, in the 40 districts that we have worked in there has been increase in met need because of the rise in skilled birth attendants. Institutional delivery has been going up especially in our districts because we have many birthing centres. So, there is system support ...”

- Central level stakeholder

They felt that greater awareness; a reduction in fertility; and increased availability and accessibility of services; were the main factors influencing the decline in maternal mortality. Maternal health interventions and safe motherhood policy were also mentioned by a few participants.

“...There has been a lot of debate on this. Personal feeling is that they showed it declined and it has declined. In the period between 1996 and 2006, there have been a lot of interventions to address maternal health. Because of that we can't say that it hasn't declined because those places that previously did not have access have that now. There are many private medical colleges in periphery that were not there 10 years ago. Lot of hospitals, teaching hospitals, for referral have come up. People are going there and getting services. In serious cases, many people do take them to the hospitals. Besides that, the number of private sector hospitals has increased. All the interventions like safe abortion services, establishment of BEOC/CEOC units would contribute to the decline. Now there is more access due to that for women and families. Access has increased. ...”

- Central level stakeholder

“... The CPR, Contraceptive Prevalence Rate has more than doubled from 24 to 49. Number two, TFR has also reduced that means there is one child less which results into less risk. If we have to establish straight link then when MCHW and women are connected then at least they are attending ANC. Maybe they are not having complete visit but they are visiting and taking injections. That is one aspect and other is iron, health education. So because of other different 12-14 interventions everything has been supportive.....So when we look at all those things there has been change. When we interact with people and ask women if there are cases of maternal deaths then they say that it used to happen 10-15 years ago not now and some had died due to excessive bleeding or because of obstruction during delivery. ...”

- Central level stakeholder

5.1.5 Levels of Institution Based Maternal Mortality

Hospitals

57 maternal deaths were identified in hospitals within the MMM study catchment area during the one year study period (Table 5.5). No maternal deaths occurred in hospitals in Jumla, Baglung and Rasuwa. The overall hospital based MMR was 267 per 100,000 live births, given the small sample sizes it would be inappropriate to draw too much from district comparisons.

Table 5.5: Hospital Based Maternal Mortality by District

District	Number of maternal deaths	Number of live births	MMR (per 100,000 live births)
Okhaldhunga	2	248	806
Sunsari	18	6,948	259
Rupandehi	21	8,246	255
Kailali	13	2,802	464
Surkhet	3	1,794	167
Baglung	0	934	0
Jumla	0	337	0
Rasuwa	0	36	0
Total	57	21,345	267

Unlike the community surveillance system, the hospital death data include deaths to residents from outside the study area. Just over half of the hospital maternal deaths (54%) were usual residents of the study area, while 46 percent resided in other districts (Table 5.6). In Sunsari most of the deaths (78%) were to residents coming from other districts. They were coming for a range of complications and from a number of different districts (Dhankuta, Morang, Saptari, Illam, Jhapa, Mahottari, Sankhuwashabha, Saptari, Taplejung and Udayapur) and from India. Sunsari contains BPKIHS - the major referral centre for all Eastern districts.

Table 5.6: Resident Status of Maternal Deaths in Hospitals by District

District	Usual resident of District		Non-resident	
	Number	Percent	Number	Percent
Okhaldhunga	2	100.0	0	0.0
Kailali	9	69.2	4	30.8
Rupandehi	14	66.7	7	33.3
Surkhet	2	66.7	1	33.3
Sunsari	4	22.2	14	77.8
Baglung	0	0.0	0	0.0
Jumla	0	0.0	0	0.0
Rasuwa	0	0.0	0	0.0
Total	31	54.4	26	45.6

EOC facilities

Once again data from all EOC facilities in the study area include deaths to non-residents of the study districts. The overall maternal mortality ratio at EOC facilities in the eight study districts was 218 per 100,000 live births, with a maternal mortality ratio (Table 5.7). There is a lot of district variation, but the sample sizes within the districts are too small to make robust district level comparisons.

Table 5.7: Maternal Mortality at EOC Facilities by District

District	Number of live births	Number of maternal deaths	Maternal Mortality Ratio (per 100,000 live births)
Rasuwa	36	1	2,778
Okhaldhunga	285	2	702
Kailali	3,662	13	355
Sunsari	8,687	18	207
Rupandehi	10,184	21	206
Surkhet	2,423	3	124
Baglung	1,048	0	0
Jumla	337	0	0
Total	26,662	58	218

5.2 Causes of Pregnancy Related Mortality

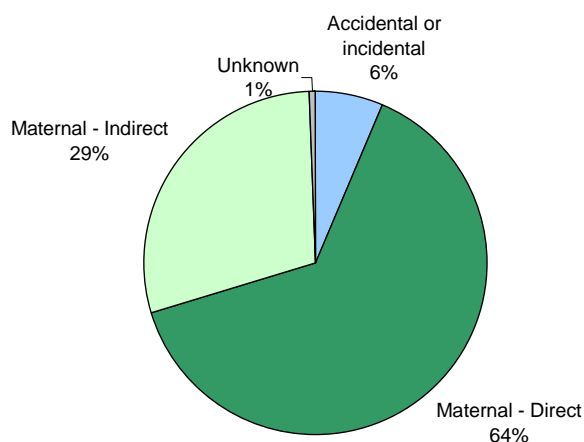
Pregnancy related deaths occur while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death. Therefore they include maternal deaths, as well as deaths during this time period due to accidental or incidental causes. If the cause of death in a pregnant woman, or up to 42 days post-partum, can not be determined, or if there is insufficient evidence to code a cause of death, then it is still classified as a pregnancy-related death but not as a maternal death. Table 5.8 shows the breakdown of pregnancy related deaths by accidental/incidental, maternal or unknown cause by district and Figure 5.8 shows the overall results, including the split between direct and indirect causes discussed below. Out of 172 pregnancy related deaths just 11 (6%) were due to

accidental or incidental causes and one was unknown. In three districts all pregnancy related deaths were due to maternal causes (Okhaldhunga, Rasuwa and Baglung).

Table 5.8: Pregnancy Related Deaths by Accidental/Incidental, Maternal or Unknown Cause, by District

Districts	Accidental or incidental		Maternal		Unknown		Total (n)
	N	%	N	%	N	%	
Sunsari	2	7.4	25	92.5	-	-	27
Rupandehi	2	4.0	47	94.0	1	2.0	50
Kailali	4	8.5	43	91.0	-	-	47
Okhaldhunga	0	0.0	5	100.0	-	-	5
Baglung	0	0.0	11	100.0	-	-	11
Surkhet	2	10.5	17	89.5	-	-	19
Rasuwa	0	0.0	3	100.0	-	-	3
Jumla	1	10.0	9	90.0	-	-	10
Total	11	6.4	160	93.0	1	0.6	172

Figure 5.8: Breakdown of Pregnancy Related Causes of Death



5.2.1 Accidental and Incidental Pregnancy Related Deaths

There were 11 pregnancy related deaths due to accidental or incidental causes. Table 5.9 shows the cause of death by district. Five of these deaths were due to suicide: three consumed poison and two hung themselves (Case Study 5.1). Three of these deaths were due to homicide: one by her parents; one by her husband and one by another relative (Case Studies 5.2 and 5.3). One woman accidentally fell, one was bitten by a venomous snake and woman was victim of lightening. Although these are all officially classified as accidental or incidental causes, and not maternal causes, with the exception of two cases (lightening and snake bite), one could argue that the pregnancy status could have influenced the other deaths. All accidental/incidental pregnancy related deaths occurred during pregnancy.

Table 5.9: Accidental and Incidental Causes of Pregnancy Related Deaths

Cause of Death	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total	%
Suicide	1	-	3	-	-	1	-	-	5	45.5
Homicide	-	2	-	-	-	-	-	1	3	27.3
Accidental fall	-	-	-	-	-	1	-	-	1	9.1
Contact with venomous snake	-	-	1	-	-	-	-	-	1	9.1
Victim of Lightening	1	-	-	-	-	-	-	-	1	9.1
Total	2	2	4	0	0	2	0	1	11	100.0

Case Study 5.1: Suicide by a pregnant woman

Sanju was a 21 year old, illiterate, mother of two children. She had given birth to her two children without any complications. This was her third pregnancy. During her pregnancy she was anaemic and malnourished, and she felt dizzy and weak most of the time, but she never attended antenatal care.

When she was three months pregnant she was about to travel to her maternal home, with her husband, by bicycle, but her relatives stopped her as there was a flood so she went to her room to sleep. An hour later her mother-in-law entered her room to see if she was alright. She said that had eaten some medicine for killing lice. Her husband, mother-in-law and neighbour took her to the local medicine shop in their cart, and the pharmacist immediately referred her to the district hospital.

Her relatives borrowed money from the local people, hired a private van and took her to hospital. It took about 25 minutes to reach the hospital, where she was admitted to the emergency ward and attended to by the doctor immediately. She was given IV drips and a pipe was inserted into her nose. A little poison was expelled, but she did not vomit. She had convulsions and became unconsciousness and died at about 1pm while treatment was still ongoing.

The above account was given by her mother-in-law. In contrast, the female community health volunteer said that Sanju suffered from hysteria and was being forced to have an illicit relationship with her father-in-law. She was treated for her hysteria but was forced to continue the relationship, and therefore was tense most of the time. The FCHV and VHW felt that her in-laws behaviour towards her may have been the reason she committed suicide.

Case Study 5.2: Homicide of a unmarried pregnant woman by family members, who tried to disguise as suicide

Nasira was an 18 year old unmarried Muslim lady who was in love with a married Hindu man. Their affair was common knowledge within the community, but their families did not accept the relationship and Nasira's father, with the help of her brothers beat her to death. To try to hide their crime from the police and the community they hung her body from a ceiling fan, informed people that she had committed suicide, and buried her in a graveyard. The same night, her boyfriend was also found brutally beaten to death and his body thrown in a field. On hearing of the death of her son, the boyfriend's mother immediately suspected the girlfriend's family and filed a police case. The police demanded the girl's body was exhumed, and three days after the burial she was taken for post mortem. The postmortem report revealed that she was pregnant.

Case Study 5.3: Homicide of a epileptic pregnant woman by husband

Meena was 35 years old, very poor and worked as labourer on a construction site. She had suffered from epilepsy since her childhood. Often during or after an epileptic attack, she used to pass stools and/or urine in her clothes. Due to her chronic illness, sometimes she could not even cook food for the family. Often her neighbour gave her food but sometimes she would suppress her hunger by eating mud. Her husband drank alcohol daily and did not earn any money. If she refused to give him money for alcohol he would sexually abuse her.

She was pregnant for the sixth time, once she had delivered twins, but both died two days after birth. During her latest pregnancy she had not attended any antenatal check ups and at eight months she had one epileptic attack six days before her death. She had passed stools and urine during the attack. On her way to the river to clean her clothes, all of sudden her husband started beating her with a stick very brutally. He then kicked her in the abdomen and she became unconscious, had an epileptic attack, and again passed urine and stools. He only stopped when others intervened.

After the incident, her condition deteriorated. She lost her speech, was only semiconscious and had no fetal movement. Her neighbour informed her family about what had happened, and her sister and her sister's husband immediately came to see her and admitted her to the Zonal Hospital. They referred her to the Medical College Hospital for better treatment. However, they needed more money for treatment so her family returned home to arrange additional finance. During this time her husband went to the hospital and discharged her. Her relatives returned to the hospital, and on not finding her, went to her rented house where they found her unconscious in bed. The husband tried to prevent them taking her again and they argued, but managed to take her back to the hospital. The doctor at the hospital said that foetus had died in the womb and that she required an operation, but given her condition the doctor refused to do the operation. Her relatives thought she may have a better chance of recovery if she was taken to Kathmandu, but the doctor warned against moving her. When they put her on the stretcher to take her to the ambulance she died.

5.2.2 Maternal Causes of Death

Overall, direct causes accounted for 69 percent of all maternal deaths, while indirect causes accounted for 31 percent (Table 5.10). The split between direct and indirect causes in this study (69% and 31%) is similar to the figures proposed by Khan et al. (2006) for Asia as a whole (69% and 25%, with 6% unclassified). There was a lot of variation between districts, however a lot of this is due to the small sample sizes in Rasuwa, Jumla and Okhaldunga. For the remaining five districts the percentage of direct deaths ranged from 63 percent in Kailali to 73 percent in Baglung.

Table 5.10: Proportion of Direct and Indirect Maternal Deaths by District

Districts	Direct		Indirect		Total Number
	Number	Percent	Number	Percent	
Sunsari	17	68.0	8	32.0	25
Rupandehi	32	68.1	15	31.9	47
Kailali	27	62.8	16	37.2	43
Okhaldhunga	4	80.0	1	20.0	5
Baglung	8	72.7	3	27.3	11
Surkhet	11	64.7	6	35.3	17
Rasuwa	3	100.0	0	0.0	3
Jumla	8	88.9	1	11.1	9
Total	110	68.8	50	31.3	160

Direct Causes

Direct causes of death result from "obstetric complications of the pregnant state (pregnancy, labour, and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events from any of the above" (ICD-10). Table 5.11 shows the direct causes of maternal deaths by district. The main direct maternal cause of death was haemorrhage, accounting for 24 percent of maternal deaths (10% PPH without retained placenta; 8% PPH with retained placenta, and 6% APH). Eclampsia was the second leading direct cause of death, accounting for 21 percent of maternal deaths. Abortion was the third highest direct cause, accounting for 7 percent of deaths, with half of these being induced and half being spontaneous. The other direct causes included obstructed labour (6%), puerperal sepsis (5%); retained placenta without haemorrhage (1%); ruptured uterus (1%); and inversion of uterus (1%); pulmonary embolism (1%); and one woman died from a primary haemorrhage from a caesarean section and another from a blood transfusion reaction. Case studies 5.4 to 5.7 illustrate examples of deaths due to direct causes.

Table 5.11: Direct Causes of Maternal Deaths by District

District Causes	Sunsari	Rupandehi	Kailali	Okhaldhunga	Baglung	Surkhet	Rasuwa	Jumla	Total	% of direct causes	% of Maternal Causes
Haemorrhage	2	12	12	1	2	3	2	4	38	34.5	23.8
- <i>Postpartum haemorrhage</i>	2	8	8	0	2	2	2	4	28	25.4	17.5
- <i>Antepartum Haemorrhage</i>	0	4	4	1	0	1	0	0	10	9.1	6.3
Eclampsia	11	9	6	3	1	1	0	3	34	30.9	21.3
Abortion	2	3	3	0	1	1	1	0	11	10.0	6.9
- <i>Induced</i>	2	1	0	0	1	1	1	0	6	5.5	3.8
- <i>Spontaneous</i>	0	2	3	0	0	0	0	0	5	4.5	3.1
Obstructed labour	1	3	1	0	1	2	0	1	9	8.2	5.6
Puerperal sepsis	1	1	1	0	2	3	0	0	8	7.3	5.0
Retained placenta without haemorrhage	0	0	2	0	0	0	0	0	2	1.8	1.3
Ruptured Uterus	0	1	0	0	0	1	0	0	2	1.8	1.3
Inversion uterus	0	1	1	0	0	0	0	0	2	1.8	1.3
Pulmonary Embolism	0	1	0	0	1	0	0	0	2	1.8	1.3
Misadventure to patient (primary haemorrhage from C/S)	0	0	1	0	0	0	0	0	1	0.9	0.6
Agents primarily affecting blood constituents (Blood transfusion reaction)	0	1	0	0	0	0	0	0	1	0.9	0.6
Total	17	32	27	4	8	11	3	8	110	100.0	68.8

Case Study 5.4: Maternal death due to spontaneous abortion

Ruksana was a 26 year old, illiterate, mother of two, who lived with her children and mother-in-law. Her husband worked overseas. Both of her previous deliveries were normal deliveries at home. During her third pregnancy she had her first antenatal care check-up at two months, and three check-ups in total within the first five months.

At one and half months of pregnancy she became unconscious once. At the third month of pregnancy she experienced swelling of body, abdominal pain and unconsciousness. "We thought she was caught by evil spirits so we did not seek medical treatment" said her mother-in-law.

At five months she had continuous vaginal bleeding and vomiting, so she was taken to the Medical College Hospital at midnight. She was admitted there for treatment for three days. After treatment, the bleeding stopped and her maternal parents took her to their home as it was more accessible to the facility. Fifteen days after returning from the hospital she started bleeding again and was taken to the nearby hospital for treatment. Her condition did not improve, even after taking all of the prescribed medicines, so again she was taken to the Medical College Hospital. She was given a blood transfusion and more medicine, but the bleeding did not stop. The hospital discharged her saying that there was no hope. She was taken to her maternal house. Her relatives said she had no blood left in her body, had lost her appetite and used to lie down on her bed all day and night, until she died. Her relatives spent about fifty thousand rupees on her treatment.

Case Study 5.5: Maternal death due to induced abortion

Sumitra was a 36 year old, literate, mother of five. This was her tenth pregnancy, four of which she had terminated. At the third month of pregnancy she had requested an induced abortion from an auxiliary nurse midwife at a local medicine shop. She had gone alone, and not informed her family about the termination until she developed severe abdominal pain. Her condition deteriorated, the pain continued and she lost weight, so her daughter took her to a family planning clinic four days after her attempted termination. A scan report did not show any complications in her uterus so the doctor advised her to take rest at home.

After 17 days of bed rest she developed severe abdominal pain at midnight. Since it was midnight, and an ambulance would charge more, her relatives decided to wait and take her to the health facility in the morning. At about eight o'clock in the morning they arranged for an ambulance to take her to a nursing home. She was admitted to the emergency ward, but the doctor said there was nothing serious enough to keep her in that ward. A blood sample was taken for testing at about 11am, and the report came back at about 3pm showing it was serious and she needed a caesarean section. They got her ready for the operation at 4pm and took her to the operation theatre at 7pm. She came out of the operation theatre at 10pm and the doctor told her relatives that she had Septicemia and showed them the uterus he had removed. She resumed consciousness at 2am, but was unable to speak. She died due to septic shock at around 4pm, 24 days after her termination attempt.

"My mummy could have been saved if we had recognized her problem and taken her to a better health facility sooner. If we were informed prior to her abortion attempt we could have taken her to a better health facility instead of the medical shop. The nurse who assisted her should have informed us about the risks instead of doing it just for money. Actually it was the nurse who took her life" says her daughter who was with her at the time of her treatment and death.

Case Study 5.6: Maternal death due to postpartum haemorrhage

Harimaya was 45 and literate, but had never attended school. She had already had eight children, two terminations, and one stillbirth. During her ninth pregnancy the doctor had warned her that if she became pregnant again she may die, and recommended her to have a laparotomy or Depo-Provera.

During her twelfth pregnancy she suffered from weakness, anaemia, fatigue, shivering, malnourishment and suffered from occasional abdominal pain. During the fifth month she had vaginal bleeding and vomited blood once. She never received antenatal care during her last pregnancy, but her pregnancy progressed, and during the ninth month her labour pains started at about 3am. At about 4:30am she went to field for her agricultural duties, and at 5:30am she delivered in the field with assistance from her husband and daughter, there was no excessive bleeding but her placenta was not delivered. She was taken to her home, carrying her child, with help from her neighbours. They suggested that her husband take her to hospital, but she refused to go.

A private practitioner came to her home at about 7am and gave her intravenous drips. Her abdomen became swollen and her stomach became harder, but he left and said she would recover soon. Her situation deteriorated, and a traditional birth attendant was called, who massaged her abdomen. However, the placenta still didn't come out and the TBA referred her to hospital and an ambulance was called at about 8:30am. She was shivering, had chest pain and became semi-conscious. The TBA used her safe delivery kit to tie the umbilical cord with thread, cut the cord with a blade and tied a piece of wood on its edge to stop it from getting in. Soon after that she became unconscious. The placenta expelled, but only partially, and in pieces. Five hours after she delivered the baby she died, before the ambulance had arrived.

Her husband felt the delays in recognizing that she had complications; deciding to seek care from a skilled health worker; finding money; arranging transportation and the long distance to the health facility contributed to her death. He felt she could have been saved if she was taken to hospital as soon as she delivered despite, of her refusal, had been attended to by a skilled health worker instead of the private practitioner, and had got an ambulance sooner.

Case study 5.7: Maternal death due to eclampsia

Rammaya was 20 years old, belonged to poor family and had passed grade six at school. She was married to her elder sister's husband, as his second wife. She had gone to India with her husband and was eight months pregnant when she returned home. This was her first pregnancy. 7-8 days prior to returning from India her hands and feet became swollen, and she had a headache and giddiness at times. It persisted even when she stayed at home. She did not receive any treatment in India as the service was unavailable and her husband did not feel the need. Gradually she lost her appetite but she did not have any treatment, nor antenatal care at the nearby sub health post, despite her in-law's recommendation.

One day at about 11am, her father-in-law found her lying on the floor by her bed. She was semiconscious, her tongue was bitten, and there was a small cut on the left hand side of her forehead. She opened and closed her eyes on and off, but did not respond when we spoke to her. She had collected grass for the pets earlier that morning. A traditional faith healer treated her and she became conscious at times, and complained of headache and giddiness. The family said they had money for treatment but it was very difficult to take her to the health facility as there was no means of transportation. The faith healer asked for a white cockerel for her treatment and the family went to seek one. Eclampsia led to cerebral haemorrhage and she died at about 4 pm later that same day.

Despite seeking care from a traditional faith healer, the family recognised that if they had not delayed in recognising she had a complication and in seeking care from a health facility she may have survived.

Indirect Causes

An indirect cause of death is a “previous existing disease or disease that develops during pregnancy and which was not due to direct obstetric causes, but which was aggravated by the physiologic effects of pregnancy” (ICD-10). Table 5.12 shows the indirect causes of maternal deaths by district. The leading indirect maternal cause of death was heart disease at 7 percent, followed by anaemia (4%) and gastroenteritis (4%). The remaining indirect causes were hepatitis; pneumonia; septicaemia; typhoid; epilepsy; malaria; renal failure; HIV/AIDS; tetanus; tuberculosis; severe dehydration and APD; rabies; and pulmonary oedema. During the study time period there was severe flooding in some of the districts (Sunsari and Kailali), and three out of the seven gastroenteritis cases were linked to this flooding, due to outbreaks of diarrhoea. The remaining four cases were linked to poor hygiene and poor living conditions. Case studies 5.8 and 5.9 illustrate examples of deaths due to indirect causes.

Table 5.12: Indirect Causes of Maternal Deaths by District

Indirect Causes	Sunsari	Rupandehi	Kailali	Okhal-dhunga	Baglung	Surkhet	Rasuwa	Jumla	Total	% of indirect causes	% of Maternal Causes
Heart disease	0	4	4	0	2	1	0	0	11	22.0	6.9
Anaemia	0	5	2	0	0	0	0	0	7	14.0	4.4
Gastroenteritis	4	0	2	0	0	1	0	0	7	14.0	4.4
Hepatitis	1	0	1	0	1	2	0	0	5	10.0	3.1
Pneumonia	0	3	1	0	0	0	0	0	4	8.0	2.5
Septicaemia	1	1	0	1	0	0	0	0	3	6.0	1.9
Typhoid	0	0	0	0	0	2	0	0	2	4.0	1.3
Epilepsy/Seizures	0	0	1	0	0	0	0	1	2	4.0	1.3
Malaria	0	0	2	0	0	0	0	0	2	4.0	1.3
Renal failure	0	0	1	0	0	0	0	0	1	2.0	0.6
HIV/AIDS	0	0	1	0	0	0	0	0	1	2.0	0.6
Tetanus	1	0	0	0	0	0	0	0	1	2.0	0.6
Tuberculosis	1	0	0	0	0	0	0	0	1	2.0	0.6
Severe dehydration and APD	0	1	0	0	0	0	0	0	1	2.0	0.6
Rabies	0	0	1	0	0	0	0	0	1	2.0	0.6
Pulmonary Oedema	0	1	0	0	0	0	0	0	1	2.0	0.6
Total	8	15	16	1	3	6	0	1	50	100.0	31.3

Case Study 5.8: Maternal death due to anaemia

Sonawati died giving birth to her first child when she was just 18 years old. She had one antenatal care check up at four months, and pregnancy progressed to the ninth month without any complications. However, 8-9 days prior to delivery her legs became swollen and she had difficulty in breathing, but she did not have any vomiting or fever so her family sought no treatment.

She went to her maternal house one week prior to her delivery, where her breathing further deteriorated. She went into labour at about 5pm, and her husband, who was at his own house was informed immediately. He wasted no time in arranging an ambulance and arriving at his in-law's house. The family took her to a private hospital and arrived at about 8pm. Her treatment started within 10 minutes of reaching the hospital. She was given IV drips, and an injection to speed up contractions and make the delivery more effective. The doctor prescribed some medicines, and another injection that could not be bought locally and therefore had to be brought from a neighbouring border town in India at the cost of Rs. 4,000. The doctor also informed family members that she may require a blood transfusion, therefore some people from the village where waiting at the hospital to donate blood, if necessary.

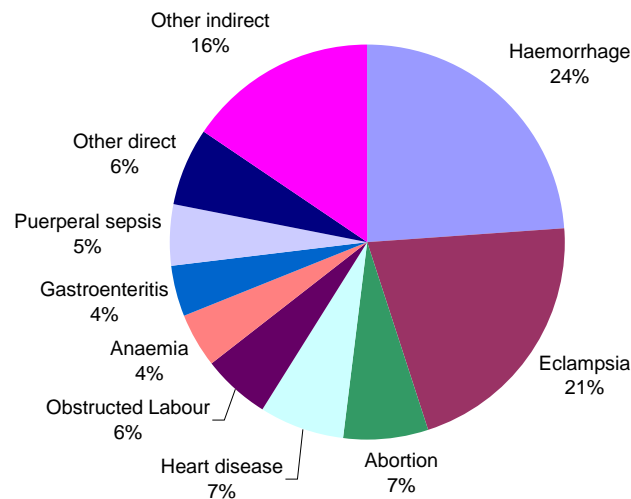
At 2am she delivered a stillborn baby, and the placenta was delivered naturally within half an hour. She received oxygen for about one hour. She was quiet and didn't speak to visitors. Before being given a blood transfusion she died at 6am. The family spent about 35,000 rupees on her treatment.

Case Study 5.9: Maternal death due to Gastroenteritis

Sangita was a 16 year old, literate woman who belonged to the Dalit caste (the lowest in the Hindu caste system). She was married for the second time after her first husband re-married.

This was her first pregnancy, and initially it progressed without any complications apart from feeling weak and dizzy at times. She attended one antenatal care check-up during her pregnancy. At six months of pregnancy she developed Jaundice. She was taken to a traditional healer (Lama) and recovered after treatment. At eight months she complained of heart pain, but felt better after a while and so her family did not seek treatment. In the same month, six days before her death, she started to vomit continuously in the morning. Her condition deteriorated, and she developed a severe headache. Her relatives took her to a traditional healer for treatment, but she didn't improve. They then took her to a Maoist health camp where she was given immediately given IV fluid, but her condition still did not improve. After four hours she was referred to a higher level hospital. She was admitted and had a blood test and scan, these showed that the status of the foetus was good. However, she then simultaneously had diarrhoea and vomiting. On the fourth day her condition deteriorated and she became unconscious, so she was then referred to the medical college in the city. She was admitted and the doctors gave her IV Fluid along with some other medicines. She died the following day, while undergoing treatment.

Figure 5.9: Maternal Causes of Death



5.2.3 Comparison of Cause of Death Breakdown with 1998 MMM Study

The proportion of pregnancy related deaths due to maternal causes has increased from 84 percent in the 1998 MMM study (Table 5.13) to 93 percent in the 2008/09 study, with an associated decline in the percentage of deaths attributed to accidental or incidental causes from 9 percent to 6 percent. The proportion of accidental or incidental causes due to suicide has risen from 33 percent in 1998 to 46 percent in 2008/09. There has been a substantial change in the proportion of deaths due to direct causes, reducing from 84 percent in 1998 to 69 percent in 2008/09, with an associated increase in the proportion due to indirect increasing from 16 percent to 31 percent.

Table 5.13: Comparison of Pregnancy Related Causes from 1998 and 2008/09 Maternal Mortality and Morbidity Studies

Pregnancy Related Causes	1998		2008/09	
	Number	%	Number	%
Accidental/Incidental	12	9.1	11	6.4
- Snake bite	5	41.7	1	9.1
- Suicide	4	33.3	5	45.5
- Accident/burn	2	16.7	1	9.1
- Lightening	1	8.3	1	9.1
- Homicide	-	-	3	27.3
Maternal	111	84.1	160	93.0
- Direct	93	83.8	110	68.8
- Indirect	18	16.2	50	31.3
Unknown	9	6.8	1	0.6
Total	132		172	

As one would expect, the percentage contribution of some causes will have increased over time, and reduced for others. Haemorrhage was the leading cause of death in both 1998 (Table 5.14) and 2008/09. However, the percentage contribution of haemorrhage to maternal causes has dramatically lowered from 43 percent in 1998 compared to 24 percent in 2008/09. This decline reflects a reduction in PPH (both with and without retained placenta) from 39 percent to 18 percent, rather than APH. The other main causes of death that have lower percentages in 2008/09: Obstructed labour (14% in 1998 compared to 6% in 2008/09); puerperal sepsis (10% in 1998 compared to 5% in 2008/09). There were numerous causes that have higher percentages in 2008/09 with many doubling, or nearly doubling. They include eclampsia (12% in 1998 compared to 21% in 2008/09); abortion (5% in 1998 and 7% in 2008/09); Anaemia (3% in 1998 compared to 7% in 2008/09) and gastroenteritis (2% in 1998 compared to 7% in 2008/09). Heart disease didn't even feature in 1998, but accounted for 11 percent in 2008/09.

Table 5.14: Comparison of Causes of Maternal Deaths from 1998 and 2008/09 MMM Studies

Cause of Death	MMMS 1998			MMMS 2008/09		
	Number	% of direct/ indirect causes	% of maternal deaths	Number	% of direct/ indirect causes	% of maternal deaths
Direct Causes						
Haemorrhage	48	51.6	43.2	38	34.5	23.8
- <i>Postpartum haemorrhage</i>	43	46.2	38.7	28	25.4	17.5
- <i>Antepartum haemorrhage</i>	5	5.4	4.5	10	9.1	6.3
Obstructed labour/ruptured uterus	15	16.1	13.5	9	8.2	5.6
Eclampsia	13	14.0	11.7	34	30.9	21.3
Puerperal sepsis	11	11.8	9.9	8	7.3	5.0
Abortion	5	5.4	4.5	11	10.0	6.9
Ectopic pregnancy	1	1.1	0.9			
Retained Placenta	-	-	-	2	1.8	1.3
Ruptured Uterus	-	-	-	2	1.8	1.3
Inversion uterus	-	-	-	2	1.8	1.3
Pulmonary Embolism	-	-	-	2	1.8	1.3
Primary haemorrhage from C/S	-	-	-	1	0.9	0.6
Blood transfusion reaction				1	0.9	0.6
Total	93	100.0	83.8	110	100.0	68.8
Indirect Causes						
Encephalitis	5	27.8	4.5	-	-	-
Jaundice	4	22.2	3.6	-	-	-
Anaemia	3	16.7	2.7	7	14.0	4.4
Gastroenteritis	2	11.1	1.8	7	14.0	4.4
Tuberculosis	2	11.1	1.8	1	2.0	0.6
Asthma	1	5.6	0.9			
Rabies	1	5.6	0.9	1	2.0	0.6
Heart disease	-	-	-	11	22.0	6.9
Hepatitis	-	-	-	5	10.0	3.1
Pneumonia	-	-	-	4	8.0	2.5
Septicaemia	-	-	-	3	6.0	1.9
Typhoid	-	-	-	2	4.0	1.3
Epilepsy/Seizures	-	-	-	2	4.0	1.3
Malaria	-	-	-	2	4.0	1.3
Renal failure	-	-	-	1	2.0	0.6
HIV/AIDS	-	-	-	1	2.0	0.6
Tetanus	-	-	-	1	2.0	0.6
Severe dehydration and APD	-	-	-	1	2.0	0.6
Pulmonary Oedema	-	-	-	1	2.0	0.6
Total	18	100.0	16.2	50	100.0	31.3

5.2.4 Causes of Institution Based Maternal Deaths

For hospital based maternal deaths, direct causes accounted for 90 percent, and indirect 11 percent (Table 5.15). The results for maternal deaths occurring in EOC facilities are similar, with direct causes accounted for 91 percent and indirect for 9 percent.

Table 5.15: Proportion of Direct and Indirect Maternal Deaths in Institutions by District

District	Hospitals				EOC facilities			
	Direct		Indirect		Direct		Indirect	
	N	%	N	%	N	%	N	%
Sunsari	18	100.0	0	0.0	18	100.0	0	0.0
Rupandehi	17	81.0	4	19.0	17	81.0	4	19.0
Kailali	12	92.0	1	7.7	12	92.3	1	7.7
Okhaldhunga	2	100.0	0	0.0	2	100.0	0	0.0
Baglung	0	0.0	0	0.0	0	0.0	0	0.0
Surkhet	3	100.0	0	0.0	0	0.0	0	0.0
Rasuwa	0	0.0	0	0.0	1	100.0	0	0.0
Jumla	0	0.0	0	0.0	3	100.0	0	0.0
All districts	51	89.5	6	10.5	53	91.4	5	8.6
Total (n)	57				58			

In contrast to Table 5.15, Table 5.16, showing results from the verbal autopsies for just the institutional deaths, and has a higher proportion of indirect maternal deaths occurring at institutions. One should note that Table 5.15 contains all deaths in MDR institutions within the study area and includes non-residents, while Table 5.16 contains all deaths to usual residents of the study area occurring in institutions, and includes deaths in non-MDR institutions in the study area and institutions outside the study area. However, the results do suggest that the maternal death reviews and Emergency Obstetric Care Morbidity Monitoring data are missing indirect maternal deaths, and this may be a result of them occurring outside of the maternity ward.

Table 5.16: Proportion of Direct and Indirect Institutional Maternal Deaths to Women Who Were Usual Residents in the Study Area

Districts	Direct		Indirect	
	Number	Percent	Number	Percent
Sunsari	11	73.3	4	26.7
Rupandehi	18	66.7	9	33.3
Kailali	12	66.7	6	33.3
Okhaldhunga	1	100.0	0	0.0
Baglung	1	100.0	0	0.0
Surkhet	3	75.0	1	25.0
Rasuwa	1	100.0	0	0.0
Jumla	1	100.0	0	0.0
Total	48	70.6	20	29.4

For all hospital based maternal deaths the cause of death was recorded on the maternal death review (Table 5.17). Eclampsia was the leading cause, accounting for nearly one third of all maternal deaths (30%); haemorrhage was the second most common cause accounting for nearly one-fifth of deaths (19%) (with antepartum haemorrhage accounting for 9% and postpartum haemorrhage for 11%). Complications related to induced abortions (there were no cases linked to spontaneous abortions) were the third leading cause at 12 percent followed by puerperal sepsis (7%). The leading indirect cause was heart disease accounting for 5 percent.

Table 5.17: Causes of Hospital Based Maternal Deaths

Causes of Death	Number	percent
Direct Cause	51	89.5
Eclampsia	17	29.8
Haemorrhage	11	19.3
- <i>Ante partum Haemorrhage</i>	5	8.8
- <i>Postpartum Haemorrhage</i>	6	10.5
Complications related to induced abortion	7	12.3
Puerperal Sepsis	4	7.0
Ruptured Uterus	3	5.3
Obstructed Labour	2	3.5
Hydatiform mole	2	3.5
Inversion of uterus	1	1.8
Retained Placenta	1	1.8
Pulmonary Embolism	1	1.8
Disruption of caesarean section wound	1	1.8
Molar tissue embolism	1	1.8
Indirect Cause	6	10.5
Heart disease	3	5.3
Anaemia	1	1.8
Pulmonary oedema	1	1.8
Septicaemia	1	1.8
Total	57	100.0

Case study 5.10: Maternal death review for pulmonary embolism

Manita, 28, already had three children and a history of a previous lower segment caesarean section. She was taken to the emergency ward, and then admitted to the labour room at 11.35am. When admitted she was in the active stage of labour and had an intra uterine foetal death (premature foetus). On examination, her cervix was fully dilated and her membranes intact. I/V fluid was given to open the vein and the progress of labour was monitored. All of a sudden her condition deteriorated and gradually her blood pressure dropped and finally she collapsed. She was attended to by the on call doctors (Gynaecologist and Physician). Manita was gasping, feeling cold, and her blood pressure and pulse were very low. Cardiopulmonary resuscitation was done for one to two hours but nothing improved and she died of a pulmonary embolism at 6pm the day she was admitted.

Case study 5.11: Maternal death review for molar pregnancy

Sita, 20, already had one child, she presented with irregular bleeding P/V for the last 20 days at 12 weeks of pregnancy. This was a referred case from Illam district. USG confirmed that she had molar pregnancy. After necessary investigation and anaesthetic check up, suction evacuation was done under General Anaesthetic. Operative procedure sucked out about 2.5 litres of vesicles and blood. After operation, her BP dropped but she was conscious, not pale and had no active P/V bleeding. Her Hypotension was refractory. She was transferred to ICU. Oxygen concentration in the blood (SPO2) dropped so ventilator support was given. Vasopressor was given and blood transfusion was also done. She developed petechial rashes and expired.

Case study 5.12: Maternal death review for molar tissue embolism

Shanti was referred from AMDA, Damak, Jhapa district, with a history of a lower segment caesarean section (LSCS) due to foetal distress. After the LSCS she collapsed, her BP and pulse were not recordable and she had no urine output. Then she was referred to BPKIHS, Dharan. Exploratory laparotomy was done, 3 litres of bleeding from incision site was drained out and subtotal hysterectomy was conducted. She was kept under MICU with entropic drug but BP and pulse rate was not recordable. HR decreased so atropine/adrenaline was given. However she died at 2:05 pm on the same day of admission.

5.3 Timing of Pregnancy Related Deaths

All accidental and incidental pregnancy related deaths occurred during pregnancy (Table 5.18). Although these are officially excluded as being due to maternal causes, with the exception of snake bite and lightening, the pregnancy status of the women may have placed them at greater risk of dying (suicide, homicide, and an accidental fall) and unwanted pregnancies may be an important factor for the increased risk. The respondents for the verbal autopsy were asked if the pregnancy was wanted. In four cases of accidental and incidental deaths they stated the pregnancy was unwanted (homicide by husband and 3 suicide) and in two they were uncertain (homicide by parents and accidental fall), thus giving further weight to the suggestion that their pregnancy status placed them at greater risk of dying. The one pregnancy related death due to unknown causes also occurred during pregnancy.

Figure 5.10 shows the overall findings for the timing of maternal death. Forty four percent of maternal deaths occurred in the antepartum period; 39 percent occurred during the intrapartum period and up to 48 hours afterwards (with 33% of these occurring in the first 24 hours); and 28 percent occurred in the postpartum period (> 48 hours). It has been estimated that two-thirds of maternal deaths occur in late pregnancy through to 48 hours after delivery (Berhane et al. 2000) and the skilled birth attendance policy is recommended to cover this time period. This data showed a higher proportion (62%) of deaths occurring outside this time period, suggesting that there may be variability between different contexts regarding the timing of maternal deaths.

Table 5.18: Timing of Pregnancy Related Deaths by District

	Antepartum	Intrapartum (up to 24hrs postpartum)	Early postpartum (24- 48 hrs postpartum)	Postpartum (> 48 hrs - 42 days)	Total
Unknown	1				
Accidental/Incidental Deaths	11				
Maternal Deaths					
Rupandehi	18	15	3	11	47
Kailali	17	13	3	10	43
Sunsari	8	6	1	10	25
Surkhet	3	6	1	7	17
Baglung	4	3	1	3	11
Okhaldhunga	2	1	0	2	5
Jumla	1	6	1	1	9
Rasuwa	1	2	0	0	3
Total maternal (n)	54	52	10	44	160
% maternal	33.8	32.5	6.2	27.5	100.0

Figure 5.10: Timing of Maternal Deaths

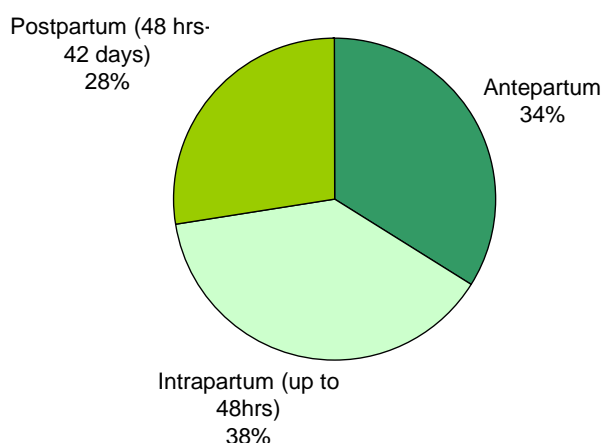


Table 5.19 shows the timing of maternal deaths by cause of death. In the antepartum period 50 percent of deaths were due to direct causes and 50 percent to indirect causes. The proportion due to direct causes is higher in the postpartum period (2 to 42 days) at 64 percent and highest in the intrapartum period (up to 48 hours afterwards) where they account for 89 percent of deaths. The main direct causes in the antepartum period are due to abortion related complications (20%); eclampsia (15%) and antepartum haemorrhage (15%). The main indirect causes during the antepartum period are heart disease (11%), gastroenteritis (9%) and anaemia (7%). The main direct causes in the intrapartum period are due to haemorrhage (39%), eclampsia (23%) and obstructed labour (13%). The main indirect causes during the intrapartum period are heart disease (3%), anaemia (3%) and hepatitis (3%). The main direct causes in the postpartum period are due to eclampsia (27%), puerperal sepsis (16%) and postpartum haemorrhage (14%). The main indirect causes during the intrapartum period are heart disease (7%), gastroenteritis (5%) and pneumonia (5%).

Table 5.19: Timing of Maternal Death by Cause of Death

Cause of death	Antepartum		Intrapartum (up to 48hrs postpartum)		Postpartum (> 48 hrs - 42 days)		Total
	N	%	N	%	N	%	
Direct Causes	27	50.0	55	88.7	28	63.6	110
Haemorrhage	8	14.8	24	38.7	6	13.6	38
- <i>Postpartum Haemorrhage</i>	0	0.0	22	35.5	6	13.6	28
- <i>Antepartum Haemorrhage</i>	8	14.8	2	3.2	0	0.0	10
Eclampsia	8	14.8	14	22.6	12	27.3	34
Abortion	11	20.4	0	0.0	0	0.0	11
- <i>Induced</i>	6	11.1	0	0.0	0	0.0	6
- <i>Spontaneous</i>	5	9.3	0	0.0	0	0.0	5
Obstructed labour	0	0.0	8	12.9	1	2.3	9
Puerperal sepsis	0	0.0	1	1.6	7	15.9	8
Retained placenta without haemorrhage	0	0.0	2	3.2	0	0.0	2
Ruptured Uterus	0	0.0	2	3.2	0	0.0	2
Inversion uterus	0	0.0	2	3.2	0	0.0	2
Pulmonary Embolism	0	0.0	0	0.0	2	4.5	2
Misadventure to patient (primary haemorrhage from C/S)	0	0.0	1	1.6	0	0.0	1
Agents primarily affecting blood constituents (Blood transfusion reaction)	0	0.0	1	1.6	0	0.0	1
Indirect Causes	27	50.0	7	11.3	16	36.4	50
Heart disease	6	11.1	2	3.2	3	6.8	11
Anaemia	4	7.4	2	3.2	1	2.3	7
Gastroenteritis	5	9.3	0	0.0	2	4.5	7
Hepatitis	2	3.7	2	3.2	1	2.3	5
Pneumonia	2	3.7	0	0.0	2	4.5	4
Septicaemia	2	3.7	0	0.0	1	2.3	3
Typhoid	1	1.9	0	0.0	1	2.3	2
Epilepsy/Seizures	1	1.9	0	0.0	1	2.3	2
Malaria	1	1.9	1	1.6	0	0.0	2
Renal failure	0	0.0	0	0.0	1	2.3	1
HIV/AIDS	0	0.0	0	0.0	1	2.3	1
Tetanus	0	0.0	0	0.0	1	2.3	1
Tuberculosis	0	0.0	0	0.0	1	2.3	1
Severe dehydration and APD	1	1.9	0	0.0	0	0.0	1
Rabies	1	1.9	0	0.0	0	0.0	1
Pulmonary Oedema	1	1.9	0	0.0	0	0.0	1
Total	54	100.0	62	100.0	44	100.0	160

5.3.1 Timing of Hospital Maternal Deaths

Of the 57 hospital maternal deaths, 39 percent occurred during the antepartum period; 37 percent during the intrapartum and up to 48 hours after delivery (with 26% in the first 24 hours and 11% between 24 and 48 hours); one quarter (25%) occurred between two and 42 days after the delivery (Table 5.20). These results are very similar to those for all maternal deaths (occurring in the community and facilities), with once again a high proportion (63%) occurring outside the intrapartum period (and up to 48 hours afterwards).

Table 5.20: Timing of Hospital Maternal Deaths

Timing of death	Number	Percent
Antepartum	22	38.6
Intrapartum (up to 24hrs postpartum)	15	26.3
Early postpartum (24-48 hrs postpartum)	6	10.5
Postpartum (>48 hrs-42 days)	14	24.6
Total	57	100.0

Table 5.21 shows the timing of hospital based maternal deaths by cause of death. All deaths due to indirect causes occurred in the antepartum period, where they accounted for 27 percent of deaths. The main cause of death in the antepartum period was complications due to induced abortion, accounting for 32 percent of antepartum deaths. This was followed by eclampsia (23%); antepartum haemorrhage (9%) and hydatiform mole (9%). The main causes of death in the intrapartum period (up to 48hrs after delivery) were haemorrhage (33%); eclampsia (24%); and ruptured uterus (14%). In the postpartum period the main causes of death were eclampsia, accounting for 50 percent of postpartum deaths, puerperal sepsis (21%) and postpartum haemorrhage (14%).

Table 5.21: Timing of Hospital Based Maternal Deaths by Cause of Death

Cause of death	Antepartum		Intrapartum (up to 48hrs)		Postpartum (48hrs-42days)		Total
	N	%	N	%	N	%	
Direct Cause	16	72.7	21	100.0	14	100.0	51
Eclampsia	5	22.7	5	23.8	7	50.0	17
Haemorrhage	2	9.1	7	33.3	2	14.3	11
- <i>Ante partum Haemorrhage</i>	2	9.1	3	14.3	0	0.0	5
- <i>Postpartum Haemorrhage</i>	0	0.0	4	19.0	2	14.3	6
Complications related to induced abortion	7	31.8	0	0.0	0	0.0	7
Puerperal Sepsis	0	0.0	1	4.8	3	21.4	4
Ruptured Uterus	0	0.0	3	14.3	0	0.0	3
Inversion of uterus	0	0.0	1	4.8	0	0.0	1
Obstructed Labour	0	0.0	1	4.8	1	7.1	2
Retained Placenta	0	0.0	1	4.8	0	0.0	1
Pulmonary Embolism	0	0.0	1	4.8	0	0.0	1
Disruption of caesarean section wound	0	0.0	1	4.8	0	0.0	1
Molar tissue embolism	0	0.0	0	0.0	1	7.1	1
Hydatiform mole	2	9.1	0	0.0	0	0.0	2
Indirect Cause	6	27.3	0	0.0	0	0.0	6
Anaemia	1	4.5	0	0.0	0	0.0	1
Heart disease	3	13.6	0	0.0	0	0.0	3
Pulmonary oedema	1	4.5	0	0.0	0	0.0	1
Septicaemia	1	4.5	0	0.0	0	0.0	1
Total	22	100.0	21	100.0	14	100.0	57

Admission Status of Hospital Based Maternal Deaths

Nearly two thirds of the women who died from maternal causes in a hospital were admitted during the antepartum period (63%), with 9 percent of these related to an induced abortion and 9 percent related to a spontaneous abortion (miscarriage) (Table 5.22). Almost one-fifth were admitted during the intrapartum (19%) and postpartum periods (18%). Most women were admitted to the hospitals as emergency cases (83%) and were critical on arrival (84%). More than one-third of the women (35%) died within 10 hours of admission to hospital; just over half of women (53%) within one day of being admitted; and 82 percent within two days. The average time from admission to hospital to death was 38 hours.

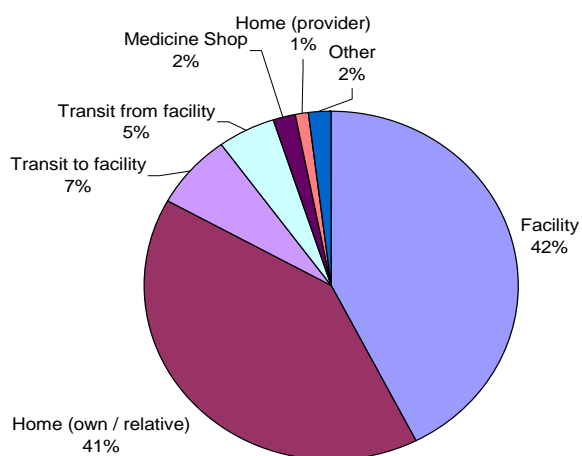
Table 5.22: Status on Admission for Hospital Maternal Deaths

Status on admission	Number	Percent
Pregnancy status on admission		
Antepartum	36	63.2
Intrapartum (up to 24hrs postpartum)	11	19.3
Early postpartum (24-48 hrs postpartum)	4	7.0
Postpartum (>48 hrs-42 days)	6	10.5
Admission status		
Emergency	47	82.5
Routine	10	17.5
Condition on admission		
Critical	48	84.2
Stable	9	15.8
Time between admission and death		
<2hrs	7	12.3
2-4 hrs	3	5.3
4-12 hrs	12	21.1
12-24hrs	8	14.0
24-48hrs	16	28.1
>48hrs	11	19.3
Total	57	100.0

5.4 Place of Death for Women Who Died from Maternal Causes

Figure 5.11 shows the place of death for those who died from maternal causes. Of the 160 maternal deaths, 42 percent occurred in a facility; 41 percent occurred at the home of the deceased or their relatives; 7 percent in transit to a facility and 5 percent in transit from a facility; 2 percent at a medicine shop and 1 percent occurred at a home of a service provider. Two percent occurred in other places such as the jungle or cowshed. Of those who died in a facility nearly half died in a public facility (45%). There has been a large increase in the percentage of maternal deaths occurring in a facility since 1998, from 14 percent to 42 percent, and an associated large reduction in the percentage occurring at home, from 70 percent to 41 percent. This suggests that there is an increase in the number of women going to a facility when they experience a complication, but that many are leaving it too late or the facility is unable to treat them.

Figure 5.11: Place of Death for Women Who Died from Maternal Causes



5.5 Characteristics of Women Who Died from Maternal Causes

Table 5.23 shows differences in the MMR by age-group and ethnicity. MMR was found to vary considerably by age-group, reflecting patterns found internationally. The lowest risk was found for women in their early twenties (119 per 100 00 live births), followed by their late twenties (191 per 100,000 live births). There was an increased risk for those under twenty (297 per 100,000 live births) and in their early thirties (323 per 100,000 live births). However, for women aged 35 or over the risk increased dramatically with an MMR of 962 per 100,000 live births. Levels of MMR also varied between different ethnic groups, with the highest rates among Muslims (318 per 100,000 live births), tarai/Madhesi (307 per 100,000 live births) and Dalits (273 per 100,000 live births).

Table 5.23: Levels of MMR by Age-group and Ethnicity

Age-group and ethnicity	Number of maternal deaths	Number of live births	MMR
Age group			
< 20	23	7,744	297
20-24	37	30,996	119
25-29	38	19,851	191
30-34	23	7,128	323
35+	39	4,056	962
Caste/Ethnicity			
Muslim	14	4,405	318
Tarai/Madhesi/Other Caste	29	9,455	307
Dalits	34	12,475	273
Janjati	43	20,823	207
Brahman/Chhetri	39	21,424	182
Newar	1	954	105
Other	0	239	0
Total	160	69,775	229

Table 5.24 presents the demographic characteristics of all maternal deaths to usual residents of the study districts, as well as those for all maternal deaths occurring in the hospitals in the study districts (i.e. includes residents and non-residents of study districts). The characteristics may reflect those of the women becoming pregnant and thus are not necessarily an indication of higher risk. Nearly half of the usual residents who died from maternal causes were in their twenties (47%). The main difference between all district residents and the deaths occurring in the hospitals in study districts appears to be a lower proportion of older women (aged 35 and over) dying in hospital, 24 percent compared to 14 percent, suggesting a lower utilisation of facilities by women of older age-groups. Ninety nine percent of the resident women who died from maternal causes were married. The distribution of maternal deaths by religion and ethnicity are similar when comparing all deaths to usual residents and those occurring in the hospitals and are largely a reflection of the population of the study area.

Table 5.24: Demographic Characteristics of Women Who Died from Maternal Deaths

Demographic characteristics	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Age group				
< 20	23	14.4	9	15.8
20-24	37	23.1	20	35.1
25-29	38	23.8	14	24.6
30-34	23	14.4	6	10.5
35+	39	24.4	8	14.0
Marital Status				
Married	159	99.4	-	-
Widowed/divorced/separated	1	0.6	-	-
Religion				
Hindu	140	87.5	48	84.2
Muslim	14	8.8	5	8.8
Buddhist	4	2.5	4	7.0
Other (Kirant, Christian)	2	3.7		
Caste/Ethnicity				
Janjati	43	26.9	16	28.1
Brahman/Chhetri	39	24.4	14	24.6
Dalits	34	21.3	12	21.1
Tarai/Madhesi/Other Caste	29	18.1	7	12.3
Muslim	14	8.8	5	8.8
Newar	1	0.6	3	5.3
Total	160	100.0	57	100.0

Table 5.25 presents the socio-economic characteristics of all maternal deaths to usual residents of the study districts, as well as those for all maternal deaths occurring in the hospitals in the study districts. The characteristics may again reflect those of the women becoming pregnant and not necessarily an indication of higher risk. The only socio-economic data included on the MDR form is education but this was unknown for over 50 percent of the women who died. Most of the resident women who died from maternal causes had not received any formal education (63%), although a third of these were classified as literate (22%). Less than half of the women (47%) had electricity supply or solar power to their house. The most common household assets were a bed (86%), clock (68%), radio (59%) dhiki/janto (traditional grinders) (45%), table (41%) and chair (39%). Seventy nine percent of households owned some agricultural land and over a third had a member of the household working overseas (35%).

Table 5.25: Socio-economic Characteristics of Women Who Died from Maternal Deaths

Socio-economic characteristics	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Education				
No schooling illiterate	66	41.3	14	24.6
No schooling literate	35	21.9	3	5.3
Grade0-5	32	20.0	2	3.5
Grade6-9	17	10.6	5	8.8
SLC passed or higher	5	3.1	2	3.5
Don't know	5	3.1	31	54.4
Household Assets				
Electricity/Solar power	75	46.9	-	-
Bed	137	85.6	-	-
Clock	109	68.1	-	-
Radio	94	58.8	-	-
Bicycle	90	56.2	-	-
Dhiki/Janto (grinder)	72	45.0	-	-
Table	65	40.6	-	-
Chair	62	38.8	-	-
Mobile phone	44	27.5	-	-
Cupboard	40	25.0	-	-
Fan	40	25.0	-	-
Television (TV)	37	23.1	-	-
Sofa	13	8.1	-	-
Motorcycle	12	7.5	-	-
Phone (Other than mobile phone)	8	5.0	-	-
Refrigerator	3	1.9	-	-
Computer	3	1.9	-	-
Any member of household own any agricultural land	127	79.4	-	-
Any member of household employed overseas	56	35.0	-	-
Total	160	100.0	57	100.0

Table 5.26 presents the maternity history of all maternal deaths to usual residents of the study districts, as well as those for all maternal deaths occurring in the hospitals in the study districts. Nearly a third of residents who died from maternal causes (29%) had never been pregnant before; 40 percent had between one to three children and 31 percent for four or more. The very low percentage of primagravidas dying in hospitals by comparison (2%) suggests that women who have never been pregnant before and are suffering from complications are less likely to reach a facility. Of those who had been pregnant before over half of the residents (53%) had between one to three children. Over one-fifth had at least one previous stillbirth (22%) and just under a fifth had had a previous neonatal death (18%).

Table 5.26: Maternity History of Women Who Died from Maternal Deaths

Maternity history	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Number of previous pregnancies				
0	46	28.8	1	1.8
1-3	64	40.0	38	66.7
4+	50	31.3	13	22.8
Missing/Don't know			5	8.8
Total	160	100.0	57	100.0
Number of previous children born				
0	7	6.1	5	9.8
1-3	60	52.6	29	56.9
4+	47	41.2	7	13.7
Missing/Don't know			10	19.6
Had at least one previous abortion	5	4.4	3	5.9
Had at least one previous miscarriage	27	23.7	10	19.6
Had at least one previous stillbirth	25	21.9	3	5.9
Had any previous neonatal deaths	21	18.4	0	0.0
Had a previous c-section	4	3.5	9	17.6
Elective	0	0.0	-	-
Emergency	3	2.6	-	-
Unknown	1	0.9		
Total	114	100.0	51	100.0

5.6 Maternal Verbal Autopsy Respondent

The interview completion rate for the community maternal verbal autopsies was 100 percent. The main respondents who assisted with completing the maternal verbal autopsies were carefully selected in regards to being: best able to describe the circumstances leading up to the woman's death, and any symptoms and medical consultations prior to her death; present at the time of death; closely related to the deceased; and available and willing to be interviewed. In 31 percent of cases the husband was interviewed; in 28 percent the mother-in-law or father-in-law; in 40 percent of cases it was another relative; and in 1 percent it was a friend or neighbour. Most of those interviewed were present at the time of death (74%). Half of those who were not present saw the deceased in the 12 hours before she died.

5.7 What could have saved the women's lives?

5.7.1 Perspectives of Members of the Community

The main respondents for the maternal verbal autopsies were asked whether they felt the life of the deceased could have been saved, and if so what could have saved her. Fifty-four percent felt her life could have been saved; 29 percent didn't and the rest were uncertain. The reasons given by respondents for what could have potentially saved the lives of the deceased were overwhelming related to quick referral to a high quality hospital. Some acknowledged the delays in the community in regards to deciding to seek care; the husband not being present to make the necessary decisions and arrangements; being unable to travel at night-time; and being unable to arrange transportation and money quickly. Once deciding to seek care, others acknowledged the long distance, difficult terrain, and bandhs making it difficult to reach facilities; as well as deciding to go to a lower quality facility first. Some mentioned reasons related to the care received once

at a facility including negligent treatment; delays in being seen by a doctor and the lack of available blood. One respondent also mentioned that her life could have been saved if she hadn't become pregnant. See quotes by relatives regarding what could have saved the women's lives in Box 5.1.

Box 5.1: Quotes from relatives regarding what could have saved the women's lives

"We could have saved her if we had taken her to a health facility instead of attending to a faith healer".

"She could have been saved if the doctor at the nursing home had treated her properly on time and if he had referred her to Kathmandu instead of other health facilities. We wasted important time visiting this and that hospital. I lost my wife because of the doctor's negligence".

"She had obstructed labour, we arranged blood as advised by the doctor and she delivered a healthy baby after caesarean section. But she developed chest pain, restlessness and started taking out all the stitches which led to bleeding from the operation site. We could not get additional blood as there was no electricity and generator was not working at that time. The oxygen supply also did not work properly. We could manage blood only after about four hours. She could have been saved if blood transfusion was done on time".

"She could have been saved if she was taken to the hospital on time rather than attending a faith healer first and if the hospital had done something to resume her consciousness on reaching there"

"She could have been saved if doctors had attended and treated her immediately when she was taken to the emergency ward. It's a shame that such a big hospital had no doctors in the emergency ward. My wife died of facility's negligence. I will never recommend anyone to go to the medical college again".

"She could have been saved if the nurse and the doctor had attended her immediately after our request and taken appropriate actions. We had never thought that she would die in the hospital at that stage".

5.7.2 Perspectives of Providers

The providers were asked whether they felt the lives of women who died in hospital due to maternal causes could have been saved, and if so what could have saved her. The providers felt that in nearly half of the cases (46%) the women could have been saved; 12 percent did not think their lives could have been saved and 42 percent did not know.

The main suggestion given by the providers for what could have saved the women's lives was if they had sought health care earlier from a hospital or EOC centre. In five of the deaths, they perceived that women could have been saved if they had received antenatal care from a health facility. Other suggestions included having an ICU in the hospital; management of blood supply in the facility; early management of transportation; use of magnesium sulphate; active management of third stage labour; early treatment of patient in hospital; ultrasound done to assess location of placenta; use of prophylaxis treatment; use of antihypertensive medicine.

The providers commented on any potentially avoidable factors that they felt may have contributed to the deaths, including any missed opportunities or examples of substandard care. They highlighted both community and facility level factors.

At the community level factors included the lack of awareness of antenatal care, danger signs, general health, and safe abortion services; lack of public health education; home rather than institutional deliveries; lack of finance; lack of transportation; and long distance to health facilities.

At the facility level some of the factors were specifically related to maternal care such as the lack of trained birth attendants; waiting homes and safe abortion services. However, most of the suggestions were related to general health system strengthening requirements: poor quality lower level facilities; lack of blood bank; delay in arranging blood supply; lack of laboratory testing facilities; lack of essential medicines and the delay in purchasing these; lack of ventilation in hospital; lack of treatment for septic shock; delay in receiving care; inappropriate treatment; lack of counselling and awareness raising; lack of adequate record keeping, in particular showing past medical history.

Box 5.2: Quotes from providers regarding what could have saved the women's lives

"She could have been saved if she had come to our facility on time or had gone to a similar facility in her own district. She came too late because it is about 12 hours walking distance from her house, even if carried on a stretcher. She should have been referred from her local health post to come and stay in the hospital's 'Waiting Home for Expectant Mothers' from three weeks before term, as she had a high risk pregnancy."

"Antenatal service provider could not diagnose pre-eclampsia. If it was diagnosed and managed or referred to higher facility on time she could have been saved."

"Regular ANC check up might have helped her to know the possible condition of mother. USG should have been done to check the location of placenta and foetal well being as she had APH. She could have been saved had she arrived in the hospital earlier."

"She could have been saved if abortion complication was recognised at home and she had attended facility immediately. The patient was brought with complaint of anaemia and oedema. Long distance travel and lack of transport also contributed to her death."

"The case could have been managed if partograph was used to monitor the prolonged second stage of labour. She had come with the history of no foetal movement since three days. If this facility had ICU and MICU with trained staff she could have been saved."

"She attended facility at post partum period with the complaint of severe bleeding. She could have been saved if she had attended the facility before delivery."

"She was referred from Dolpa to this facility for delivery. She delivered during transit to this facility and developed PPH. She could have been saved if there was a proper facility with trained staff in her district."

"She was brought from a remote village in Surkhet where there is no transportation facility. It took two days for her to reach this facility. She was gasping at the time of admission. Cardio pulmonary resuscitation (CPR) was done immediately but she died before delivery. She could have been saved if she had come earlier."

5.8 Summary of Findings

The overall Maternal Mortality Ratio (MMR) for the eight study districts is 229 per 100,000 live births, with district ratios ranging from 153 to 301. This is similar to the national figure of 281 per 100,000 live births calculated by the 2006 Nepal Demographic and Health survey (NDHS), and is in marked contrast to the WHO the revised, but unpublished, WHO estimate of 670 per 100,000 live births for 2005. The MMR varied considerably by age-group, reflecting international patterns of lowest risk amongst women in their early

twenties (119 per 100,000 live births), with a slightly increased risk for women in their late twenties, and a further increase for those aged under 20 and between 30-34. The risk increased dramatically for women aged 35 or over, with an MMR of 962 per 100,000 live births. Levels of MMR also varied between different ethnic groups, with the highest rates among Muslims (318 per 100,000 live births), tarai/Madhese (307 per 100,000 live births) and Dalits (273 per 100,000 live births). Maternal causes account for 11 percent of all deaths to women of reproductive age, however, this varies by age group with maternal deaths accounting for nearly a quarter of all deaths to women in their twenties.

Maternal causes accounted for 93 percent of pregnancy related deaths, giving an overall pregnancy related mortality ratio of 247 per 100,000 live births and making this a good proxy indicator for maternal mortality. All accidental and incidental pregnancy related deaths occurred during the ante-partum period and many were unwanted pregnancies (namely suicide and homicide deaths), suggesting the pregnancy status of the women may have placed them at greater risk. With the exception of two cases the pregnancy status could have influenced the other deaths, although they are not officially classified as maternal deaths.

Direct causes accounted for 69 percent of all maternal deaths, with 31 percent due to indirect causes. The obstetricians responsible for death assignment for the verbal autopsies had more confidence in their assignment of direct than indirect causes. The proportion of direct deaths is considerably higher when only hospital deaths are considered (89% direct; 11% indirect), but similar when all EOC facilities are considered (71% and 29%). The percentage contribution of haemorrhage (24%) to maternal causes has dramatically reduced, down from 41 percent in 1998. However, it remains the leading cause of maternal death, and the decline reflects a reduction in postpartum (from 37% to 19%), rather than antepartum. The percentage contributions of eclampsia, abortion related complications, gastroenteritis and anaemia to maternal causes have increased, while those from obstructed labour and puerperal sepsis have more than halved since 1998. Heart disease did not even feature in 1998, but now accounts for 7 percent.

Thirty four percent of maternal deaths occurred in the antepartum period; 38 percent in the intrapartum period and up to 48 hours afterwards; and 28 percent in the postpartum period. The fact that 62 percent of deaths occurred outside the intrapartum period suggests that programming needs to actively consider interventions which aim to reduce risk of dying in the antenatal and post natal period as well as the intrapartum period. Although some of the problems occurring in the postpartum period, namely sepsis (accounting for 16 percent of postpartum deaths), may be prevented by interventions in the intra-partum period. The results for just hospital based deaths are very similar (39% occurred during the antepartum period; 37% during the intrapartum and 25% postpartum) with once again a high proportion (63%) occurring outside the intrapartum period. The proportion due to direct causes is highest in the intrapartum period where they account for 89 percent of deaths. The main causes in the antepartum period are due to abortion related complications; eclampsia and antepartum haemorrhage. The main causes in the intrapartum period are due to haemorrhage, eclampsia and obstructed labour. The main causes in the postpartum period are due to eclampsia, puerperal sepsis and postpartum haemorrhage. The main causes of death in each period were very similar when just hospital deaths were taken into account. All deaths due to indirect causes occurring in hospital occurred during the antepartum period.

There was an increase in the proportion of maternal deaths occurring in a health facility, from 14 percent in 1998 to 42 percent; with 41 percent occurring at home; and 12 percent in transit (5% from a facility). Over 80 percent of women who died from maternal causes

in hospital were emergency admissions and in a critical state on admission: 18 percent died within four hours of arrival, 39 percent within the first twelve hours and 53 percent within the first 24 hours.

Over 80 percent of women who died from maternal causes in hospital were emergency admissions and according to the maternal death reviews completed by providers, in a critical state on admission: 18 percent died within four hours of arrival, 39 percent within the first twelve hours and 53 percent within the first 24 hours. One should note that the providers may be keen to report cases resulting in deaths as emergency or critical on arrival to reduce the blame on the facility. If it is indeed true that many women are arriving as critical or emergency cases but are surviving past twenty four hours, the quality of care they receive needs further exploration.

5.9 Discussion

The overall level of maternal mortality for the eight study districts was 229 per 100,000 live births. This is not a national level estimate, but the eight districts are fairly representative of the different administrative regions and topological zones in Nepal, and are spread across the HDI. The level found in this study is similar to that found in the DHS (281 - C.I. 178-384) and those recorded by MIRA in Makwanpur district (341 per 100,000 live births). All of these data are in stark contrast to the much higher revised and unpublished figure for 2005 from WHO (670 per 100,000 live births).

This study implemented the largest surveillance system ever established to measure maternal mortality in Nepal, covering eight districts. The system prospectively measured, rather than estimated, levels of maternal mortality. The DHS estimated the national level MMR using the 'sisterhood method' to generate retrospective data from a sample of the population and attempts to overcome sample size problems by asking all adult women in a household questions about the survival of their sisters, but excludes information on the cause or circumstances surrounding the death and hence measures pregnancy related deaths rather than maternal deaths. WHO produced national level estimates from modelling a combination of variables assumed to be related to maternal mortality rather than measuring actual maternal deaths. Given that their estimate is vastly different to any other measurements of maternal deaths in Nepal suggests that their assumptions regarding factors strongly related to levels of maternal mortality may be incorrect. The most comparable data, from a methodological perspective, come from prospective surveillance systems established by MIRA for measuring maternal and neonatal mortality, but the geographic area covered by these is a lot smaller (Manandhar et al. 2004).

Concerns that there may have been over-reporting of live births or deaths by FCHV identifiers due to the incentives nature of the system are invalid as payment was only made once identifications were verified (by ANMS/MCHWs/DCs). In regards to missing live births or deaths, the identifiers covered manageable geographic areas that they were already very familiar with, minimising the risk of any being missed. The death of any woman of reproductive age is a significant event that an FCHV living in that community would naturally become aware of. The interview completion rate for the community maternal verbal autopsies was 100 percent. Cross-checking between the maternal death review and EOC morbidity monitoring revealed that no cases had been missed.

The split between direct and indirect causes in this study (69% and 31%) for all deaths for women in the study area is similar to the figures proposed by Khan et al. (2006) for Asia (69% and 25%, with 6% unclassified). Khan et al. (2006) found the proportion of maternal deaths resulting from direct and indirect causes, or injuries, varies between regions (see Table 5.27). Indirect causes of maternal deaths are thought to constitute a larger proportion of all causes in Asia and Africa than they do in other regions. When looking at

just the institutional maternal deaths to all usual residents of the study area the split between direct and indirect deaths is similar. However, when relying on institutions to identify maternal deaths in the EOC monitoring and maternal death review the data suggest that indirect maternal deaths are being missed.

Table 5.27: Estimates of Direct and Indirect Causes of Maternal Death by Region

Region	Maternal deaths (%)		
	Indirect causes	Direct causes	Unclassified
Developed Countries	14.4	80.8	4.8
Africa	26.6	68.0	5.4
Asia	25.3	68.6	6.1
Latin America and the Caribbean	3.9	84.4	11.7

Source: Khan *et al.* 2006. 'WHO analysis of causes of maternal death: A systematic review.' *Lancet* 367(9516): pp.1066-74.

Taken together, differing levels of indirect and direct causes of maternal death can be telling indicators of the nature of maternal health service needs in specific settings and of where improvements to EmOC services are needed. It is perhaps not surprising therefore that after revision of the *Guidelines for monitoring the availability and use of obstetric services* published by UNICEF, WHO and UNFPA (1997), that the updated version *Monitoring emergency obstetric care: A handbook* (WHO 2009) included a new indicator on the "Proportion of maternal deaths due to indirect causes in EmOC facilities". The addition of this indicator is important because it reveals the wider social and medical picture of a country or region, with implications for investment and targeting of intervention strategies that might go beyond EmOC services where indirect causes are a major killer of reproductive aged women. This is all the more important if some indirect causes are highly preventable or treatable, such as TB or anaemia (Ronsmans & Graham 2006).

At the Tribhuvan University Teaching Hospital's Department of Obstetrics and Gynaecology in Kathmandu, Nepal, there was a shift in the causes of maternal deaths during the period 1997 to 2006 whereby indirect causes, especially hepatitis, constituted a much greater proportion of all causes of maternal death in the second half of the 10-year period (Rana *et al.* 2009). In 1997 to 2001, direct and indirect causes accounted for 65 percent and 30 percent of pregnancy-related deaths, respectively, with injuries accounting for 5 percent (Rana *et al.* 2009). The leading causes were septic induced abortion (29% of direct causes and 19% of all causes) and infective hepatitis (55% of indirect causes and 16% of all causes). Between 2002 and 2006 the distribution of causes of pregnancy-related deaths shifted with direct causes accounting for 37 percent of deaths, whereas indirect causes became the dominant causes at 54 percent of the total. Injuries also accounted for an increased share of the causes (9%). During this period, the leading causes were firstly infective hepatitis (52% of indirect causes and 28% of all causes) and then secondly septic induced abortion (35% of direct deaths and 13% of all causes), but heart disease and tuberculosis also contributed to a much greater proportion of the deaths relative to the previous 5-year period (Rana *et al.* 2009).

Using verbal autopsies to assign the primary cause of death is difficult when no formal provider is present at the death. There was some uncertainty over assigning some of the causes of death. Overall, the obstetricians had high confidence in their cause of death assignment for 74 percent of all pregnancy related deaths, and due to the high proportion of maternal deaths, this was very similar when just maternal causes were taken into account (73%). The obstetricians had slightly higher confidence in their cause of death assignment for direct than indirect causes, with 76 percent of direct causes scoring high compared to 66 percent of indirect causes (see Appendix 5.9).

The tenth version of the International Classification of Disease recommended the addition of pregnancy related deaths (ICD, 2006). Pregnancy-related deaths include the death of a pregnant woman or within 42 days of her pregnancy's termination, irrespective of cause of death (Lyengar *et al.*, 2009). This study has been able to compute both the pregnancy related mortality ratio (247) and the maternal mortality ratio (249). The small difference between the two ratios, due to maternal deaths accounting for 93 percent of all pregnancy related deaths, suggests that pregnancy related deaths are a useful proxy indicator for maternal deaths in similar contexts where cause of death data is largely unavailable. This supports the argument that it would be worthwhile including information on death certificates stipulating pregnancy status (Horon 2005) to help measure maternal mortality. This has also been found in other studies (Barnett et al. 2008). There is mounting evidence that pregnancy may place women at greater risk of dying from suicide and homicide, and that unwanted pregnancies might be an important factor for the increased risk. All accidental and incidental pregnancy related deaths occurred during the ante-partum period and many were unwanted pregnancies (namely suicide and homicide deaths), suggesting the pregnancy status of the women may have placed them at greater risk. With the exception of two cases one could argue that the pregnancy status could have influenced the other deaths, although they are not officially classified as maternal deaths. It is debatable whether pregnancy related suicides and homicide deaths should be re-classified as maternal deaths, rather than incidental or accidental causes.

This surveillance system appears to be robust for measuring maternal mortality, but as with all methods for measuring maternal mortality in the community there are clearly some limitations. Maternal deaths could be intentionally misclassified, especially with regards to unsafe abortion, in which case there is very little any system can do. There are a lot of suicides to women of reproductive age reported in this study. It is feasible that more of these women may have been pregnant or had unsafe abortions. In the 1998 study, families had good reason to hide abortion related deaths as abortion was illegal and the law was strongly enforced. Even now that abortion is legal families are likely to hide abortion related deaths due to stigma; lack of knowledge regarding the change in the law; or the use of an informal provider. Furthermore, families may be unaware of a woman's pregnancy status, or if she has had an abortion and therefore pregnancy related deaths could be unintentionally misclassified. Suicide was the main cause of non-maternal pregnancy related deaths, accounting for nearly half of these deaths. This again emphasises the problem of suicide, highlighted and discussed more fully in the Chapter 4.

The distribution of deaths across the antepartum, intrapartum and postpartum time periods suggests that interventions cannot focus solely on the intrapartum period. It has been estimated that two-thirds of maternal deaths occur in late pregnancy through to 48 hours after delivery (Berhane et al. 2000). This data showed a higher proportion (62%) of deaths occurring outside this time period, which is similar to results from other studies with intensive community surveillance (Barnett et al. 2008) suggesting that there may be variability between different contexts regarding the timing of maternal deaths. Therefore policies focusing solely on interventions targeting this period may neglect many in this population.

There has been a large increase in the percentage of maternal deaths occurring in a facility since 1998, from 14 percent to 42 percent, and an associated large reduction in the percentage occurring at home, from 70 percent to 41 percent. This suggests that there is an increase in the number of women going to a facility when they experience a complication. Qualitative components of this study supported this increasing recognition and use of health facilities in the event of a complication. However, the verbal autopsies highlight the multitude of delays still faced in the community, and for those who do reach a facility the quality of care is often inadequate and cost many women their lives.

CHAPTER 6: MATERNAL MORBIDITY AND CHRONIC ILLNESS



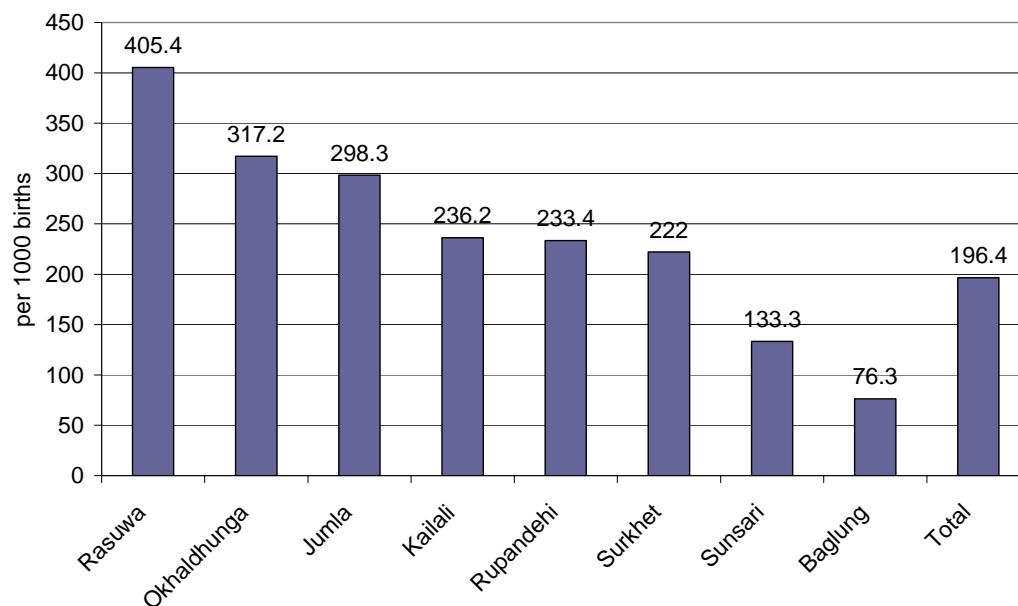
6.0 Introduction

This chapter presents the key findings related to maternal morbidity and chronic illness. First of all, findings related to major obstetric morbidities (prolonged labour, abortion complications, haemorrhage, retained placenta, pre-eclampsia, eclampsia, ectopic pregnancy, sepsis, ruptured uterus) are presented. This is followed by findings related to other obstetric complications and morbidities. Finally, results related to chronic illness are presented. The data presented in this chapter come from the EOC obstetric morbidity monitoring; the hospital based maternal death reviews; maternal verbal autopsies; and qualitative in-depth interviews with women who suffered maternal complications in the last two years.

6.1 Major Obstetric Morbidities

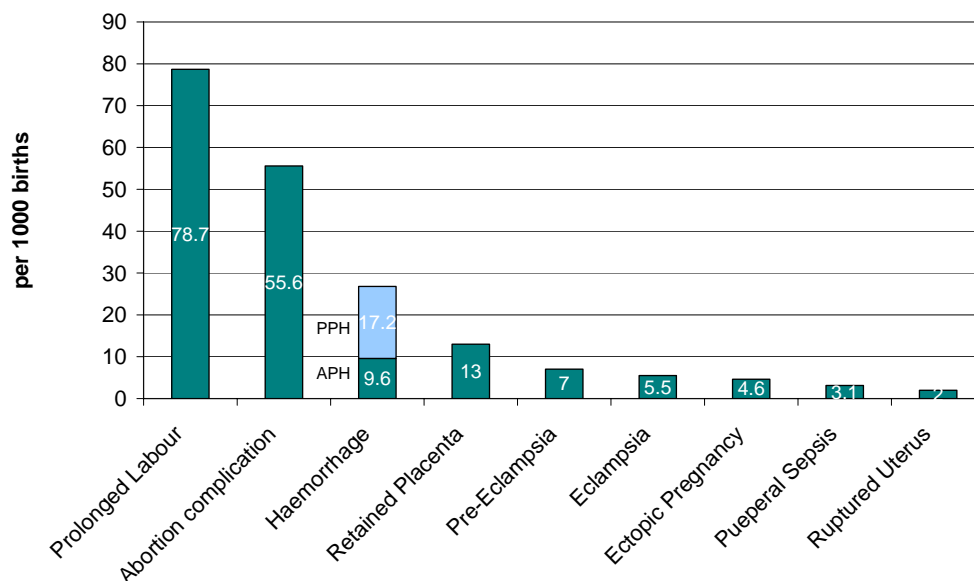
The overall rate for all major obstetric morbidities (prolonged labour, abortion complications, haemorrhage, retained placenta, pre-eclampsia, eclampsia, ectopic pregnancy, sepsis, ruptured uterus) in the EOC facilities in the eight study districts was 196 per 1,000 births (Figure 6.1, Appendix 6.1 and 6.2). This indicator reflects the sum of all morbidities, not the number of women; some women may have suffered from more than one morbidity. Rasuwa had the highest rate with 405 obstetric complications per 1,000 births. However, it should be noted that Rasuwa's rates need to be interpreted with caution as the denominator (i.e. the number of births) was very low compared to other districts, thus making the rates very unstable. The lowest overall rate was seen in Baglung at 76 per 1,000 births, and was far lower than other districts.

Figure 6.1: Major Obstetric Morbidity Rates at EOC Facilities



Combining all eight study districts, prolonged labour had the highest rate of all the major obstetric morbidities at EOC facilities, at 79 per 1,000 births, followed by abortion complications at 56 per 1,000 births (Figure 6.2). Haemorrhage had the third highest morbidity rate (27 per 1,000 births), largely for post-partum haemorrhage (17 per 1,000 births), and retained placenta was fourth (13 per 1,000 births).

Figure 6.2: All Major Obstetric Morbidity Rates at EOC Facilities



Respondents for the verbal autopsies were asked if the deceased women suffered from some major obstetric morbidities during previous pregnancies (Table 6.1). Fourteen percent of the deceased women suffered from prolonged labour during their previous pregnancy, 6 percent from retained placenta and none had previously experienced an ectopic pregnancy.

Table 6.1: Major Obstetric Morbidities During Previous Pregnancy

Obstetric morbidities	Number	Percent
Prolonged labour	22	13.8
Retained placenta	9	5.6
Ectopic pregnancy	0	0.0
Total	160	

Providers completing the maternal death reviews reported any major obstetric morbidities experienced by the deceased to the best of their knowledge (Table 6.2). The form does not collect information on all major morbidities. Eleven percent of women experienced prolonged labour during their previous pregnancy; 18 percent experienced eclampsia and 12 percent pre-eclampsia during the recent pregnancy. Twenty seven percent experienced a haemorrhage during their recent labour/delivery and 40 percent after their recent delivery, while 30 percent each experienced eclampsia and sepsis after the recent delivery.

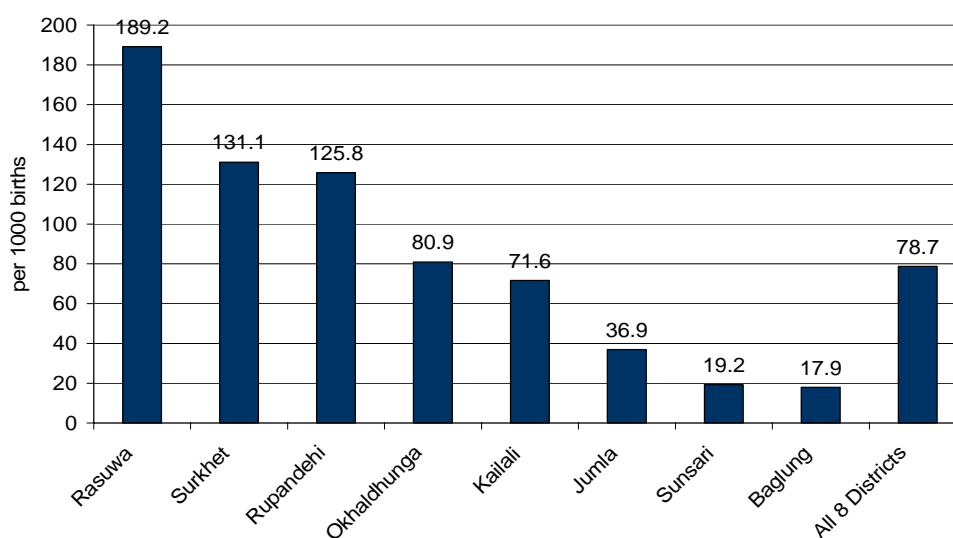
Table 6.2: Major Obstetric Morbidities for Hospital Based Maternal Deaths

Obstetric morbidities	During previous pregnancy		During recent Pregnancy		During recent labour / delivery		After recent delivery	
	N	%	N	%	N	%	N	%
Prolonged labour	6	10.5	-	-	3	9.1	-	-
Abortion complications	1	1.8	-	-	-	-	-	-
Haemorrhage	-	-	4	7.0	9	27.3	12	40.0
Retained placenta	-	-	-	-	1	3.0	-	-
Pre-eclampsia	1	1.8	7	12.3	-	-	-	-
Eclampsia	1	1.8	10	17.5	-	-	9	30.0
Ectopic pregnancy	-	-	-	-	-	-	-	-
Sepsis	-	-	5	8.8	-	-	9	30.0
Ruptured uterus	-	-	-	-	-	-	-	-
Total	57	100.0	57	100.0	33	100.0	30	100.0

6.1.1 Prolonged Labour

The overall rate for prolonged labour in the EOC facilities in the eight study districts was 79 per 1,000 births (Figure 6.3). The highest rates were in Rasuwa at 189 per 1,000 births followed by Surkhet at 131 and Rupandehi 126. These rates were far higher than the lowest rate in Baglung at 18 per 1,000.

Figure 6.3: Prolonged Labour Rates at EOC Facilities



Seven in-depth interviews were conducted with women who had experienced prolonged labour, of whom six had delivered in an institution and one on her way to hospital. Four had undergone caesarean sections and all delivered live births. Three of the women experienced delays in deciding to seek care. One woman's mother-in-law did not initially allow her to go to the health facility for her delivery, however once her condition deteriorated, and the woman insisted, she was taken to a hospital:

'I told my mother-in-law that I was experiencing labour pain then my mother-in-law said that nothing would happen and asked me to continue working and said that the baby would come out when it had to...I spent two days like this but on the third day I felt...excruciating pain that I could no longer bear. Then I told my mother-in-law that if she was not going to take me to the Mission hospital then I would take someone else and go and then she said she would take.'

- 29 year-old mother, Okhaldhunga

Another woman was obliged to attend a worship ceremony of a relative despite having labour pains and was not taken to the health post until after the ceremony:

'I had told him [my husband] [about my stomach ache] in the morning and he had asked me not to go to the puja but since it was a close one's puja I had to go.'

- 24 year-old mother, Surkhet

A third woman was not taken to a health facility because it was night time and the family decided to wait and take her the following day. Three experienced delays in reaching a facility, for two it was due the unavailability of transport, and for one it was a seven hour drive to the maternity hospital.

'We went by bus and returned by van. Local bus had arrived and we went. There were no other vehicles. We called from Butwal but it was too late so went by bus. I got seat in bus. I was having labour pain. I couldn't sit on my back. My sister made me lean.'

- 21 year-old woman, Rupandehi

One did not receive prompt care on reaching the facility, due to lack of essential drugs and equipment at the PHCC:

'One person would come and insert the hand and again another would come and do the same thing...That was the way they provided the treatment. They would come, insert their hand and leave. On the evening of the second day, they gave me a saline but only half a bottle. For artificial labour pain, they gave me synto or something. It still didn't work. It use to pain and when they inserted their hand I started to bleed a lot...It was evening, they consulted. They called my husband for consultation. They told him that they couldn't do it here and asked him to take me down. My husband started to fight. They didn't say anything throughout the day and now that it is night time they started to say like this...I was about to die due to bleeding.'

- 26 year-old mother, Rasuwa

Case Study 6.1: Prolonged labour

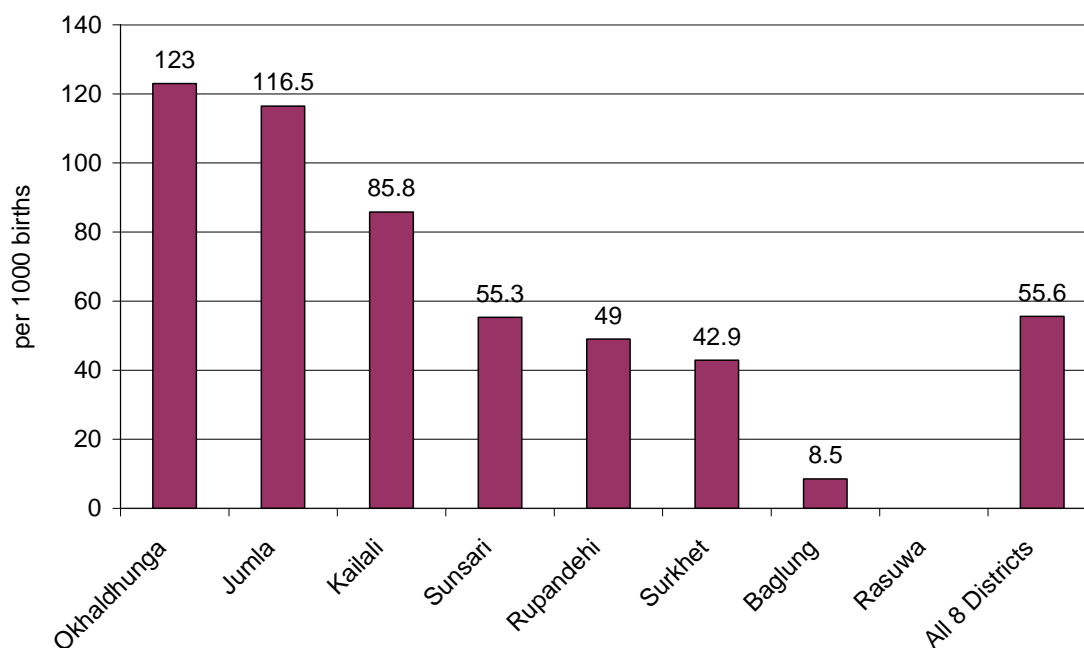
Maili is a 21 year-old mother, who studied up to fifth grade and farms for a living. When she became pregnant with her second child, she attended regular antenatal check-ups after the fifth month at the PHCC. She took iron tablets and two doses of tetanus toxoid injections, rested and ate well, although she continued to work on the farm up to her ninth month of pregnancy. During her antenatal care the PHCC staff advised her that everything was normal but that she should return if any problems arise. Therefore she planned to deliver at home or in the PHCC, if a complication arose.

One evening, she started having severe abdominal pain which lasted through the night until the following morning. She asked her husband to call the 'didi' from next door who applied heat to her stomach, causing her water to break. This relieved her pain, but the baby did not follow, and she spent a further two days waiting to deliver. The family attended the PHCC, where she was told that she wasn't ready to deliver as the baby's head was still not in the right position; since the procedure could not be conducted in the PHCC she was referred to the maternity hospital in Kathmandu. No ambulance was available, so her family borrowed money from the village merchants and another form of transport was obtained. Within four hours of arrival at the hospital, the medical staff decided to conduct delivery by caesarean. When asked her opinion of the delivery services she had received in the government hospital, she said: *'My life was saved by going there. I don't know what would have happened if I had not gone there. It was good for my health. My child did well too.'*

6.1.2 Abortion Complications

The overall rate for abortion related complications in the EOC facilities in the eight study districts was 56 per 1,000 births (Figure 6.4). No abortion complications were reported in Rasuwa, while the rate of abortion complications was highest in Okhaldhunga 123 per 1,000 births, followed by Jumla 117 per 1,000 births.

Figure 6.4: Abortion Complication Rates at EOC Facilities



Pregnancy Wantedness

The maternal death verbal autopsy respondents were asked whether the pregnancy was 'wanted' or not, although one needs to bear in mind that the response given may not necessarily reflect the opinion of the deceased mother. Seventy two percent stated that the pregnancy was wanted and 23 percent that it was unwanted, while 5 percent of respondents admitted to not knowing, (Table 6.3). Pregnancy wantedness varied by age: 54 percent of women who had an unwanted pregnancy were of 35-49 age group compared to 8 percent of those aged 20-24. As mentioned in Chapter Five, in four of the accidental and incidental deaths they stated the pregnancy was unwanted (one homicide by husband and three suicides), and in two they were uncertain (one homicide by parents and one accidental fall), thus giving further weight to the suggestion that their pregnancy status placed them at greater risk of dying.

Attempted Abortion

Of the 37 reported unwanted pregnancies, 12 attempted to end their pregnancy (32%). All of those who attempted to abort, did so during the first and second trimesters, (between the third and fifth months), with eight (67%) attempting in the first trimester and four (33%) in the second (Table 6.4). Eight of those who tried to induce went to the pharmacy; three to an NGO facility; one to a public facility; and one to a public hospital. Six respondents did not know the method used. Some women tried multiple methods; three used a surgical method; five had an instrument or substance inserted; two took an abortifacient drug and two a herbal remedy. Six, of the 12 women who attempted to abort

their pregnancy, suffered at least one complication following their abortion attempt (50%): five had abdominal pain; four had excessive vaginal bleeding; three had fever; and three had each of the following problems - abdominal swelling; bad smelling vagina discharge; vomiting and difficulty breathing.

Table 6.3: Pregnancy Wantedness for Women Who Died of Maternal Causes

Pregnancy wantedness	Number	Percent
Wanted	115	71.9
Unwanted	37	23.1
Don't know	8	5.0
Total	160	100.0
Unwanted pregnancy by age-group		
15-19	3	8.1
20-24	3	8.1
25-29	5	13.5
30-34	6	16.2
35-49	20	54.1
Total	37	100.0

Table 6.4: Attempted Abortion by Women who had Unwanted Pregnancy

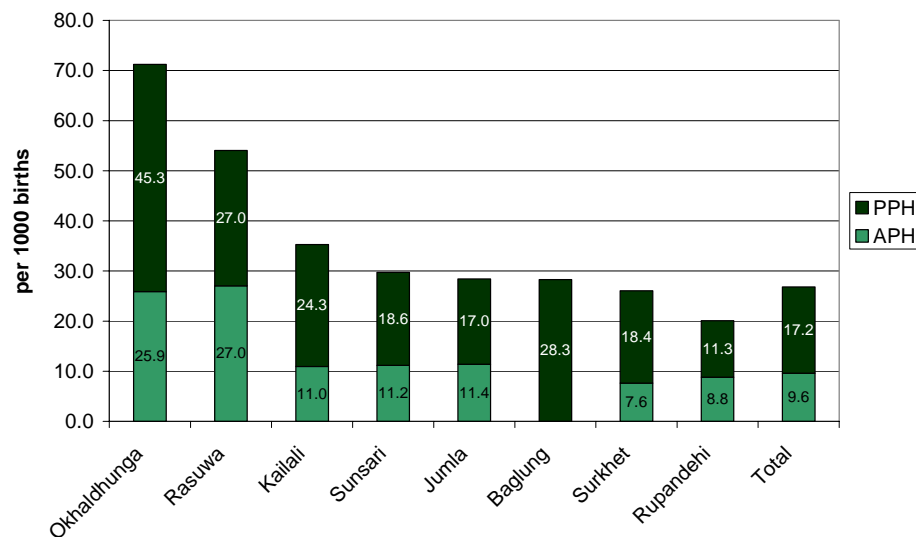
	Number	Percent
Attempted to end pregnancy	12	32.4
Stage attempted to abort		
3 Months	8	66.7
4 Months	3	25.0
5 Months	1	8.3
Place went for termination		
Pharmacy	8	66.7
NGO facility	3	25.0
Public hospital	1	8.3
Methods used*		
Surgical	2	16.7
Instrument or substance inserted into Vagina	3	25.0
Pharmaceutical drug	1	8.3
Herbal/Homeopathic remedy	1	8.3
Don't know	3	25.0
Other	4	33.3
Total	12	
Whether had complication after attempting to induce		
Yes	6	50.0
No	6	50.0
Total	12	100.0
Problems experienced after attempting to induce*		
Abdominal pain	5	83.3
Excessive vaginal bleeding	3	50.0
Fever	3	50.0
Abdominal swelling	1	16.7
Bad smelling vaginal discharge	1	16.7
Vomiting	1	16.7
Difficulty in breathing	1	16.7
Total	6	

* Multiple responses allowed

6.1.3 Haemorrhage

The overall rate for haemorrhage in the EOC facilities in the eight study districts was 27 per 1,000 births (Figure 6.5). The rate was lowest in Rupandehi, at 20 per 1,000 births, and highest in Okhaldhunga at 71 per 1,000 births. The proportion of postpartum haemorrhage (PPH) is greater than antepartum haemorrhage (APH) in all districts, with the exception of Rasuwa where the proportion is equal, but sample size is too small to draw conclusions. On average about two-thirds of haemorrhage complications are due to PPH and one third APH. In Baglung all haemorrhage complications were related to postpartum haemorrhage.

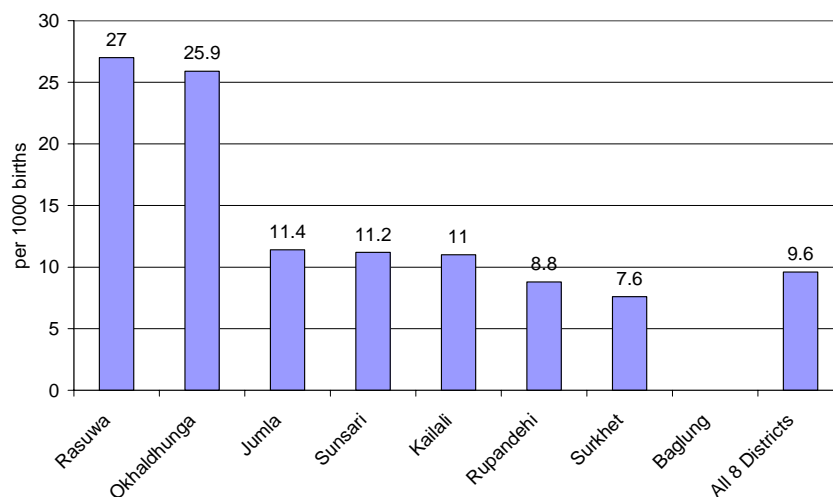
Figure 6.5: Haemorrhage Rates at EOC Facilities



Ante Partum Haemorrhage

The overall rate of antepartum haemorrhage for all EOC facilities in the eight study districts was 10 per 1,000 births (Figure 6.6). There were no antepartum haemorrhage cases in Baglung, while high rates were recorded in Okhaldhunga at 26 per 1,000 births and Rasuwa at 27 per 1,000. However, Rasuwa is based on a very small sample size.

Figure 6.6: Antepartum Haemorrhage Rates at EOC Facilities



There were two in-depth interviews with women who had an antepartum haemorrhage during their last pregnancy. One woman suffered from bleeding between two to three times during pregnancy, and was warned by health providers to stop doing heavy work. However, the heavy work continued and when she was carrying one heavy load she started bleeding and was immediately taken to a PHCC where she delivered her placenta. She was then referred to Surkhet and delivered her infant by caesarean section. The other is described in Case Study 6.2.

Case study 6.2: Antepartum Haemorrhage

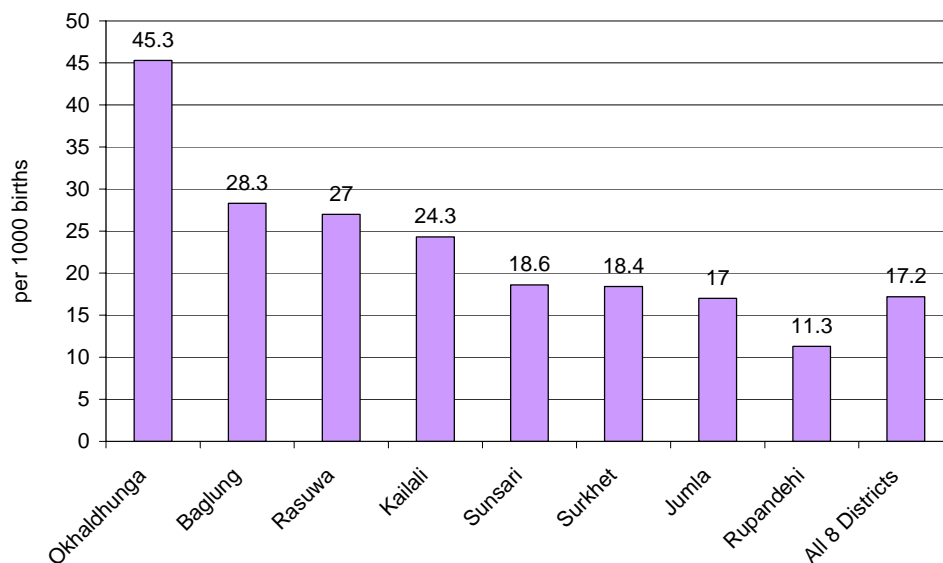
Thuli is a 23 year-old mother. During her first pregnancy she received monthly antenatal check-ups, tetanus toxoid injections, iron and vitamin supplements and followed a healthy diet. However, in her village it is believed that heavy work should be undertaken during pregnancy to facilitate delivery. On her way home from an antenatal check-up at the hospital she began to bleed heavily, and so she returned to the hospital where saline was provided to stop the bleeding. There was no doctor present, and the nursing staff (who were new) referred her to Kathmandu, saying that they were unable to treat her. Her family decided that it would be better to return home and only make the journey to Kathmandu if her situation had not improved by the following morning. Since she continued to bleed, the family left at dawn to look for transport, however, she delivered on the road before reaching the capital. The family returned home without attending a health facility, and she suffered postpartum bleeding for the following two months.

Afterwards, she was critical of the competence of the medical staff at Dhunche hospital: 'When I was pregnant with my daughter they asked me to go to Kathmandu without properly examining me. They said they can't do anything there. Without looking at the patient, they just said go to Kathmandu, we can't do it here. At least they should look at the patient first and then if they really can't do anything, they should ask the patient to go to Kathmandu. They get nervous like that.'

Postpartum Haemorrhage

The overall rate for postpartum haemorrhage in the EOC facilities in the eight study districts was 17 per 1,000 births (Figure 6.7). The rate was lowest in Rupandehi, at 11 per 1,000 births, and highest in Okhaldhunga at 45 per 1,000 births.

Figure 6.7: Postpartum Haemorrhage Rates at EOC Facilities



There were four in-depth interviews with women who had a postpartum haemorrhage, three of whom had institutional delivery and one had a home delivery and was later transferred to hospital. Saline water was administered to all four women, and two received vitamins. Two of the four women stayed at the facility for 24 hours after admission, and one for three days. The fourth could not recall how long she stayed.

Three of the women interviewed experienced delays in deciding to seek care. One woman was too shy to go to a health care provider, and instead visited a traditional healer first when she had post partum bleeding. A second woman did not want to deliver at the nearby district hospital because she had heard rumours about the bad quality of service there:

'they put their hands inside and I also have heard that they give trouble and they beat you if you don't have enough money. They do this if you shout a bit and scold you and they say that you didn't feel like this when you slept together and now you feel like this, this is what I have heard from others so I had said I won't go.'

- 26 year-old mother, Jumla

Another woman sought help from a traditional birth attendant, who insisted on managing the complication at home. Three of the four women experienced some delay after they decided to seek care and before they reached the facility. The long distance to the health facility was a problem for two women. In two women's cases, they were delayed while people were found to take them to the health facility. One woman had to be carried in a bamboo basket (*doko*) and one was taken by oxen cart (*bail gada*) to the health institution. None of the women reported any delay in getting timely care once they reached the health facility.

Case study 6.3: Postpartum Haemorrhage

Bina is a 22 year-old teacher. She was pregnant with her first child and attended regular antenatal check-ups after the third month of her pregnancy, and also took tetanus toxoid vaccinations, de-worming medication and nutritious foods. Her husband was working abroad during her pregnancy but her parents-in-law treated her well, prohibiting her from carrying out difficult tasks and heavy lifting.

She experienced light bleeding a few days prior to delivery. Her labour pains started at lunchtime and caused her substantial pain all afternoon. Her mother-in-law suggested that she saw the Jhankri who lived nearby, who told her that she had been affected by a bad influence and that at sundown she should offer flowers and grains of rice in order to release herself. After the offering was made, her pain increased, and her family made her spend the night sitting by the fire while they rubbed oil and massaged her, and gave her butter soups to drink. At her neighbours' suggestion she was taken to the PHCC. The usual transportation was not available as it was the monsoon season, so she was carried by stretcher. Her waters broke on the way to the PHCC, and upon arrival she was helped to deliver quickly. Following the birth, she bled heavily for four hours and was given nine bottles of saline to stop the bleeding. This caused her body to swell up, so she was given medication in order to encourage the last of the blood to leave the uterus. Not all of these medicines were available at the PHCC and had to be brought from outside.

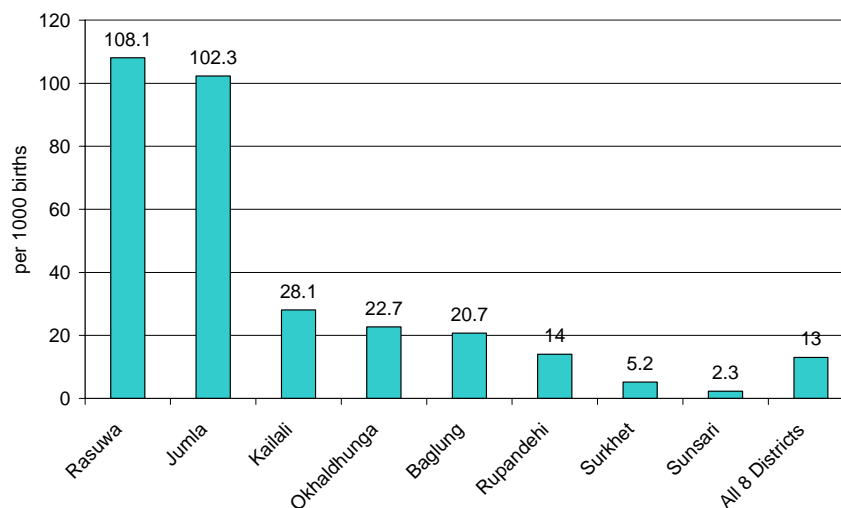
Afterwards she said: *'I felt I was going to die. I felt scared when the baby was not delivered for a long time. I thought I would not be meeting my husband and my parents again. I was having bad feelings all the time. The thought of dying scared me.'*

6.1.4 Retained Placenta

The overall rate for retained placenta in the EOC facilities in the eight study districts was 13 per 1,000 births (Figure 6.8). The retained placenta rate was highest in Rasuwa 108 per

1,000, followed by Jumla 102 per 1,000, with the lowest rates recorded in Sunsari and Surkhet with 2 per 1,000 births and 5 per 1,000 births respectively.

Figure 6.8: Retained Placenta Rates at EOC Facilities



For 13 percent of women who died from maternal causes someone did something to speed up the delivery of the placenta (Table 6.5). This included common traditional practices in Nepal, such as feeding the woman hair to make her vomit; inserting a hand into her mouth to try to make the woman vomit; abdominal massage; tying some cloth tightly around her abdomen; encouraging the women to jump and trying to manually extract by hand. In 49 percent of cases the placenta came out spontaneously, while it was manually extracted in 6 percent of cases. In 51 percent of cases it came out fully and in 4 percent only partially, and it did not come out for 12 percent of cases. Of those that were manually extracted 50 percent came out partially. For those where it was expelled, most delivered the placenta within 30 minutes (79%), with 5 percent taking between one and six hours and 3 percent more than six hours.

Table 6.5: Delivery of the Placenta for Women Who Suffered Maternal Deaths

	Number	Percent
Someone did something to speed up delivery of placenta		
Yes	14	13.2
No	58	54.7
Don't know	34	32.1
Placenta came out		
Spontaneously	52	49.1
Manually	6	5.7
Don't know	48	45.3
Placenta Expelled		
Fully	54	50.9
Partially	4	3.8
No	13	12.3
Don't know	35	33.0
Total	106	100.0
Time taken to deliver placenta		
Within 30 minutes	46	79.3
30 minutes to 1 hour	5	8.6
1 hour to 6 hours	3	5.2
More than 6 hours	2	3.4
Don't know	2	3.4
Total	58	100.0

There were three in-depth interviews with women who had retained placenta after their last delivery. Two of three women had planned to deliver in their cattle shed, which was customary in their villages, whereas one woman had planned to deliver at the health post. Food was kept in stock by all women and money was saved for incidental costs during delivery by one woman.

All three women delivered at home and had live births but were taken to a health facility once their placenta did not come out after delivery. Two of the women were taken to the district hospitals whereas one woman was taken to the nearby PHCC to have their placenta removed.

All three experienced delays in deciding to seek care. One woman's placenta had still not come out three hours after delivery. There was no male family member in the house so she did not know how she would be taken to the PHCC, so she tried several home remedies (such as walking around with a stick tied to the cord, and putting hair in her mouth).

'They told me that it will come down if I stand and walk around but I kept on sitting. What could the family members say? They said that the baby was born here so the placenta will come down too...They said that it will come down if I place hair on my mouth.'

- 27 year-old mother, Baglung

One woman was too shy to go to the hospital to deliver as she feared that the service providers would do an internal examination. In addition, she did not have support from her family and had financial constraints. When her placenta did not come out she sought help from a traditional healer who gave her 'spelled' water and told her to take sugar water. Seven hours passed before she was taken to the district hospital, where her placenta was removed. Another woman planned to deliver at home and had financial difficulties so she was reluctant to seek care from a health facility.

Case Study 6.4: Retained Placenta

Mathura is a 25 year old woman living with her husband and two children. She is illiterate and makes her living through daily wage labour. During her last pregnancy, she did not seek ANC because to get to the health post, she had to cross a river, which the villagers believe is haunted. However, she did get TT injection when the health care workers came to a nearby village. During the 8th month, she had bleeding and white vaginal discharge but treated herself with ayurvedic herbs from the jungle. She said she did not have money to seek care. She also did not want to take medicines fearing that she would have miscarriage. The bleeding nonetheless stopped after a week.

On the day of delivery, her labour pain started at 3 in the morning. She had initially planned to deliver in the shed on her own due to shyness but her husband brought a TBA to assist with the delivery. Fire was lighted and she was given hot oil massage and some warm water to drink to induce childbirth. The baby was delivered by 5 a.m. but her placenta did not come out. She was then made to drink water which was spelled by traditional faith healer and some sugar water in the hopes that the placenta would fall. When it did not come out even after 6 hours of birth, her husband went to get a woman from the nearby village who had experience in removing placenta. The woman came at 1 p.m. and for half an hour, she forcibly and repeatedly pulled the placenta with her hands. However, only pieces of it came out and the rest sprung back inside. Then she started to bleed heavily like "tap water" and lost consciousness. The AHW was called and he suggested that she be taken to the hospital in Jumla immediately. She was transported in an improvised stretcher with the help of villagers to the hospital. She received treatment at the hospital and was discharged the next day. She opined she had to sell her land to pay for treatment.

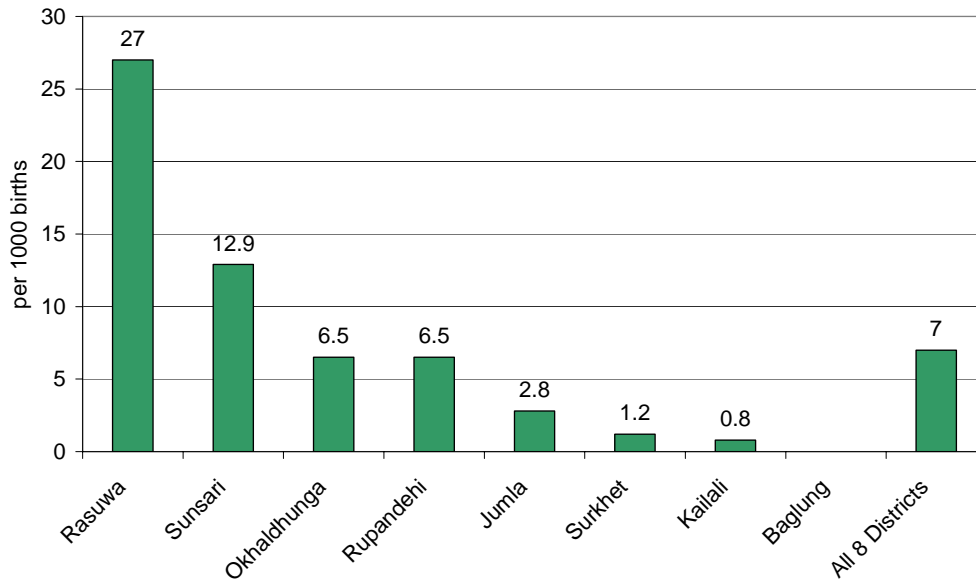
This unpleasant experience has shown her the benefits in seeking proper medical care during pregnancy and delivery: 'Now even if I have a baby I will go down there [to the health post], even if the devil eats me I will go'.

All three women experienced delays in reaching facilities due to the difficult geographical terrain and lack of transport. One was transported on an improvised stretcher; one was initially carried by hand and subsequently in a bamboo basket (*doko*). The third woman had to wait for some time until they found a stretcher. There were no delays at the health facilities for two women, but one had to be referred to the district hospital as her case couldn't be managed at the health post. By the time she reached the district hospital, her condition was very serious, but fortunately she survived. None of the women sought follow-up postnatal care.

6.1.5 Pre-eclampsia

The overall rate for pre-eclampsia in the EOC facilities in the eight study districts was 7 per 1,000 births (Figure 6.9). There were no pre-eclampsia cases in Baglung. The rate of pre-eclampsia rate is highest in Rasuwa 27 per 1,000 births followed by Sunsari 13 per 1,000 births.

Figure 6.9: Pre-eclampsia Rates at EOC Facilities



There were three in-depth interviews with women who had suffered from pre-eclampsia during their last pregnancy. Only one planned to deliver in hospital but they all ended up having caesarean sections at an institution and had live births. In one case there was a delay in deciding to seek care, where care was only sought after twelve hours of experiencing problems. The family initially consulted a TBA and FCHV at home, only when it was clear that they could not manage the complication was she referred to a health facility.

'[My] whole body was trembling. Though it occurred since night time, nothing was done. Then mother-in law went to call [FCHV]. After palpation she asked to take me to Tikapur, as that was not good symptom.'

- 23 year-old mother, Kailali

Case study 6.5: Pre-eclampsia

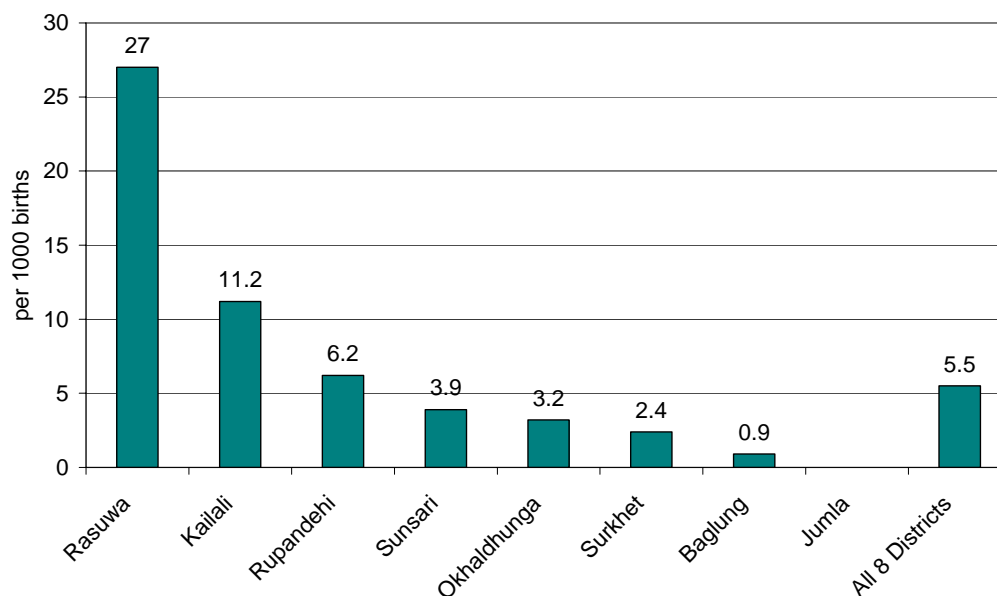
Kulwanti is a 27 year-old housewife. Right from the start of her pregnancy she experienced vomiting, swelling and high blood pressure. Accordingly, she went for regular check-ups and ate well, undertaking only light work where necessary. In the fifth month, the swelling was so great that it prevented her from walking and even wearing clothes, so she was immediately carried to the hospital by her husband and mother-in-law. The hospital staff told her that her condition was so critical that she must remain in the facility until her delivery. In the seventh month of her pregnancy, after spending one month in hospital she developed difficulty breathing due to the abdominal swelling so she was given medicine to induce her labour, however, after two days of no progress the baby was delivered by operation,

She commented that attending ANCs meant that she was better informed about potential complications, which could obviate the need to attend distant health facilities in non-emergency situations: *'When I got sick, it would be really difficult for me to visit the hospital as it was very far. So, when I went there, they would tell me about the problems beforehand.'*

6.1.6 Eclampsia

The overall rate for eclampsia in the EOC facilities in the eight study districts was 6 per 1,000 births (Figure 6.10). There were no eclampsia cases in Jumla. As with pre-eclampsia, the eclampsia rate was highest in Rasuwa at 27 per 1,000 births, and the second highest rate was in Kailali at 11 per 1,000 births.

Figure 6.10: Eclampsia Rates at EOC Facilities



There were two in-depth interviews with women who had suffered from eclampsia during their last pregnancy. During pregnancy, one woman had convulsion and fits with heavy discharge, abdominal pain and bleeding, while the other suffered from dizziness and convulsion with bleeding and heart problems. Both sought care from formal health service providers as well as from traditional faith healers. One planned a home delivery and the second made no birth plans. For one of the women, after labour started, she first tried to deliver at home. Her relatives consulted three TBAs and a health worker at home. The third TBA referred her to hospital saying that a home delivery was not possible. She was examined and had an ultra sound, followed by a caesarean section.

'Firstly, TBA came. Then my husband went and called doctor...Then one of my mother-in-laws had called another TBA from her "gotipar." She said that it would be at home. One of the father-in-laws said that TBA was new and not experienced, and he would call another experienced TBA and he called mother of the TBA with whom you came, and he said the delivery would not be at home.'

- 27 year-old mother, Kailali

The second woman left for a health post after two-three hours of labour pain, and was attended immediately on arrival. She was examined and supported by the health worker and delivered normally.

'My mother in law...started saying that she would call FCHVs. I asked why we needed them as they wouldn't do anything. I asked her to take me to Mehulkuna. This is what I had to say and people from Nepalgunj came and took me to the hospital.'

- 28 year-old mother, Surkhet

Both women had live births. In the first case, the decision to visit the hospital was taken by her mother while in the second one, the woman herself made the decision to visit the health post.

Case study 6.6: Eclampsia

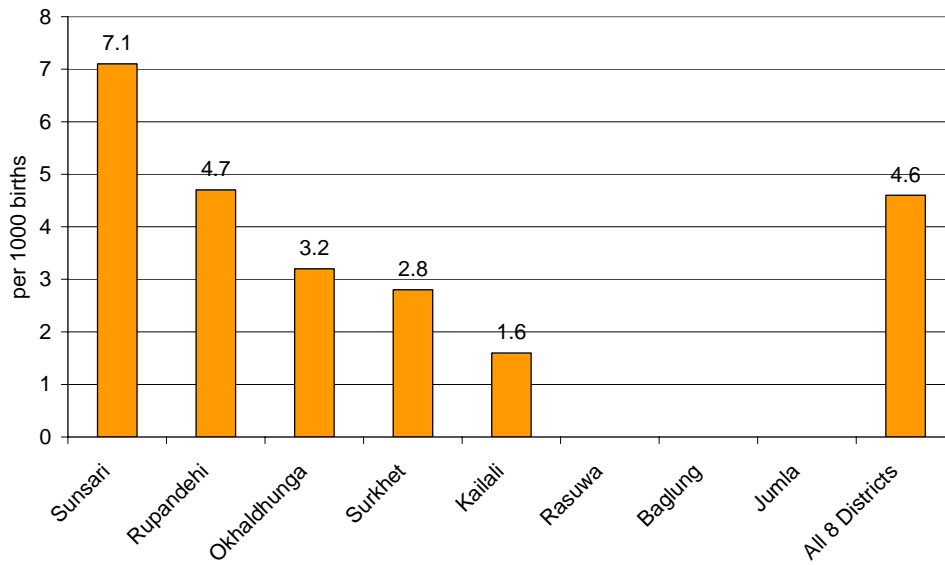
Indra Maya 20 years, illiterate, primi, had no any complications except anemia and hypertension when she was pregnant. She had first antenatal care check-up at third month and took two more such services from the nearby sub health post. She was healthy and energetic throughout her pregnancy. She never complained of anything except epigastric pain at times after eight months of pregnancy. "One day at ninth month she developed severe chest pain at about 12 noon while working on the field. We took her to a nearby faith healer at about seven in the evening. He treated her on a traditional way but the situation got deteriorated with restlessness, swelling of body, feet and face, nausea, vomiting, fits and unconsciousness" says her husband.

"We had decided to take her to the hospital but could not do so because it was late at night and unavailability of transportation" says her husband. The next morning it took about 5-6 hours to take her to the Mission hospital on a *Dali*, a carrier. Meanwhile, one of the relatives borrowed money from neighbours for her treatment. On reaching the hospital, she got admitted and caesarean section was done immediately. "The doctor said that it was the case of transverse lie and the foetus inside was dead" says her husband. Two pints of blood was transfused and she was transferred to ICU unit in unconscious state. She was fed through Ryles tube for 2-3 days. She stayed at ICU for seven days and died of Eclampsia that led to Cerebral haemorrhage.

6.1.7 Ectopic Pregnancy

The overall rate for ectopic pregnancies in the EOC facilities in the eight study districts was five per 1,000 births (Figure 6.11). There were no ectopic pregnancies reported at EOC facilities in three districts (Rasuwa, Jumla and Baglung). The highest rate was in Sunsari at 7 per 1,000, with 61 out of the 62 cases recorded in this district from the BP Koirala Institute of Health Sciences (BPKIHS). This is a tertiary level hospital, and therefore has the ability to detect and treat ectopic pregnancies. The second highest rate was in Rupandehi at 5 per 1,000. All 49 ectopic pregnancies in Rupandehi were recorded by Lumbini Zonal Hospital, Medical College, AMDA (NGO) and the private nursing homes.

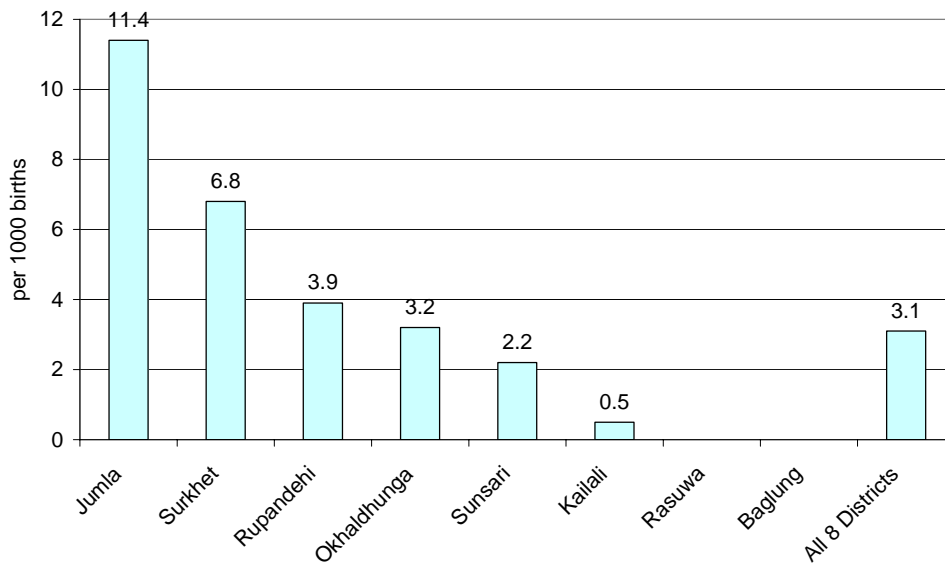
Figure 6.11: Ectopic Pregnancy Rates at EOC Facilities



6.1.8 Puerperal Sepsis

The overall rate for puerperal sepsis in the EOC facilities in the eight study districts was 3 per 1,000 births (Figure 6.12). There were no puerperal sepsis cases in Rasuwa and Baglung. The highest rate was seen in Jumla at 11 per 1,000 births followed by Surkhet at 7 per 1,000 births. Levels of puerperal sepsis were highest during the monsoon months (July and August).

Figure 6.12: Puerperal Sepsis Rates at EOC Facilities



Two in-depth interviews were conducted with women who had sepsis during their last pregnancy. Both had home deliveries, with one making preparations for a blade and plastic sheet.

After 36 hours of bleeding, the second woman delivered her baby at 7:00 p.m. in the evening but the placenta did not come out. The placenta was tied with a thread to the women's feet. Large blood clots came out three times during the night and she was in

pain. The next day at 12:00 noon, the placenta came out, followed by bleeding. The woman became weak, felt dizzy and had headache. On the seventh day, she was unconscious. She was then taken to the hospital. In the zonal hospital four packets of glucose and four pints of blood were transfused to her. She stayed at the hospital for seven days and recovered.

In both cases there was a delay in regards to deciding to seek formal care, spending a number of days at home with complications before seeking care. They were only taken to health facilities once the complication became severe. The treatment for the second woman was delayed at a lower level facility that was unable to treat the problem and referred her to a higher level facility.

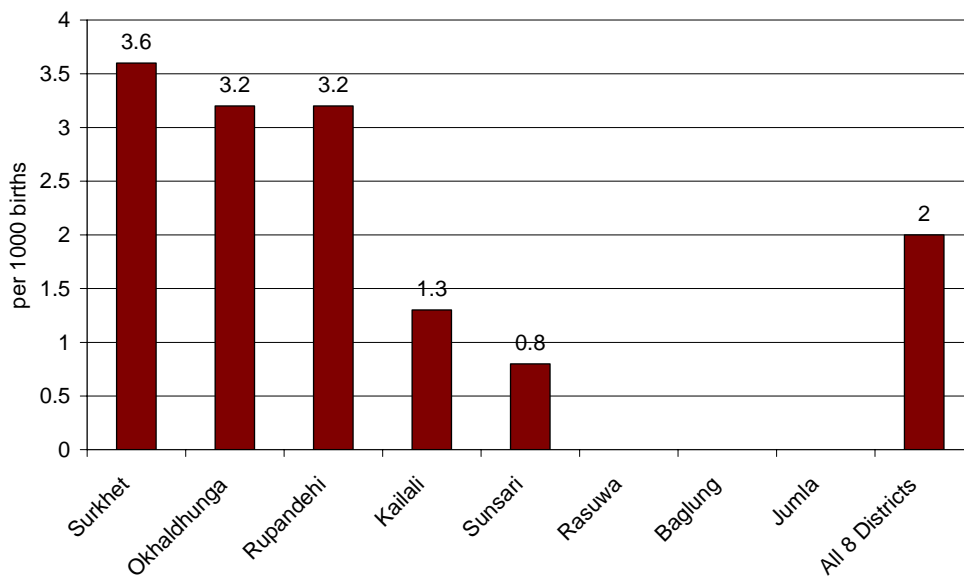
Case study 6.7: Puerperal Sepsis

Namuna is a 21 year-old housewife. She had one check-up during her pregnancy, in the sixth month, due to her shyness. She had no difficulty with the delivery itself, and experienced only moderate labour pains; however, after nine days of having the baby she began to experience mild abdominal pain and swelling. She told her mother-in-law who decided that it must be her bayugano/uterus prolapse; she accordingly gave her some herbs and called for a traditional healer. The pain continued to increase, and after the child's death on the twentieth day it became unbearable and she fell unconscious. Her husband brought a stretcher and the next day the villagers helped to carry her to the district hospital. Upon arrival, the nurse examined her and diagnosed her with a growth of flesh in her belly. She gave her an injection and they tried to cut the growth out, but due to excessive bleeding she was referred to the medical college hospital where an operation was conducted to resolve the problem. Plane tickets were provided to facilitate the transfer.

6.1.9 Ruptured Uterus

The overall rate for ruptured uterus in the EOC facilities in the eight study districts was 2 per 1,000 births (Figure 6.13). There were no ruptured uterus cases in Rasuwa, Baglung and Jumla. The ruptured uterus rate was highest in Surkhet at 4 per 1,000 births followed by Rupandehi and Okhaldhunga at 3 per 1,000 births.

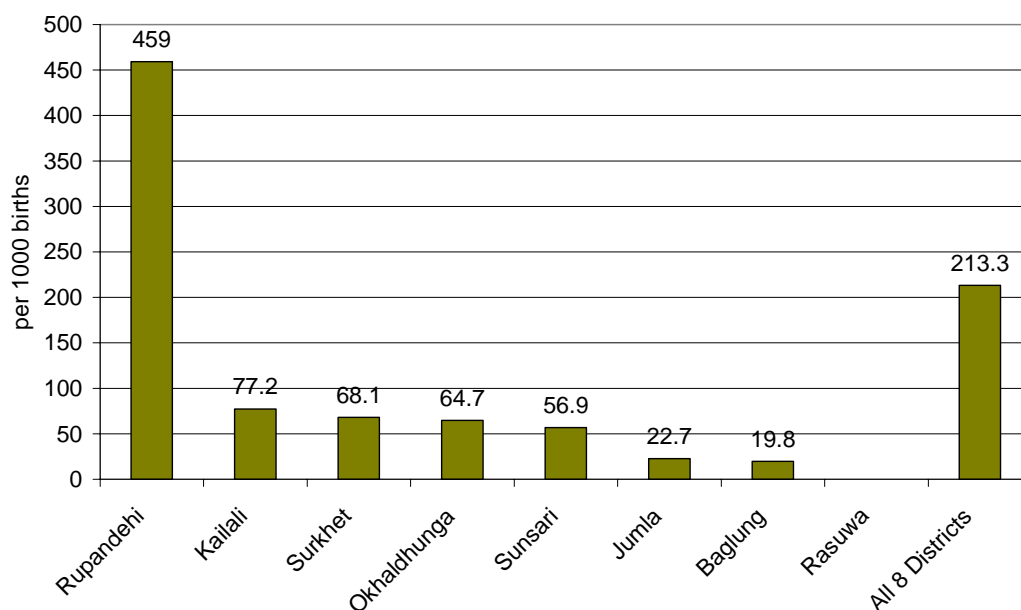
Figure 6.13: Ruptured Uterus Rates at EOC Facilities



6.2 Other Obstetric Complications

The overall rate for other obstetric morbidities in the EOC facilities in the eight study districts was 213 per 1,000 births (Figure 6.14). Rupandehi had by far the highest rate at 459 per 1,000 births followed by a much lower 77 per 1,000 in Kailali. It should be noted other obstetric complication may not have always been classified correctly and thus may be underreported.

Figure 6.14: Other Obstetric Complication Rates at EOC Facilities



Respondents for the verbal autopsies were asked about other obstetric morbidities the deceased women suffered from (Table 6.6). The form does not collect information on all other obstetric morbidities. Eleven percent of women had jaundice during their recent pregnancy; 7 percent had an abnormal presentation; 9 percent a cord prolapse and 3 percent a hand or feet prolapse during their recent labour/delivery. Five percent of the women experienced complications of operative delivery.

Table 6.6: Other Obstetric Morbidities for All Maternal Deaths

	During previous pregnancy		During recent Pregnancy		During recent labour / delivery	
	N	%	N	%	N	%
Hypertension	4	2.5	-	-	-	-
Premature labour	6	3.8	-	-	-	-
Jaundice	-	-	17	10.6	-	-
Abnormal lie/Presentation	-	-	-	-	7	6.6
Cord prolapse	-	-	-	-	9	8.5
Hand/feet prolapse	-	-	-	-	3	2.8
Anaesthetic Complication	-	-	-	-	0	0.0
Complications of operative delivery	-	-	-	-	5	4.7
Total	160	100.0	160	100.0	106	100.0

Providers completing the maternal death reviews reported any other obstetric morbidities experienced by the deceased to the best of their knowledge (Table 6.7). The form does not collect information on all other obstetric morbidities. Sixteen percent of the women suffered from hypertension during their recent pregnancy; 12 percent had premature labour; and 39 percent suffered from shock during their recent labour.

Table 6.7: Other Obstetric Morbidities for Hospital Based Maternal Deaths

	During previous pregnancy		During recent Pregnancy		During recent labour / delivery		After recent delivery	
	No.	%	No.	%	No.	%	No.	%
Hypertension	2	3.5	9	15.8	-	-	-	-
Molar pregnancy	1	1.8	1	1.8	-	-	-	-
Urinary tract infection	-	-	1	1.8	-	-	2	6.7
Abnormal lie/Presentation	-	-	1	1.8	3	6.1	-	-
Shock	-	-	-	-	13	39.4	-	-
Premature labour	-	-	-	-	4	12.1	-	-
Cord prolapse	-	-	-	-	1	3.0	-	-
Anaesthetic Complication	-	-	-	-	1	3.0	-	-
Complications of operative delivery	-	-	-	-	2	6.7	-	-
Total	57	100.0	57	100.0	33	100.0	30	100.0

Respondents for verbal autopsies were asked about maternal symptoms and complications experienced by the deceased (Table 6.8). During their most recent pregnancy many had possible symptoms of anaemia: 42 percent felt weak/tired most of the time; 34 percent were very pale; 31 percent were breathless when doing normal activities; and 27 percent suffered from dizziness and fainting. There was also a high prevalence of possible symptoms of anaemia after delivery with 54 percent felt weak/tired most of the time; 43 percent were very pale; 26 percent were breathless when doing normal activities; and 35 percent suffered from dizziness and fainting. Many also had symptoms of pre-eclampsia during their recent pregnancy with 27 percent having swelling of the feet and ankles and 23 percent a general swelling of the body. Nineteen percent suffered from excessive vaginal bleeding during their recent labour/delivery.

Table 6.8: Complications for All Maternal Deaths

	During previous pregnancy		During recent Pregnancy		During recent labour / delivery		After recent delivery	
	No.	%	No.	%	No.	%	No.	%
Severe headache	-	-	69	43.1	-	-	-	-
Felt weak/tired most of the time	-	-	67	41.9	-	-	29	53.7
Very pale	-	-	54	33.8	-	-	23	42.6
Breathless when doing normal activities such as household chores	-	-	50	31.3	-	-	14	25.9
Strong and sudden abdominal pain	-	-	50	31.3	-	-	19	35.2
Swelling of feet and ankles	-	-	43	26.9	-	-	-	-
Excessive vomiting	-	-	43	26.9	-	-	-	-
Dizziness/Fainting	-	-	43	26.9	-	-	19	35.2
General swelling of body or face	-	-	36	22.5	-	-	-	-
Loss of consciousness	3	1.9	23	14.4	16	14.8	24	44.4
Vaginal bleeding	17	10.6	22	13.8	20	18.5	25	46.3
Seizures	22	13.8	21	13.1	14	13.0	13	24.1
Pain or burning sensation while urinating	-	-	20	12.5	-	-	-	-
Foul smelling vaginal discharge	-	-	17	10.6	-	-	5	9.3
Difficulty seeing at night	-	-	14	8.8	-	-	-	-
Reduced or no foetal movement	-	-	14	8.8	-	-	-	-
Raised/high blood pressure	-	-	12	7.5	-	-	-	-
Fever	-	-	5	3.1	17	15.7	16	29.6
Foul smelling vaginal discharge	-	-	-	-	9	8.3	-	-
Baby too big for delivery	-	-	-	-	16	14.8	-	-
Tear around the birth passage/vagina/cervix requiring stitching	-	-	-	-	2	1.9	-	-
Leaking of urine or stool from vagina	-	-	-	-	-	-	5	9.3
Womb or vaginal wall fell out	-	-	-	-	-	-	0	0.0
Breast abscess	-	-	-	-	-	-	1	1.9
Total	160		160		108		54	

Providers completing the maternal death reviews reported any other obstetric morbidities experienced by the deceased to the best of their knowledge (Table 6.9). The form does not collect information on all obstetric morbidities. During their recent pregnancy over one-fifth of women lost consciousness (21%), and 10 percent each suffered from severe headaches and abdominal pain. During their recent labour/delivery nearly one quarter (24%) lost consciousness and 12 percent suffered from seizures.

Table 6.9: Complications for Hospital Based Maternal Deaths

Complications	During recent Pregnancy		During recent labour/delivery	
	Number	Percent	Number	Percent
Loss of consciousness	12	21.1	8	24.2
Severe headache	6	10.5	-	-
Abdominal pain	6	10.5	-	-
Seizures	5	8.8	4	12.1
Fever	5	8.8	2	6.1
Proteinuria	5	8.8	-	-
Dizziness/fainting	4	7.0	-	-
Leaking membrane	3	5.3	-	-
Excessive vomiting	3	5.3	-	-
Fluctuating heart rate and blood pressure	-	-	1	3.0
Reduced or no fetal movement	1	1.8	-	-
Total	57	100.0	33	100.0

6.3 Chronic Illness

The verbal autopsy respondents were asked if the deceased women suffered from any chronic illness prior to pregnancy (Table 6.10). Over one-third of the women suffered from anaemia (34%) prior to pregnancy and over one fifth from malnutrition (21%), and 23 percent of women who died in hospital from a maternal death were anaemic after delivery. Eight percent each suffered from heart disease, jaundice and hypertension, while 4 percent suffered from epilepsy and 2 percent each suffered from tuberculosis, HIV/AIDS and Malaria. One percent suffered from hepatitis and one percent from mental illness prior to pregnancy.

Table 6.10: Chronic Illness Experienced by Women Who Died from Maternal Causes

Chronic illness	All deaths		Hospital Deaths			
	Illness prior to pregnancy		Illness during pregnancy		After recent delivery	
	Number	Percent	Number	Percent	Number	Percent
Anaemia	55	34.4	-	-	7	23.3
Malnutrition	34	21.3	-	-	-	-
Heart disease	13	8.1	1	1.8	-	-
Jaundice	13	8.1	-	-	-	-
Hypertension	12	7.5	-	-	-	-
Epilepsy	6	3.8	-	-	-	-
Tuberculosis	3	1.9	-	-	-	-
HIV/AIDS	3	1.9	-	-	-	-
Malaria	3	1.9	-	-	-	-
Hepatitis	2	1.3	-	-	-	-
Mental illness	2	1.3	-	-	-	-
Cancer	1	0.6	-	-	-	-
Diabetes	0	0.0	1	1.8	-	-
Total	160	100.0	57	100.0	30	100.0

6.4 Summary of Findings

The overall rate for all major obstetric morbidities (prolonged labour, abortion complications, haemorrhage, retained placenta, pre-eclampsia, eclampsia, ectopic pregnancy, sepsis, ruptured uterus) in the EOC facilities in the eight study districts was 197 per 1,000 births. Prolonged labour had the highest rate of all the major obstetric morbidities at EOC facilities, at 79 per 1,000 births, followed by abortion complications at 56 per 1,000 births and haemorrhage at 27 per 1,000 births. On average about two-thirds of haemorrhage morbidities at EOC facilities are due to PPH and one third APH.

Anaemia and malnutrition are underlying factors in many maternal deaths. Over one-third of the women who died from maternal causes suffered from anaemia (34%) prior to pregnancy and over one fifth from malnutrition (21%) while 23 percent of women who died in hospital from a maternal death were anaemic after delivery. During their pregnancy many had complications, possibly linked to anaemia and malnutrition: 42 percent felt weak/tired most of the time; 34 percent were very pale; 31 percent were breathless doing normal activities; and 27 percent suffered from dizziness and fainting. There was also a high prevalence of these complications after delivery as 54 percent felt weak/tired most of the time; 43 percent were very pale; 26 percent were breathless when doing normal activities; and 35 percent suffered from dizziness and fainting.

Nearly one quarter of women who died from maternal causes (24%) did not want to become pregnant at that time; and this proportion increased for older women, with over half of women aged 35-49 not wanting to become pregnant (51%). Over one third of those who had an unwanted pregnancy (34%) attempted to abort, with nearly one third of those (31%) doing so in the second trimester. Fifty four percent of those who attempted an abortion suffered from at least one obstetric complication.

For 13 percent of women who died from maternal causes someone did something to speed up the delivery of the placenta, including common traditional practices, such as feeding the woman hair or inserting a hand to make her vomit; tying cloth tightly around her abdomen. The placenta was manually extracted in 6 percent of cases and in 50 percent of these it only came out partially.

6.5 Discussion

It is estimated that half of women who deliver experience obstetric complications leading to maternal morbidities (UK APPG 2009). Measurements of maternal morbidity are notoriously difficult to verify due to the lack of a universal definition and agreement as to which symptoms qualify as morbidities. Many morbidities require a medical examination for diagnosis, which women often do not receive, and in many cultures even if they do, women are reluctant to openly discuss personal health issues. Hence, the incidence of morbidities is often underreported. Accordingly, the data and literature concerning maternal morbidities vary enormously in their estimation of prevalence, for example global estimates vary from affecting 1.7 million (Geller et al. 2004) to 60 million women annually (UK APPG 2009). These discrepancies preclude the formation of effective policy and the efficient allocation of resources in order to tackle the problem of maternal morbidity.

In the absence of an agreed definition, maternal morbidity is widely conceived of as 'any departure, subjective or objective, from a state of physiological or psychological well-being during pregnancy, childbirth and the post-partum period' (Last 1995). Accordingly, any pregnancy-related illness or disease, physical or mental, incurred by the mother up to a year after delivery is generally considered to be a maternal morbidity. As Filippi et al.

note, 'subjective elements of reproductive morbidity cannot be ignored, because they are important in themselves and they are important determinants of the demand for services' (Filippi et al. 2007). The authors found that delivering women suffering from morbidities had worse mental health outcomes than those experiencing uncomplicated deliveries, and were more prone to risk of depression and suicidal ideation; with both of these symptoms undergoing rising levels in Nepal, it may be that focusing efforts and resources on steps to reduce the prevalence of maternal morbidity will have attendant benefits in mental health.

In Nepal, the range of maternal morbidities is immense, and it is usual for delivering women to experience at least one condition. A facility-based study in Kathmandu found that 94 percent of the 274 women admitted for delivery experienced maternal morbidity of some kind (Smith et al. 1996). Eighty nine percent of women reported at least one problem during pregnancy and, of these, 82 percent experienced multiple morbidities. The range of illnesses experienced were similar to those observed in this study. Although maternal morbidities are widely reported in Nepal, data is largely facility-based, hence since most women deliver at home and are likely to be experiencing a higher level of complications, these will be unaccounted.

Although these conditions may not necessarily be fatal *per se*, factors operating in Nepal to preclude or prolong the decision to seek treatment may cause them to develop irreversibly. When necessary treatment is not sought, maternal morbidities can develop into life-threatening conditions, thereby augmenting the level of maternal mortality. Maternal morbidities cause up to 80 percent of maternal deaths globally (Simkhada et al. 2006), and increase not only the risk of a maternal death, but also the death of the newborn. Geller et al's study (2004) concluded that if medical decision-making were improved, the severity of the outcome of morbidity incidence would be greatly reduced. The authors found that appropriate and timely medical intervention would have seen 41 percent of the sample women as near-misses instead of deaths; 45 percent as severe morbidities instead of near-misses; and 17 percent of severe morbidities as less severe ones. Many of the case studies in this chapter highlight the importance of timely medical intervention. A facility-based study conducted in Burkina Faso found that 'the increased risk of infant death in the group born to women with complications persisted at 1 year post partum, and so cannot be explained solely by the neonatal complications and death associated with severe obstetric complications' (Filippi et al. 2007). This means that the persistence of maternal morbidities presents a direct impediment to the achievement of the fourth and fifth MDGs relating to maternal and child health.

In spite of their prevalence, the majority of maternal morbidities are largely treatable and some entirely avoidable. A wealth of research emphasises the importance of safe abortion in reducing maternal morbidity (Filippi et al., 2007; Hindin 2007; APPG 2009). Unsafe abortion increases the likelihood of contracting a morbidity. The legalisation of abortion in Nepal in 2002 therefore has the potential to impact substantially upon the country's rate of maternal morbidity, however, nationwide promulgation has been tempered by the difficulties presented by Nepal's geophysical terrain, and many studies report that a large proportion of the rural population remains uninformed of the change, thus continuing to seek clandestine abortion. This also supports the contention that the level of maternal morbidity and mortality due to unsafe abortion which is underreported is significant due to social taboo and legal implications.

CHAPTER 7: MATERNAL HEALTH CARE SEEKING BEHAVIOUR

7.0 Introduction

This chapter explores maternal health care seeking behaviour. The health care seeking behaviour of a woman during pregnancy, childbirth and postpartum can influence the survival of herself and her child. Previous studies have shown that care seeking behaviour is influenced by many factors operating at the individual, family and community levels. This chapter explores the decision making process; the support received from friends and family; the factors affecting choice of care; care received during the antepartum, intrapartum and postpartum periods; referral; and changes in care seeking behaviour. Health seeking behaviour was discussed in focus group discussions with women in the community who had given birth during the last ten years; in-depth interviews with women who had pregnancy related complications in past two years; in-depth interviews with service providers (both formal and informal); and in-depth interviews with key stakeholders. Furthermore, additional information is obtained from the maternal verbal autopsies, maternal death reviews, and EOC obstetric morbidity monitoring.



7.1 Decision Making Process

The decision-making process can be an important underlying factor contributing to maternal deaths. The low social status of women in Nepal limits their access to economic resources; basic education; and ability to make decisions related to care seeking. Women may be denied access to care because the decision-making power lies in the hands of other family or community members. The inability to make their own decisions, regarding when and where to seek care, can result in a fatal delay in seeking care. Most women interviewed had a preference for delivering at home and often made the decision to do so themselves, in anticipation of a normal delivery. Their preference for a home delivery, as opposed to institutional, is discussed in more detail in Chapter 9.

“Pregnant women themselves decide to give birth at home...because of shyness. Moreover, it costs more to go to the hospital and it makes difficult for others as well. If home delivery takes place, no one has difficulty and others will not know...”

- FGD participant, Baglung

“It is not like being in your own home. You have to take along all the clothes. There won't be homely treatments like massage and all. Expense is also high. Carrying pregnant women till the centre is another problem. It is arduous for the body to deliver in health institutions. There is no need to carry food if we deliver at home; everything is at your side.”

- Woman with complication

Women usually notify their husbands or mother-in-laws when they think they are going into labour. Husbands then usually locate the traditional birth attendant or community health care provider (e.g. FCHV, MCHW) to assist with the delivery.

“... the pregnant woman's husband calls me. Others haven't called me so far. The husband decides to call and so he calls me. If the case is normal, then we do the delivery at home or else we take her to the hospital...”

- TBA, Baglung

When a complication that cannot be managed at home occurs, care at a health facility is considered. Many people are usually involved in the decision-making process surrounding seeking care at a facility, including family members; birth attendants; and the women themselves.

"They usually call me for home delivery. I inform them if I could not carry out the delivery. Then, family members like mother-in-law, father-in-law or husband decide to take her to the hospital..."

- TBA, Rupendehi

The main driving forces in the decision to seek care at a facility include assessment of the severity of a complication (including the possibility of losing the life of the mother or infant); as well as non-medical factors, such as finance and logistics. Since a home delivery is often assumed, prior arrangements for money, transport and accompanying persons are often not made until a complication occurs.

"... I felt difficulty in breathing. After that I reached the stage where I could neither sleep nor stand up straight... I told them (family members) to take me to Mehlkuna (PHCC) describing my condition and... I was taken to Mehlkuna."

- Woman who had eclampsia, Surkhet

If a complication cannot be managed at the first health facility visited, service providers will advise the persons accompanying the woman, usually family members, to take her to a higher level facility. The decision to take her to another facility is not straightforward and again is dependent on the agreement of family members after considering cost, availability of transport and who will accompany her.

"Well the expenses....Had to pay even for the trash and for sleeping as well. They gave so little food to the patients which didn't do for us...The person who carried me had to be fed a meal. The ambulance and the bus fare as well as medicines cost me 11 thousand rupees."

- Woman with complication

The people playing a role in the decision making process depend on the context and circumstances, but the outcomes are largely dependent on the husband or mother-in-law because they involve financial and logistical issues. Service providers often have an important role, and sometimes other family members, neighbours and the women themselves play a part.

"... Regarding taking the women to the PHCC, the mother in law decides and in case of her absence, the husband does. (Everyone said the same thing). In most of the households, if the mother- in- law is there then she makes the decision...."

- FGD participants, Okhaldhunga

"... I informed my husband about the problem. Then went to the health post. At the health post the doctor decided that I should be taken to the Maternity hospital. She told my husband to take me there and told him to relax. I didn't know anything. She sent a doctor along with us. They provided us with that facility. The doctor was from our village. Her house is nearby. They sent her with me in case some complication arose on the way."
(Note: it is likely that the accompanying "doctor" was in fact a lower level health worker)

- Woman with complication, Rasuwa

Table 7.1 shows the main decision maker for care seeking prior to death for those who died of maternal causes. In 38 percent of cases it was the husband of the deceased; in 26 percent a member of the paternal family; 11 percent a member of the maternal family; and for 1 percent a friend or neighbour.

Table 7.1: Main Decision Maker for Care Seeking

Main decision maker	Frequency	Percent
Husband	61	38.1
Member of the paternal family	41	25.6
Member of the maternal family	18	11.3
Friends/neighbours	2	1.3
Others	18	11.3
Total (n)	160	100.0

7.2 Support from Family, Relatives and Friends

Most women interviewed said they received help from their husbands during pregnancy. They stressed that husbands were particularly supportive in doing household chores; providing nutritious food; offering advice about taking rest and avoiding heavy work; and accompanying women to health facilities. Furthermore, they played a crucial role during an emergency in seeking assistance at home; arranging stretchers or other forms of transport and in overall decision making.

"... They provide green leafy vegetables, meat and pulse time to time. They suggest us to do light works and not to do heavy works....laughs...They advice us not to do too much work and have this and that kind of foods. They tell us to go for check-up. They love us during pregnancy. They tell us and let us eat iron-containing foods like green leafy vegetables and fruits. They advice us to visit the hospital (PHCC) for check-up..."

- FGD participants, Baglung

"... I woke up in the morning and went to fetch water. It started to pain little. I told my husband and he brought the stretcher and called people to help in carrying me. He informed all of them that I would be taken to the market (health centre) the next morning and my mother and father in-law also came...and then I was taken to the market..."

- Woman with sepsis, Jumla

"I did not work and rested and had foods. I did not do anything, not even washed my petticoat for 3 months. My husband washed all clothes. I even didn't wash dishes for 3 months. I just took rest."

- Woman with complication

Some women reported receiving help from their mother-in-law, especially around the time of delivery, for example massaging their belly with oil; providing warm food and drinks; giving advice; seeking assistance at home and accompanying them to a health facility. They also offered advice about avoiding heavy work during pregnancy at home. Similar roles were reported for mothers, sisters and sisters-in-law, although the mother-in-law tended to play a more prominent role.

"... I sat by the fire the whole night. They rubbed oil and massaged me. I was given butter soups to drink. The volunteer from the village, grandmother-in-law, mother-in-law and sister-in-law helped me. They prepared soups for me to drink. They took turns in sleeping and rubbed oil and massaged me the whole night. They gave hot water for me to drink..."

- Woman who had PPH, Baglung

Neighbours frequently played an important role in seeking assistance at home, making transport arrangements to facilities and accompanying women to facilities.

"... I was working though I had pain. When water started to flow, I let my son to call my neighbour sister-in-law (bhauju). She arrived immediately and called my mother-in-law. .. After mother-in-law arrived, she phoned my husband and asked him to bring a jeep with him. ..."

- Woman who had Pre-eclampsia, Kailali

7.3 Factors Affecting Choice of Care

During discussions with women in the community the main factors that determine whom women consult and where they go for care include the distance to a facility, cost of care and the type of complications women are experiencing. Many women and their families prefer home deliveries as it is the common practice among their peers. During home deliveries women are often assisted by TBAs, since they have attended many deliveries and are readily available in their neighbourhood.

"...Women visit health post because they feel and also have hopes that they will be treated there. It is near by. (Everyone agrees) Because it will cost them less and they feel that if they can get a treatment there then why should they go anywhere else!"

- FGD participants, Surkhet

"...The TBA is in the village and so are they and therefore it is easy for family members to go and call them in the event of a problem. Since they have been giving the services for the people think that they will be able to do and why should they go to the hospital, I have heard people saying this. TBA can do it. And if the TBA can't handle the case then they will get a staff of the medical which is near by and if they also can't help then they will refer the case to the PHCC..."

- ANM, Kailali

The availability of 24-hour care is important, and the limited opening hours and expectation of a shortage of medicines influences some to go directly to higher level facilities. Participants reported that if they do go to the health post or PHCC first and their treatment cannot be managed, then they are often referred to the district hospital. Some participants from districts bordering India mentioned that women went to the health facilities in India because they were discriminated against by the service providers in Nepal, as they did not speak the Nepali language.

7.4 Antenatal Care

Self care during pregnancy is important to women. Most participants said that women and their families are becoming more conscious about their well-being during pregnancy and are taking more care of their health during this period. Women reported consuming nutritious foods like green vegetables, fish, meat, eggs, fruits, juice and soups during pregnancy. There is also more awareness of the need to limit heavy work during pregnancy, but at the same time not to be idle either. Generally women agreed they should continue to do light household chores when pregnant.

"... Regarding taking care of themselves... Things are not like before. They do not carry heavy load and these days they take vitamin. They do light work. They do not do anything up to 3 months of pregnancy. They take rest. They take vitamins and eats vegetables and spinach. Most of them work. Earlier, they use to do heavy work but it has decreased a lot these days. These days when they reach the 7th month, they take rest, avoid heavy works and eat good food. They eat vegetable, spinach and milk..."

- Informal provider, Baglung

"... Well... (Thinking)...I did not work hard and took a little rest. I increased the intake of nutrients. I took precautions from getting hurt for my safety. Unlike cities, we need to walk up and down in the village. I was very cautious while walking, I took careful steps. I moved about very carefully while collecting grass and firewood in the forest. In addition, I ate quite a lot of fruits, green vegetables and pulse soups..."

- Woman with complication, Baglung

"... During pregnancy, I took rest. I had eggs, green, leafy vegetables and fruits. I had some vitamins, eggs and milk as well. Here we have FCHVs. Service providers from Syaphru health post come in every 3rd of the month and we get examined then..."

- Woman with complication, Rasuwa

However, some women, especially in remote and mountainous areas, are compelled to carry out heavy work and do not have sufficient food, and this is likely to have been the historic practice.

"... How will pregnant women take care, they have to do the household chores. There are no nutritional food facilities even when you are pregnant; no diet is available here in Jumla. The volunteers, most of them don't give iron pills, vaccination in time and there is no medicine, that's all. We have to work. At some places we have to go to hold the plough and somewhere we have to go to hold a spade (bauso) and somewhere else we have to go for other work. At some places we have to lift stones and at other places we have to do the agricultural works. We have to work even though the family tells us not to. If we don't bring firewood today we have to strive the next day, women go to work wherever men go..."

- FGD participants, Jumla

'In ancient times, oldies used to say that, "During pregnancy, one should work rather than taking rest, then the delivery would be easier, in home, no need to go hospital..."

- Woman with complication

Traditional practices, such as pregnant women being forbidden to worship or visit temple or make sacrifices to the god; not crossing rivers or participating in funeral ceremonies, still exist in some communities and thus prevent them accessing care.

"... They don't let us cross the river and say the devil spirit will take over. They say if the river will be crossed then the devil spirit will take over our body so while we are pregnant we don't cross the river. I did not go for antenatal check up. To go for the check-up the river needs to be crossed and there is the fear..."

- Woman with complication, Jumla

"... Pregnant women cannot participate in the "Pitri Puja", because they cannot perform any worshipping. It is believed that something bad will happen so we do worship or offer anything to God during pregnancy. It starts from the day it is known that the woman is pregnant she cannot do 'Puja'..."

- Woman with complication, Baglung

The safe motherhood programme recommends women should receive at least four antenatal check-ups. Most respondents agreed that women are aware of the availability and importance of antenatal care. They also felt that increased awareness was translating into increased service utilisation. It was commonly reported that most women received antenatal care from formal providers at all levels of facilities.

"...No one used to go anywhere in earlier days but these days they visit the health post. Madam (ANM) provides treatment over there. When, we come to know about a woman's pregnancy in the ward we suggest she visits the health post for check up. Some of them go to the health post and some of them go to the school where the madam (ANM) from the health post comes every month for check up..."

- Informal provider, Rasuwa

"...Women visit to the health centre in Burtiwang. Well, Madam, that is what they do. They keep doing the work as well as visit to the health post for monthly check-ups. They take injection too. It is done by each pregnant woman. All women from ward no. 9 go to the health centre (PHCC)..."

- FGD participants, Baglung

Despite the increase in utilisation of formal providers, there were still reports of women utilising informal providers such as FCHVs, TBAs and local pharmacists.

"...The FCHVs come and if they wish, they get a check-up. Nowadays, FCHVs are the ones who visit the household. They check the position of the baby and examine. They examine if the baby is in the wrong position. They provide about iron tablets. Even if the house is far they visit to provide iron tablets.

"...There is an old TBA and the FCHV, she was the first TBA and now she is 70 years old. Some women still go to her to get a check-up..."

- Informal provider, Jumla

Regarding the timing and number of visits, opinions varied between participants and districts. Most women interviewed felt that women make their first visit before the fifth month of pregnancy, while service providers felt that women, especially from remote, rural and marginalised groups, only seek ANC service after six months, unless they experience a problem.

A better uptake of antenatal care was reported by the respondents of the verbal autopsy than by the providers completing the maternal death reviews (Table 7.2). This is not surprising given that the relatives/friends completing the verbal autopsy are likely to have better knowledge of uptake of antenatal care by the deceased. Sixty-eight percent of the women who died from a maternal cause received antenatal care from a formal provider. Twenty-three percent had the WHO recommended four antenatal check-ups, and 29 percent had their first check-up in the first trimester.

Table 7.2: Antenatal Care Received by Women Who Died from Maternal Causes

Antenatal care	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Had antenatal check-up from formal provider*	108	67.5	27	47.4
Number of antenatal check-ups *				
1	20	12.5	9	15.8
2	22	13.8	6	10.5
3	23	14.4	4	7.0
4	37	23.1	7	12.3
Don't know/Missing	6	3.8	1	1.8
Timing of first antenatal check-up *				
1-3 months	47	29.4	3	5.3
4-6 months	45	28.1	3	5.3
Don't know/Missing	-	-	21	36.8
Total	160	100.0	57	100.0

*This does not include care by informal providers

Regarding the components of ANC care, participants agreed that abdominal examinations; iron tablets; TT injections; de-worming tablets; and counselling are the common services offered in the health facilities.

"..... We perform general check-up. We provide de-worming medicine, iron tablets and TT injections. We continuously provide these things from third month of pregnancy up to 45 days postpartum. We suggest them to come for monthly ANC visits, take iron tablets, TT injection and de-worming tablets. They follow our suggestions...."

- Service provider, Okhaldhunga

"...In the health facility, they provide both examination and counselling services. They perform check up to find out the position of the baby. They provide counselling for what one should do during pregnancy. They suggest us about the types of diet and about the physical work. They also gave TT injection, iron tablets and tested the blood and urine..."

- Woman with complication, Baglung

"...He vaccinated me for TT. I liked it. I got 2 TT vaccinations. I was told that I should take vitamins and was given iron tablets. I took vitamins and iron tablets. They also give you advice that you should take vitamins, eat fruits, have iron tablets and should rest. He said we should not carry heavy load..."

- Woman with complication, Rasuwa

Twenty three percent of women who died from maternal causes at a hospital received at least two doses of tetanus toxoid (Table 7.3).

Table 7.3: TT Immunisation Received by Women Who Died from Maternal Causes in Hospital in Study Districts

TT Immunization	Number	Percent
None	41	71.9
One dose	1	1.7
At least two doses	13	22.8
Missing/Don't know	2	3.5
Total	57	100.0

Table 7.4 shows the interventions received during the antepartum period by those who suffered a maternal death in hospital. Six received blood transfusions; three received treatment for anaemia; one received treatment for malaria.

Table 7.4: Interventions Received During the Antepartum Period by Those Who Suffered a Hospital Based Maternal Death

Intervention received	Number	Percent
Blood Transfusion	6	10.5
Treatment of anaemia	3	5.3
Treatment for malaria	1	1.8
Total	57	100.0

7.5 Intrapartum Care

The participants interviewed agreed that most women prefer to deliver at home, and only seek care from a facility if they have complications. The reasons for preferring a home delivery include convenience, availability of clothes and food, shyness and lower cost.

"...Nowhere compares to home. It's safer. Those who understand this and know the value of money deliver at home...."

- Informal Provider, Surkhet

"...Women deliver at home.... They are taken to the hospital only for serious condition. Women are not taken to the hospital unless they are likely to die.... Women are carried to the hospital for complications..."

- FGD participants, Kailali

Furthermore, some hold a traditional belief that pregnant women should not go out of the house after labour pain starts. Such beliefs often lead to low or non-utilisation of health services.

"...They will have difficulty and fear that they might be haunted by the ghosts. ... We have a tradition that a woman should not cross her doorstep after she has labour pain and if she does so she will be haunted by the ghosts. All follow this and we do not have a SBA here in the village and so they call the volunteer and mostly they give birth to the baby at home..."

- FGD participants, Okhaldhunga

Although participants largely perceived home deliveries to be safe, two women who developed sepsis after home deliveries had used plastic sheets for delivery, but were uncertain whether the blade used for cutting the cord was new or sterilised.

"....No, I didn't call anyone. There is a TBA near by... she is a Chaudary I didn't even call her. There was no one at home, only my sister-in-law was there. My sister-in-law brought a blade... the umbilical cord was cut. The umbilical cord was tied with a thread and then it was tied to my feet. We tied it to my feet. I slept. I had severe pain all night. Here and there every where it hurt... And at three o'clock something black similar to a ball fell at night..."

- Woman with puerperal sepsis, Kailali

Some women mentioned preparing food and oil ready for the delivery.

".....What preparation..... I had prepared rice. I had prepared oil.... (laughs). I had kept wheat, ghee, and chicken in stock... It is not affordable to buy things outside.. My husband had made the stretcher ready to take me to the health post. I asked him to call FCHV ..."

- Woman with complication, Surkhet

The type of assistance women receive during childbirth is dependent on the place of delivery. Most home deliveries are likely to be assisted by close relatives, TBAs, or FCHVs. Generally hot water, clean cloths and heated blades are used during home delivery and women are provided with hot food and oil massage. Use of safe delivery kits (SDK) is reportedly uncommon. Women reported that general practice during the intrapartum period at home was an oil massage of the abdomen and applying heat. They also said they were given hot soup of lentil, *jwano*, butter and other warm food. Pressing and squeezing the abdomen is a common practice at home for retained placenta.

".....My sister-in-law said my labour had started. I was in labour the whole night. I sat by the fire the whole night. They rubbed oil and massaged me. I was given butter soups to drink. The volunteer from the village, grandmother-in-law, mother-in-law and sister-in-law helped me. They prepared soups for me to drink. They took turns in sleeping and massaging me the whole night. They gave me hot water to drink. As the night grew, I got more pain in my lower abdomen....."

- Woman with PPH, Baglung

'I asked my husband to call the next-door sister (didi). She then came to our house. She then lighted fire, cooked some jwano, and then applied heat to my stomach. After that my water broke (sano sutok). After the water broke, I was in intense pain (plyak plyak) and I thought I was about to have the baby.'

- Woman with complication

Just under one third of women who suffered from a maternal death during or after delivery delivered in a facility (32%): including 17 percent in a government hospital, and 7 percent in a teaching hospital (Table 7.5). Fifty three percent delivered in their own home or that of a relative. For those who died in hospital during or after delivery, 77 percent delivered in a facility, including 40 percent in a government hospital, and 20 percent delivered in their own home or that of a relative. For those who died of a maternal death

during or after delivery, 36 percent were delivered by a formal care provider, while 24 percent had a friend or relative assist, 12 percent a TBA and nearly one-fifth had no one (18%). For the hospital maternal deaths 60 percent of those who delivered were attended to by a doctor; 13 percent by a nurse; and 7 percent had no birth attendant. In 20 percent of cases the informant was unaware who the main attendant was.

Table 7.5: Place of Delivery and Delivery Attendant for Women Who Died from Maternal Causes

Place of delivery	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Government hospital	18	17.0	12	40.0
Own/relative home	56	52.8	6	20.0
Private facility	4	3.8	4	13.3
NGO/Missionary facility	3	2.8	4	13.3
Primary Health Care Centre (PHCC)	1	0.9	2	6.7
In transit to health facility	3	2.8	1	3.3
Teaching hospital	7	6.6	1	3.3
SHP/HP	1	0.9	-	-
Other	4	3.8	-	-
Missing	9	8.5	-	-
Main delivery attendant				
Doctor	27	25.5	18	60.0
Staff Nurse/ANM	7	6.6	4	13.3
AHW	2	1.9	-	-
MCHW	2	1.9	-	-
FCHV	1	0.9	-	-
TBA/Dai	13	12.3	-	-
Village doctor 'quack'	1	0.9	-	-
friend/relative	25	23.6	-	-
Self	19	17.9	2	6.7
Don't know	9	8.5	6	20.0
Total	106	100.0	30	100.0

For those who didn't deliver in a facility the verbal autopsy respondents were asked the reasons why. The overwhelming reason given was that they did not want to (70%), and one third of women did not see a need to (33%) (Table 7.6). Over-coming financial and distance barriers were less of an issue, just reported by 12 percent of respondents.

Table 7.6: Reason for Not Delivering in a Facility for Women Who Died from Maternal Causes

Reasons for not delivery in a facility	Maternal deaths to residents of study districts	
	Number	Percent
Did not want to	42	70.0
Did not see a need to	20	33.3
Could not afford to get money in time	7	11.7
Distance to health facility too far	7	11.7
Transportation not available/took too long	6	10.0
Not want to go alone	4	6.7
Early/unexpected labour	4	6.7
Not able to go alone	3	5.0
Family did not permit	2	3.3
Facility closed	2	3.3
Night-time	2	3.3
Total	60	100.0

Forty four percent of women who died from maternal causes had been advised to deliver in a facility: 17 percent because of complications during this pregnancy, but also 12 percent who were not perceived to be at risk but to receive better care (Table 7.7). Just over one

quarter of women who died of a maternal cause in hospital were known to have been advised to deliver in a facility. Ten percent were advised to due to complications during pregnancy.

Table 7.7: Advised to Deliver in a Facility for Women Who Died from Maternal Causes

Advised to deliver in a facility	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Yes	47	44.3	8	26.7
No	43	40.6	5	16.7
Missing/Don't know	16	15.1	18	56.7
Reason for advising to deliver in a facility				
Complications during previous pregnancy	10	9.4	2	6.7
Complications during this pregnancy	18	17.0	3	10.0
Provider considered her to be high risk	6	5.7	1	3.3
To receive better care	13	12.3	-	-
Don't Know			2	6.7
Total	106	100.0	30	100.0

In 6 percent of the maternal deaths to residents of the study area, and 7 percent of maternal deaths in hospitals in the study area the labour lasted more than twenty four hours (Table 7.8). In 14 percent of the deliveries to residents the baby was delivered by an emergency caesarean section; and this was the case for one third of hospital based deaths. The reasons for caesareans were largely maternal related.

Table 7.8: Delivery Care Received by Women Who Died from Maternal Causes

Delivery care	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Length of labour				
< 12 hours	79	74.5	10	33.3
12 - 23 hours	11	10.4	2	6.7
>= 24 hours	6	5.7	2	6.7
Don't know/Missing	10	9.4	16	53.3
Mode of delivery				
Normal	76	71.7	14	46.7
Forceps	2	1.9	0	0.0
Caesarean Section (emergency)	15	14.2	10	33.3
Vacuum	1	0.9	5	16.7
Missing/Don't know	12	11.3	1	3.3
Reason for c/s* / forceps / vacuum				
Maternal	9	8.5	9	30.0
Foetal	9	8.5	1	3.3
Total	106	100.0	30	100.0

* Only for c/s for hospital deaths

Of the hospital maternal deaths, a partograph was used in one-fifth of cases, and this was complete in 17 percent of cases (Table 7.9).

Table 7.9: Use of a Partograph for Hospital Based Maternal Deaths

Partograph was used	Number	Percent
Yes - complete	5	16.7
Yes - incomplete	1	3.3
No	16	53.3
Don't Know	8	26.7
Total	30	100.0

Table 7.10 shows the interventions during the intrapartum period. Seventeen percent of the hospital based maternal deaths received a blood transfusion during the intrapartum period; 11 percent of maternal deaths to the usual residents of the study area received an injection to 'speed up delivery' and 9 percent and injection to 'increase the pain'. Five received a blood transfusion; ten received anaesthesia during delivery (five received a spinal and four a general). Nearly three quarters of women (74%) who suffered from a maternal death during or after delivery had no anaesthetic during delivery.

Table 7.10: Interventions Received During the Intrapartum Period by Those Who Died from Maternal Causes

Interventions received	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Blood Transfusion	-	-	5	16.7
Injection to 'speed up delivery'	11	10.4	-	-
Injection to 'increase pain'	10	9.4	-	-
Anaesthesia administered during delivery				
None	78	73.6	20	66.7
Yes - spinal	1	0.9	5	16.7
Yes - general	0	0.0	4	13.3
Yes - local	1	0.9	0	0.0
Yes - don't know type	3	2.8	1	3.3
Don't know	23	21.7	0	0.0
Total	106	100.0	30	100.0

Service providers felt that the government policy of providing maternity (safe delivery) incentives has resulted in an increase in the number of women delivering in a health institution.

"...They usually call me for home delivery. I inform them if I cannot carry out the delivery. Then, family members like mother-in-law, father-in-law or husband decide to take her to the hospital....."

- Informal provider, Rupandehi

".....Most of the women deliver at Baglung Hospital.... The delivery incentive of Rs. 1,000 that we have been providing has also helped them to pay for the transportation and eased the problem... because of this cash incentive, many more women are coming to hospital for delivery....."

- Service provider, Baglung

Despite a traditional preference for home deliveries, most participants interviewed were positive about institutional delivery, saying that the mother and child will be safe in an institutional delivery. Moreover, some of the participants felt that, as facilities were able to manage problems, women should deliver in an institution.

7.6 Postpartum Care

The safe motherhood programme recommends that all women have at least two postpartum check-ups within the first six weeks after delivery. Discussions revealed that women generally do not seek postpartum care unless they have a complication. The main reasons for not seeking postnatal care include lack of understanding of its importance; providers failing to emphasise this during antenatal care or childbirth; and a lack of availability of postnatal services.

".... I did not know about check-up during the period of one and half month after delivery. No one goes for check-up if they do not have any problems. When they have lower abdomen pain and bleeding, they go to the health post (SHP)...."

- Informal provider, Kailali

“... There is no concept of check-ups after delivery.. If the baby is delivered in the hospital, we go for check-ups according to the doctor’s advice otherwise we do not go if we deliver at home (Everyone agrees)...”

- FGD participants, Baglung

“I was unknown about it. FCHV did not suggest going for postnatal care. If she had told, I would have gone. I thought everything was fine. I have not gone anywhere after this baby was born.”

- Woman with complication

Discussions indicated that women who do utilise postpartum care are often those who have a postpartum complication, but uptake among those who had a complication during the antepartum or intrapartum period was lower.

“.....In PNC we have problems, as we have sensitised people to go for institutional delivery but did not inform them about postnatal care. They do not come to us unless they face problems. PNC is very minimal. In my service period, no one has come with PPH; 2-3 cases of retained placenta have come within 36 hours of delivery. Others come with urinary infections and diarrhoea. Only a few women have come for PNC service and that also only in the district hospital. We do not have good data for all places.....”

- Service provider, Jumla

“...I did not go to the health post. They did not ask me to come. They told me to come if any complication arose. They told me to come if I had problem with my back and if I bled a lot. That sister gave me those suggestions. I did not have that problem. She had told me to come to PHCC if I have severe problem. I did not bleed a lot so there was no need for me to go...”

- Woman with complication, Baglung

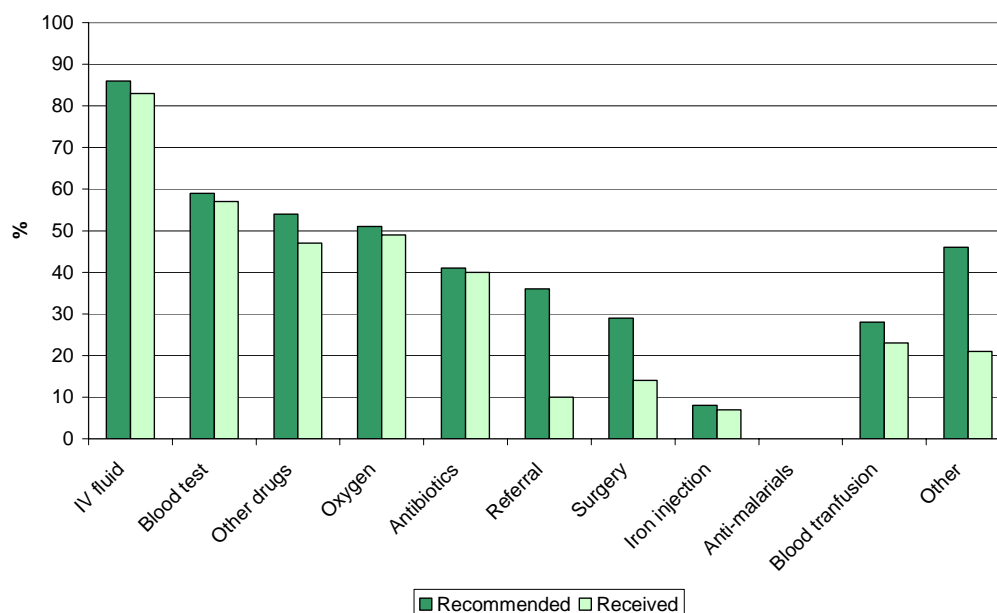
It is more common for women to be concerned about having a nutritious diet and rest during the postpartum period. Family members often gave women support during this time.

Table 7.11 shows the interventions received during the postpartum period by those who died from maternal causes. Forty percent of those who died in hospitals had a blood transfusion. Thirty eight percent of all maternal deaths to usual residents had IV drips.

Table 7.11: Interventions Received During the Postpartum Period by Those Who Died from a Maternal Death

Interventions received	All maternal deaths to residents of study districts		All maternal deaths in hospitals in study districts	
	Number	Percent	Number	Percent
Blood Transfusion	14	13.2	12	40.0
Laparotomy	-		4	13.3
Hysterectomy	1	0.9	3	10.0
Exploration	-		2	6.7
Manual removal of placenta	6	5.7	2	6.7
Episiotomy	2	1.9	-	-
IV drip	40	37.7	-	-
Injections				
Tetanus toxoid (TT) injection	11	10.4	-	-
Iron injection	3	2.8	-	-
ICU ventilator used	-		2	6.7
Total	106	100.0	30	100.0

Figure 7.1: Treatments Recommended and Received Prior to Death by Women Who Died from Maternal Deaths



7.7 Referral

Out of 57 women who died in a hospital in the eight study districts, over a third (35%) self-referred to the facility where they died; just under a third (30%) were referred from government health facilities (21% from a hospital; 7% from a private facility; 5% from a PHCC and 4% from a Health Post); 7 percent were referred from a private facility and just 1 case was referred from a NGO or missionary facility (Table 7.12). In 14 cases the informants did not know where the deceased was referred from. Nearly a quarter of the deceased women were referred by a doctor (23%); 7 percent by an ANM or staff nurse; just one by a TBA or FCHV and one by a quack. A referral slip is known to have been given to 43 percent of those who were referred.

Table 7.12: Referral Details for Hospital Based Maternal Deaths

Referral	Number	Percent
Not referred	20	35.1
Place referred from		
Government Hospital	12	21.1
Private Facility	4	7.0
PHCC	3	5.3
HP	2	3.5
NGO/Missionary Facility	1	1.8
Don't Know	15	26.3
Referred by		
Doctor	13	22.8
ANM/Staff Nurse	4	7.0
TBA/FCHV	1	1.8
Quack	1	1.8
Don't know	1	1.8
Referral slip given		
Yes	16	28.1
No	6	10.5
Missing/Don't know	15	26.3
Total	57	100.0

Failure to refer to an appropriate facility causes further delay to treatment and poses a serious threat to maternal mortality. Precious time is often wasted while patients are transferred between facilities without being treated.

"I went to the health post for check-up and they said I needed to do a video x-ray [ultrasound]. Then we went to the Koshi Zonal Hospital to get my video x-ray done. Then people there said that the video x-ray is not done when the baby is about to be delivered and then they sent us back. They even shouted at us. They gave me medicine and told me to keep on eating the medicine but they said I didn't need to get a video x-ray done. Then I came back and told the doctors and nurses that I had gone to get my video x-ray but they said that I didn't need to do it and that they even shouted at us then they said what kind of doctors are there. They should have told us not to come in the first place. My husband bought the saline water and injections and after buying all of that they started to say- where will you have the baby, we don't even have a place to do the delivery nor do we have the materials required. Then we really got angry and went to the community clinic."

- Woman with complication

7.8 Changes in Maternal Health Care Seeking Behaviour

Study participants felt there have been considerable changes in maternal health care seeking behaviour among the women over the last ten years. The practice of seeking care from traditional faith healers is declining though not entirely absent. Changes have been most pronounced for antenatal care and for women experiencing complications.

"..... Yes, I have noticed change. Earlier people were not interested in antenatal check up but now their husband or mother in law bring them for antenatal check up. Nowadays they bring the pregnant woman to the health institutions if they have prolonged labour. This is also a change isn't it....."

- Service provider, Baglung

"..... The women did not go for check-ups before. These days they go every month. They take tablets and injections. Doctors also come to villages from health-posts to do check-ups. These days women are taken to hospitals for delivery and in the case of complications. Rs. 1,500 is given after the delivery but I have not received it yet..."

- Woman with complication, Rasuwa

"Earlier, they didn't visit every house. These days they visit every house and asks you to go for check up, take medicine and also tells you the pros and cons of doing such things. If you do it then it will be good for the baby. They talk about these things. Earlier, they didn't talk about all these things. Things have become more developed, people have become more understanding and educated. That could be the reason. People listen to radio and watch advertisements on television. Most of the household have a TV. People have been influenced due to that as well. People have learnt that they have to go to get service. I think that is also one of the reasons."

- Woman with complication

Despite the notable increase in the utilisation of antenatal care, change has been less dramatic for delivery practices. Generally women are increasingly aware of the advantages of delivering in a health institution and of having a skilled attendance at the birth, but this is not necessarily translating into practice. However, some positive changes have been observed.

"..... Institutional delivery is the 'best' and it will be good and is safe as well. But still in our villages there are lots of home deliveries because of culture, religion. Earlier deliveries used to be conducted by TBAs but that tradition has already declined a lot. To conduct home delivery FCHV and health workers also go which is safe. But home delivery should be minimised and the institutional delivery needs to be increased. The institutional

delivery is increasing as incentive is being given both to health workers and to the women. We need to increase this trend....."

- District level key stakeholder, Kailali

As previously noted, results revealed continuing low postnatal service utilisation, even among women who experienced complications during delivery. Generally postpartum care is not considered important and women visited health facility or provider only in event of complication during postpartum period.

".....Women go for postnatal care services only for complication of mother or baby. Those who had gone for institutional delivery, go there for check-up. Otherwise, no one goes there....."

- FGD participant, Rupandehi

".....Actually, I don't understand PNC. The reports are coming to us as they have to report but I don't believe it and I don't think there is PNC service. They are just reporting it because they have to report it. They are showing first visit, second visit, and third visit. I don't think any health worker goes to the women's house and examines them in 6 hrs, 6 days and 6 weeks and likewise women's also do not come to our health facility in 6 hrs, 6 days and 6 weeks. I don't know where the report comes from and only the person who makes it knows (laughing and smiling)...."

- District level key stakeholder

Respondents cited different reasons for changes in the uptake of maternal health care services. The major reason pointed out by most respondents was increased awareness among members of the community. Various initiatives are perceived to have had a beneficial impact in influencing women to seek formal care, including mobilization of FCHVs; women's groups; the maternity (safe delivery) incentive scheme; local birthing centres; increased number of health posts.

".....The awareness level among general people has increased. District Public Health Office has made the public aware. At peripheral levels, through FCHV, mothers group meeting, the public has been made aware that if you go to a hospital, you will get good service and you will receive Rs.500. Because of all these things there is increase in use of delivery service...."

- District stakeholder, Sunsari

".....Government trains the FCHVs and they are sent from the health post in our community to let us know what to do. This is from foreign aid; not from government It is due to free health care services Everybody goes there for check up, injection and takes medicine if we don't have to pay for it. If we have to pay then it would be useless. Due to free services such changes have occurred (everybody said)....."

- FGD participants, Rasuwa

7.9 Summary of Findings

The low social status of women limits their decision-making power regarding care seeking, and can result in a fatal delay. Although many women prefer to deliver at home, and decide to do so themselves in anticipation of a normal delivery, in the event of a complication many people are usually involved in the decision-making process surrounding seeking care at a facility and assess the severity of a complication, finance and logistics.

If the woman is referred from one facility to another, the decision to take her is not straightforward and again is dependent on the agreement of family members after considering cost, availability of transport and who will accompany her. The final decision often rests with husbands and mother-in-laws but service providers, birth attendants,

other family members, neighbours and the women themselves play a part. Many women receive support from their husbands during pregnancy, namely in doing household chores; providing nutritious food; offering advice about taking rest and avoiding heavy work; and accompanying women to health facilities. Furthermore, they played a crucial role during an emergency in seeking assistance at home; arranging stretchers or other forms of transport and in overall decision making. Care was often received from mother-in-law and other female relatives around the time of delivery and neighbours frequently play an important role in seeking assistance at home, making transport arrangements to facilities and accompanying women to facilities.

Self care during pregnancy is important to women and many women and their families are becoming more conscious about their well-being during pregnancy and are taking more care of their health during this period. Women are also increasingly aware of the availability and importance of antenatal care and this increased awareness is translating into increased service utilisation. However, traditional beliefs, such as pregnant women being forbidden from crossing rivers or going out of the house after labour pain starts, still exist in some communities and thus prevent them accessing care.

Most women prefer to deliver at home, largely perceiving home deliveries to be safe, and often only seek care from a facility if they have complications. Reasons for preferring a home delivery include convenience, availability of clothes and food, shyness and lower cost. The overwhelming reason for women who suffered from a maternal death not delivering in a facility was because they did not want to (70%), and one third of women did not see a need to (33%). Over-coming financial and distance barriers were less of an issue, just reported by 12 percent of respondents. Despite a traditional preference for home deliveries, many are positive about institutional deliveries, viewing them as safe and equipped to handle complications if the need arose. Twelve percent of women who died from maternal causes were advised to deliver in a facility in order to receive better care. Just under one third of women died from maternal causes during or after delivery delivered in a facility (32%) and 36 percent were delivered by a formal care provider. While 52 percent delivered in their own home or that of a relative, and 24 percent had a friend or relative assist, 12 percent a TBA and nearly one-fifth had no one (18%).

Women generally do not seek postpartum care unless they have a complication. The main reasons for not seeking postnatal care include lack of understanding of its importance; providers failing to emphasise this during antenatal care or childbirth; and a lack of availability of postnatal services.

Overall there have been considerable changes in maternal health care seeking behaviour among the women over the last ten years: seeking care from traditional faith healers is declining though not entirely absent and increase in service utilisation has been most pronounced for antenatal care and women experiencing complications. However, change has been less dramatic for delivery and postpartum care. Women are increasingly aware of the advantages of delivering in a health institution and of having a skilled attendance at the birth, but this is not necessarily translating into practice.

7.10 Discussion

Global evidence indicates that maternal health care seeking is dependent on a complex mix of factors operating at individual, family and community level on both supply and demand sides, and addressing one without the other is unlikely to have a significant effect on increasing uptake of services (Ensor & Cooper 2004). On the demand side, cultural traditions, the physical environment, social norms and the status of women are major

influences, which may even override changes that might be expected to result from improved availability and quality of services, even when women and their families know about these services. In Nepal there is a strong tradition of home delivery, as first choice of women and their families (Devkota et al. 2006). This is an outcome of the practicalities of cost, geographical terrain (which is extreme in parts of Nepal) limited availability of transport and negative perceptions of the quality of formal health care services. It is also strongly linked to religious traditions and beliefs, including issues around ritual pollution associate with childbirth (Devkota et al. 2006), social practices and the low status of women. International studies have shown that women who are more educated and have their own income are more likely to access maternal health care services, largely because of their increased decision-making power within the household (Matsumura & Gubhaju 2001; Shen & Williamson 1999). Programme experiences in Nepal, as a predominantly Hindu society, also show that traditional religious practices and beliefs associated with pregnancy and childbirth pose significant barriers to utilisation of formal health care. Since Hinduism is caste-based and hierarchical, social exclusion is also a barrier, with low caste women, or those from ethnic groups, facing discriminatory behaviour from providers when they seek do services (World Bank & DFID 2006).

In recent years access issues have been addressed through a variety of interventions, chief among which are community level social mobilisation and awareness raising, through women's groups and other local bodies; increased mobilisation of Female Community Health Volunteers (FCHV); and the Safe Delivery (or maternity) Incentives Programme, which provides a cash incentive to help meet the costs of travelling to a health facility for delivery. This has more recently (since the study period) been expanded to include free delivery care.

Factors operating on the supply side include women's past experiences with health services; availability of alternative health care providers (formal or informal); and their perceptions on the quality of the services. Studies confirm limitations in both availability and quality of services as an obvious barrier to utilisation (Campbell & Graham 2006), especially among poor, low caste and less educated populations and those in remote areas, as they have fewer options, being less able to access services at the district centre or pay the cost of better quality private services. For these women, the key to uptake is the availability of user-friendly local services. Recognising this factor, the Nepal government has recently initiated a programme of to develop more local 24-hour birthing centres attached to health posts and staffed by locally recruited female skilled birth attendants able to manage normal deliveries and identify, stabilise and refer complications to higher level emergency care centres. Interventions to improve quality of care, at both peripheral and higher level facilities, include infrastructure development; a major national skilled birth attendant training programme prioritising Auxiliary Nurse Midwives (ANM) in rural areas; and an appreciative inquiry based review and planning process to improve health facility management and expand service availability and improve quality. An important aspect of this last approach is the inclusion of all stakeholders in the process, including community representation, in order to generate local ownership and trust in services.

The effectiveness and speed of the referral system is another factor influencing care seeking (Murray & Pearson 2006), since it affects the confidence of users in formal health care services and the likelihood that they will go to a local health facility, rather than bypassing them and perhaps self-referring inappropriately, and accept the advice of the referring facility if necessary. Efforts to develop this include improved communications between different levels of facility and links with transport and emergency funds to promote rapid response in an emergency.

CHAPTER 8: QUALITY OF MATERNAL HEALTH CARE



8.0 Introduction

This chapter explores the quality of maternal health care in the study districts. Quality of care is a particularly important consideration in an assessment of maternal health services. It delineates the effectiveness of supply by demonstrating whether provision is responding appropriately to demand for services. Since the quality of care received by pregnant and delivering women will be a factor in the formulation of their perceptions of the health service, it is an equally important factor in determining that demand. Quality of care can be broadly divided into the enabling environment (services, drugs, equipment) and of personnel (staff behaviour, competency and availability). Table 8.1 outlines the basic sets of health care interventions that should be available at CEOC and BEOC facilities.

Table 8.1: Functions of Basic Versus Comprehensive EOC Services

Basic Services (CEOC & BEOC Facilities)	Comprehensive Services (CEOC Facilities)
1) Administer parenteral antibiotics (injection or intravenous infusion)	Perform signal functions 1-7, plus
2) Administer uterotonic drugs (i.e. parenteral oxytocin ^a)	8) Perform surgery (e.g., caesarean section)
3) Administer parenteral anticonvulsants for preeclampsia and eclampsia (i.e. magnesium sulphate).	9) Perform blood transfusion
4) Manually remove the placenta	
5) Remove retained products (e.g. manual vacuum extraction, dilation and curettage)	
6) Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	
7) Perform basic neonatal resuscitation (e.g., with bag and mask)	

A basic emergency obstetric care facility is one in which all functions 1-7 are performed.

A comprehensive emergency obstetric care facility is one in which all functions 1-9 are performed. A recent WHO technical consultation (November 2008) to develop guidelines for interventions for postpartum haemorrhage, reviewed all available evidence, and identified parenteral oxytocin as the recommended choice of drug for prevention of post-partum haemorrhage. Ergometrin (second line) and misoprostol (third line) as options that could only be used where oxytocin is not available. Oxytocin should therefore be available in facilities to be defined as providing EOC.

Source: WHO, 2009. *Monitoring emergency obstetric care: A handbook*. Geneva: World Health Organisation

In Nepal services for women who are pregnant are delivered in three main service settings CEOC centres, BEOC centres and Birthing Centres (BC). The quality of care provided at CEOC, BEOC and BC facilities in the study districts was assessed by obstetricians and midwives using facility and staff competency assessment tools. Some additional information about quality of care is provided by the EOC morbidity monitoring data. Furthermore, perceptions of quality of care were discussed in focus group discussions with women in the community who had given birth during the last ten years; in-depth interviews with women who had pregnancy related complications in past two years; in-depth interviews with service providers (both formal and informal); and in-depth interviews with key stakeholders.

8.1 Facilities

8.1.1 Provision of Services

8.1.1.1 Obstetric Services

Table 8.2 shows the percentage of facilities providing various obstetric care services and whether the service was provided 24 hours a day, seven days a week. The facilities performed well regarding the availability of antenatal, postnatal and routine delivery care. However, at BEOC facilities and birthing centres there is a need for improvement in regards to manual removal of placenta and assisted vaginal deliveries. In regards to the CEOC facilities assessed, the main problem was that although they all had operating theatres, caesarean section, blood transfusion and anaesthesia, one facility did not have twenty four hour services (Jumla - which ceased being a CEOC during the study).

Table 8.2: Availability of Obstetric Services (excluding abortion) by Type of Health Facility

Obstetric services	Health facilities providing obstetric services (%)					
	Service available			Available 24 hours 7 days a week		
	CEOC	BEOC	BC	CEOC	BEOC	BC
Antenatal care	100.0	100.0	100.0	20.0	9.1	22.7
Postnatal care	100.0	100.0	100.0	80.0	90.9	50.0
Routine delivery care	100.0	100.0	90.9	100.0	100.0	86.4
Manual removal of placenta	100.0	81.8	54.5	100.0	72.7	50.0
Assisted vaginal delivery: Vacuum Extraction	100.0	45.5	9.1	100.0	45.5	4.5
Assisted vaginal delivery: Forceps	40.0	0.0	NA	40.0	0.0	NA
Laboratory	100.0	90.9	36.4	90.0	27.3	18.2
Operating theatre	100.0	NA	NA	90.0	NA	NA
Caesarean section	100.0	NA	NA	90.0	NA	NA
Blood transfusion	100.0	NA	NA	90.0	NA	NA
Anaesthesia	100.0	NA	NA	90.0	NA	NA
Ultrasonography	100.0	NA	NA	60.0	NA	NA
Total facilities assessed	10	11	22	10	11	22

The availability of obstetric services varied considerably in the eight study districts. The availability of obstetric services is better in the Terai districts than the hill and mountain districts. Availability of services in the mountain district of Rasuwa was very poor with no facilities offering forceps, vacuum or caesarean section deliveries. Furthermore, the district lacked ultrasound, induced abortion care, post abortion care, x-ray facilities, a laboratory and an operating theatre. In the other mountain district, Jumla, the district hospital had a well equipped operating theatre and blood transfusion facility but the availability of caesarean services were dependent on the posting and availability of a MDGP or an obstetrician/gynaecologist. Not all hospitals with an operating theatre provide caesarean services, for instance, the district hospital in Rupandehi, has an operating theatre but the caesarean service was not available due to unavailability of a MDGP or an obstetrician/gynecologist and an aesthetician. The availability of manual removal of placenta (MRP) was largely determined by the presence of a trained human resource.

8.1.1.2 Family Planning Services

Access to family planning services is crucial for reducing unwanted pregnancies and enabling spacing between pregnancies reducing the number at risk of maternal deaths. This report has already shown that for many of the women who died from a maternal causes the pregnancy was unwanted, especially among older women, where the MMR was

so high. Table 8.3 shows the availability of family planning services by type of facility. In regards to the CEOC facilities the main problem was that at least one facility never provides postpartum or postabortion family planning, and more than one facility either never or just sometimes offering IUD, Norplant, minilap or vasectomy, with AMDA in Rupandehi not offering any of these. Twenty seven percent of birthing centres never provided post abortion family planning services.

Table 8.3: Availability of Family Planning Services by Type of Health Facility

Family planning services	Health facilities providing family planning services (%)								
	CEOC			BEOC			BC		
	Always	Some-times	Never	Always	Some-times	Never	Always	Some-times	Never
Post partum FP services	90.0	0.0	10.0	72.7	27.3	0.0	77.3	13.6	9.1
Post abortion FP services	90.0	0.0	10.0	72.7	9.1	18.2	50.0	22.7	27.3
IUD	60.0	30.0	10.0	54.4	18.2	27.3	13.6	13.6	72.7
Norplant	30.0	40.0	30.0	63.6	9.1	27.3	9.1	13.6	77.3
Minilap	40.0	50.0	10.0	0.0	18.2	18.2	NA	NA	NA
Vasectomy	50.0	30.0	20.0	0.0	18.2	18.2	NA	NA	NA
Total facilities (n)	10			11			22		

8.1.1.3 Abortion Services

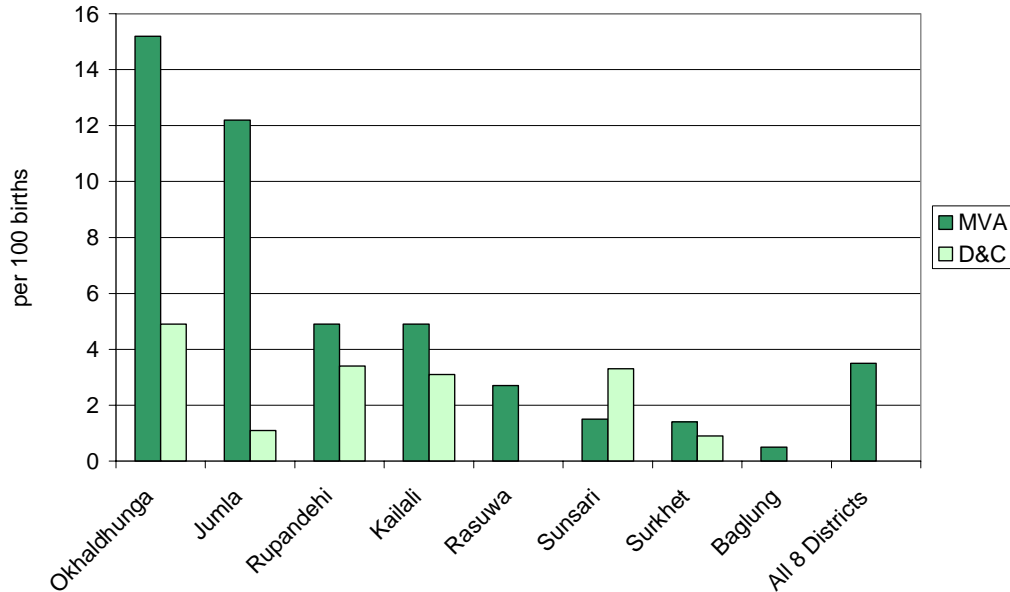
Table 8.4 shows the availability of abortion services by type of health facility. In Okhaldhunga the main hospital is a faith-based Mission hospital run by UMN, and despite officially being recognised as a CEOC site it does not provide post or induced abortion care. Therefore, currently the PHCC in Rumjatar is the only facility that offers MVA service in the district. Furthermore, two other CEOC facilities were not providing first trimester abortion care. The level of abortion services offered at BEOC facilities is very low, with just one-third offering first trimester induced abortion services and two-thirds offering post abortion care. No CEOC facility provides second trimester induced abortion services.

Table 8.4: Availability of Abortion Services by Type of Health Facility

Abortion services	Health facilities providing obstetric services (%)					
	Service available			Available 24 hours 7 days a week		
	CEOC	BEOC	BC	CEOC	BEOC	BC
Post abortion care (MVA)	90.0	72.7	13.6	90	63.6	13.6
1 st trimester induced abortion	70.0	36.4	9.1	30	18.2	4.5
2 nd trimester induced abortion	0	NA	NA	0	NA	NA
Total facilities assessed	10	11	22	10	11	22

Figure 8.1 shows the rate of manual vacuum aspirations (MVA) and the rate of dilation and curettage at EOC facilities, from the EOC morbidity monitoring data. The overall rate of manual vacuum aspiration at all EOC facilities in the eight districts was 4 per 100 births (Figure 8.1). The highest rates were in Okhaldhunga (15 per 100 births) and Jumla (12 per 100 births) while the lowest were in Surkhet (1 per 100 births) and Baglung (0.5 per 100 births). In Okhaldhunga the only facility providing CAC was Rumjatar PHCC. The overall rate of dilation and curettage at all EOC facilities in the eight districts was 3 per 100 births. The highest rates were in Okhaldhunga (5 per 100 births) while no D&C procedures were performed in Rasuwa and Baglung. In Sunsari there were more D&C procedures than MVA, and Rupandehi, Kailali and Surkhet had high proportions of D&C.

Figure 8.1: Rate of Manual Vacuum Aspirations (MVA) and Dilation and Curettage (D&C) at EOC Facilities by District



8.1.1.4 Laboratory Services

Given the long distance between facilities, on-site laboratories are preferred. Some service providers complained that their facility's inadequate laboratory facilities: due to the lack of a 24 hour service or the lack of a laboratory altogether. This affects the timely detection of high risk conditions for pregnant women, such as eclampsia or low haemoglobin.

"...Sometimes there are caesarean section cases at midnight. At that time we carry out the operation blindly and it is so risky. We are unaware of the Hb level, HIV and other things..."

- Service provider, Kailali

Table 8.2 shows that, for the facilities assessed, one CEOC did not have laboratory services available around the clock, and that although many of the BEOC facilities did have laboratories very few were available for twenty four hours.

8.1.1.5 Twenty Four Hour Care

The availability of around the clock services is necessary for maternal health care. The timing of an event such as childbirth is unpredictable and women might require urgent assistance at anytime. Women reported that the closure of PHCCs at night time is prohibitive to seeking care. Unavailability of 24 hour care is a bigger problem for women in remote and mountainous areas, as they have fewer alternatives where they can seek care. Furthermore, the cost of seeking care at night is greater.

"... It's hard to get service, we don't know if (the staff) are there or not. Sometimes we have to return (home) after we come here and have to go to another place as the facility is closed..."

- A Dalit woman, Jumla

"...Some women need to be taken to the health post even at night. But, the health post is not open during night. In this condition, we have to take women to Butwal. In an emergency, transportation is not easily available and expenses are higher..."

- Informal provider, Rupandehi

"At the moment, normally and according to the government law health workers are there only from 10am to 4pm. For the remaining time of 18 hours there isn't anything. In terai (plain) region people can get an ambulance and even go to India for delivery but it is not the same in the mountains...."

- District stakeholder, Jumla

In contrast, data revealed that there has been an increase in the utilisation of maternal health services where health posts have started giving a 24-hour service. A service provider working in a health post after it started a 24 hour service in Surkhet shared his experience:

"...Over the past years, we used to work 10am-2pm in the health post. Now, Lekhgaun Health Post is considered to be providing 24 hours delivery services. Definitely there are difficulties in providing 24 hour service. We have to be on duty even at night. Before, we used to close the health post at 2pm. Now, we have to stay there after 2pm in case of delivery cases arrive. In comparison with the past years, utilization of the health post services has been increasing...."

- Service provider, Surkhet

Tables 8.2, 8.3 And 8.4 highlight the problem that many lower level facilities do not offer services on a twenty four hour basis, most importantly routine and assisted delivery care, manual removal of placenta, post abortion and first trimester abortion care and laboratory services.

8.1.2 Referral

An efficient and effective referral system is necessary to provide quality maternity care. A well coordinated and responsive referral system plays a crucial role in averting maternal deaths and reducing maternal morbidity. The efficiency of referral procedures adopted at the time of a maternal emergency can determine the maternal health outcome.

Comments from service providers and key stakeholders, suggests that in a lot of instances the referral system is not functioning effectively. Service providers acknowledged that in many instances patients are not referred in a timely manner; referred to an inappropriate facility; and that they had no clear mechanism for following up of clients once they are referred to another facility. Factors preventing an efficient referral system included a lack of awareness among those accompanying patients; lack of money; lack of transportation between facilities; no established referral mechanism between facilities; no referral slips; inadequate information on referral slips; and lack of a support system.

".....Firstly, they (patient party) don't understand the reason why we refer them... and it is quite difficult to convince them. And even if we are successful in convincing them, they are reluctant to go because of the economic reason...."

- Service provider, Rasuwa

"...We had to face a lot of difficulties while referring this case after delivery... The delivery was conducted properly but later she kept bleeding. We sent her to Dharan where she was given three pounds of blood... While she was bleeding heavily, we did our level best; we injected Syntocin, gave her a double dose, and also put her on saline... Later, I started feeling that we should have sent her earlier but we did only after delivering the baby. What to do? Such things happen sometimes...."

- Service provider, Sunsari

Service providers acknowledged a gap in communication between facilities when patients are referred. There is no standard practice of a referring facility checking with referral facilities whether they were able to provide the necessary care for a patient, and thus prevent multiple transfers and patients wasting time and resources. There is no routine process of informing a referral facility a patient had been transferred; what complications to expect and when to expect them, to enable the referral facility to make the necessary arrangements. Likewise, there is no practice of giving feedback from the referral facility to the referring facility.

".....In general, a health institution should give feedback to the health institution after a referral slip is sent. For example for a case referred to the regional hospital, it should give feedback to the referring institution what it did with the patient. However, it is not done in practice. There is only one way referral system. Actually referral should be a two way system. This institution should inform the referring institution that it has accepted the patient. But it is not in practice. Re-feedback is very important."

- Service provider, Surkhet

"..... follow up of the referral patient is limited to paper only. A client comes from the health post and we should write back to them, but there is no environment and we don't have time either. Paramedics and the sister are also busy and we also don't remember (to write back).....there is problem for us, like how to send (feedback) and through which medium...."

- Service provider, Kailali

There are a few instances where the referral system functioned well, and these facilities set good examples for others. Good examples include staff accompanying women during the referral; arranging referral transportation and informing a facility that a patient is on her way. One example included a Mission Hospital so it may not be possible to replicate their practices among all government facilities.

"... we write on the referral sheet that she is having contractions at certain times, and which complication she has, and she is referred to the Mission (hospital). We directly call the vehicle of the Mission hospital and they clear her bills here and the vehicle will arrive, or if there are many people they will carry her...."

- Service provider at PHCC, Okhaldhunga

The facility assessment aimed to assess the obstetric complications referred to and from the selected facilities (Table 8.5). However, overall record keeping of referral cases was poor in a large proportion of the facilities assessed, which is a key finding in itself. Most interesting is perhaps referrals from CEOC facilities. Referral from Jumla is understandable as Jumla during our study period ceased to function as a CEOC due to lack of trained doctor. Referrals from Baglung district level CEOC facility were to the better equipped regional level facility in Pokhara, Kaski district, and from the Kailali district to the better equipped Kohalpur Medical College, Banke district. Less understandable are CEOC facilities in Rupandehi, where there is cross referral between CEOC's within the district.

Table 8.5: Number of Obstetric Complications Referred to and From Selected Health Facilities

Referrals	Referrals to and from health facilities (%)		
	CEOC	BEOC	BC
No. of referrals in (last year)	84	84	0
No. of referrals out (last year)	37	37	209
No. of referrals in (last month)	5	5	0
No. of referrals out (last month)	4	4	33
Total facilities assessed (n)	10	11	22

8.1.3 Building

The facility is fundamental to providing an enabling environment for high quality maternity services. Discussions revealed that most interviewees regarded government health facilities as unsatisfactory. Most service providers interviewed, especially those working at health posts and PHCCs, feel that the condition of the building is poor; the number of beds is insufficient; there is a lack of basic amenities (such as water, sanitation, heating and electricity); and staff quarters (including washroom facilities) are inadequate. Furthermore, most service providers said that the provisions of support services, such as ambulances, are largely absent. Service providers working at PHCCs and birthing centres reported conducting deliveries without adequate lighting. The condition of the facility, and lack of heating in particular, results in women opting to stay at home for delivery.

"...Because of lack of light in the facility, there is difficulty in conducting delivery especially the cases brought at night time. How can we conduct delivery with a kerosene light (tuki)?..."

- Service provider, Jumla

"...This is a cold place and people don't come here as they don't get to sit near the fire..."

- Service provider, Rasuwa

The facility assessment collected information on variables related to the facility infrastructure. Table 8.6 presents the percentage of health facilities with the essential infrastructure by type of facility. Twenty percent of CEOC facilities did not have an ambulance or vehicle for emergency transportation.

Table 8.6: Availability of Essential Infrastructure by Type of Facility

Essential infrastructure	Health facilities with essential infrastructure (%)		
	CEOC	BEOC	BC
Electricity	100.0	100.0	72.7
24 hour power backup system	100.0	81.8	50.0
Running water	100.0	72.7	68.2
Drainage system	90.0	63.6	22.7
Toilets in the facility	100.0	90.9	95.5
Toilets in labour room	80.0	9.1	22.7
Telephone/radio transmitter	100.0	72.7	54.5
Telephone in delivery ward	60.0	9.1	NA
Oxygen back up	100.0	72.7	44.4
Emergency light	100.0	90.9	54.5
Drinking water	100.0	90.9	77.3
Ambulance/vehicle for emergency referrals	80.0	36.4	4.5
Ambulance with resuscitation set and trained personnel	10.0	NA	NA
Total facilities assessed (n)	10	11	22

Space

Many providers said that it is difficult for them to offer high quality services because space is limited and congested. Some service providers voiced their concern that due to the lack of space it is difficult for them to maintain privacy and confidentiality while providing services. The utilisation of facilities has increased over the years, but in many instances the size of facilities has stayed the same.

"... We don't have beds for delivery and the existing beds are all covered with rust..."After an operation we put (women) with others in the postnatal ward as we lack a separate room for the C/S cases, there is only one room. There are many visitors and we are fearful about patients who had operations catching infections...."

- Service provider, Baglung

"...Our hospital was constructed 30-40 years ago and now the population has already doubled or tripled. The number of persons per bed is already three or five times higher. That means instead of one bed we need three or five beds. So what I am trying to say is that physical facilities should be based on the number of patients. If there were 25 beds earlier now there should be 100 beds in the hospital. Otherwise, how will it be sufficient? ..."

- Service provider, Kailali

"...There is no space where we could talk in privacy. After PNC, we have to advise those (clients) on those temporary (family planning) devices. We have to talk to them in privacy but we have only one hall and we have to talk to them with other people around. Because of that, (patients) are not willing to tell you everything.... We can't ask people to go out (of the room)..."

- Service provider, Rasuwa

The facility assessment findings related to space (Table 8.7) suggest the CEOC could improve the privacy given to patients, as only 60 percent had a separate labour/delivery room and only 40 percent had curtains in the delivery room. Eighteen percent of the BEOC and 27 percent of birthing centre facilities did not even have a delivery bed.

Table 8.7: Availability of Rooms/Beds by Type of Facility

Rooms/Beds	Health facilities with rooms/beds (%)		
	CEOC	BEOC	BC
Separate labour/delivery room	60.0	81.8	59.1
Waiting room	80.0	27.3	63.6
Private examination room	6.0	54.5	81.8
Counselling room	50.0	18.2	22.7
Delivery bed	100.0	81.8	72.7
Curtains in delivery room	40.0	9.1	31.8
Total facilities assessed (n)	10	11	22

Cleanliness

Some women who had visited health facilities complained about the lack of cleanliness in facilities.

"... Beds are dirty, and rooms are not good and dirty as well. The bed where the delivery is done is not clean and has blood on it. So the beds are very dirty...."

-Brahmin women, Rasuwa

"...There wasn't anything good. The beds were sloping downward and high up. The sheets were dirty and it was cold. I didn't find the place good. The toilet was dirty. It didn't even have a latch to lock the door...."

- A woman with prolonged labour in her last pregnancy, Sunsari

Table 8.8 shows the availability of waste disposal at facilities. All CEOC facilities and 96 percent birthing centres had sharp disposal units, however, only 91 percent of BEOC facilities did. Hundred percent of CEOC facilities, but only 82 percent of BEOCs and BCs, had either a burial pit, incinerator or burning pot.

Table 8.8: Availability of Waste Disposal by Type of Facility

Waste disposal unit	Health facilities with waste disposal (%)		
	CEOC	BEOC	BC
Sharp disposal container	100.0	90.9	95.5
Burial pit/Incinerator/Burning pot	100.0	81.8	81.8
Total facilities assessed (n)	10	11	22

8.1.4 Essential Drugs, Equipment and Registers

The routine availability of on-site drugs, supplies and functioning equipment, are essential to the delivery of high quality care.

Drugs

There were mixed reports regarding drug supply, and this was largely related to the type of drug. There were positive reports regarding supplies of albendazole, iron tablets, and tetanus toxoid injections, however, the supply of other essential drugs for maternal health care (such as oxytocin and magnesium sulphate) are reported as being irregular and inadequate. The lack of drugs often means that the burden of procuring the necessary medicines often falls on the clients, thus increasing the cost and delaying care. There is a definite need to improve the drug procurement process within government facilities to ensure essential drugs are always available on-site

"...We need syntocin, injection and many more, we still don't have emergency drugs with us. We have to get it from the medical. If she (client) has to get it from medical then it becomes a burden for her. ... We don't have emergency drugs. We receive around 10 synto packs and that is not even sufficient for 1-2 cases....."

- Service provider, Surkhet

"..We don't have enough medicines here and we don't even have gloves. And we don't have antibiotics to give them after delivery..."

- Service provider, Baglung

The facility assessment documented the availability of essential drugs in stock at the time of visit and also enquired about any stock-out for longer than two weeks in the last twelve months (Table 8.9). The drugs assessed included antibiotics, anti-hypertensives, anti-convulsives or sedatives, antidote of magnesium sulphate, oxytocics, IV fluids, analgesics and disinfectants/antiseptics. Stocks of essential drugs varied considerably by type of drugs and the type of facility.

With regard to essential antibiotics, 30 percent of CEOCs and 18 percent of BEOCs had a stock out of ampicillin for longer than two weeks in the last twelve months. Magnesium sulphate is an effective anticonvulsant recommended as the drug of first choice by WHO for treating pre-eclampsia and eclampsia, (Duley, L. et al. 2004) and is on the WHO essential drug list. However, at the time of visit it was only in stock in 73 percent of BEOCs and just 18 percent of birthing centres. Furthermore, 10 percent of CEOCs and 27 percent of BEOCs had a stock out for longer than two weeks in the last twelve months.

Table 8.9: Availability of Essential Drugs by Type of Facility

Essential drugs	Percentage distribution of health facilities by availability of selected essential drugs					
	Available in stock at the time of survey			Stock out for longer than 2 weeks in last 12 months		
	CEOC	BEOC	BC	CEOC	BEOC	BC
Antibiotics						
Ampicillin	90.0	72.7	36.4	30.0	18.2	54.5
Gentamycin	90.0	81.8	63.6	0.0	18.2	22.7
Metronidazole	100.0	81.8	95.5	0.0	18.2	9.1
Tetracycline 1% or silver nitrate 1% or Erythromycin eye ointment	20.0	54.5	54.5	20.0	27.3	27.3
Trimethoprim +sulfamethoxazole	50.0	72.7	81.8	20.0	18.2	13.6
Anti-hypertensives						
Nifedipine	90.0	36.4	27.3	0.0	63.6	36.4
Anti-Convulsives or Sedatives						
Magnesium sulphate	100.0	72.7	18.2	10.0	27.3	40.9
Valium/diazepam	80.0	81.8	68.2	0.0	27.3	4.5
Phenobarbital	50.0	63.6	27.3	0.0	45.5	45.5
Antidote of Magnesium Sulphate						
Injection Calcium Gluconate	60.0	63.6	4.5	0.0	36.4	72.7
Oxytocics						
Oxytocin	100.0	100.0	90.9	0.0	0.0	18.2
Ergometrine	80.0	90.9	50.0	0.0	9.1	13.6
IV Fluids						
Dextrose 5%	90.0	81.8	86.4	0.0	18.2	18.2
Normal Saline	90.0	100.0	100.0	0.0	0.0	0.0
Ringer's Lactate	90.0	100.0	100.0	0.0	0.0	0.0
Analgesics						
Paracetamol	90.0	100.0	100.0	0.0	9.1	0.0
Ibuprofen	90.0	90.9	90.9	0.0	9.1	9.1
Disinfectants/Antiseptics						
Chlorine	90.0	90.9	86.4	0.0	27.3	9.1
Surgical Spirit	100.0	100.0	100.0	0.0	0.0	0.0
Soap	100.0	100.0	100.0	0.0	0.0	0.0
Total facilities assessed (n)	10	11	22	10	11	22

The data reveals that shortages of essential drugs, both at the time of visit and in the last 12 months, were more prominent in terai districts. The terai experienced frequent bandhs (strikes) during this time period and this was reported as one of the main reasons for stock out. Sunsari was most adversely affected by the strikes, road blockades and agitations, and as a result a large proportion of facilities there reported stock outs. Eighty three percent of facilities had undergone stock out of Ampicillin in Sunsari. Likewise, about one quarter of facilities assessed in Kailali had experienced a stock out of essential drugs like antibiotics, anti-hypertensive and anti-convulsive during that period.

Equipment

The lack of equipment, and lack of routine maintenance of equipment when it is available, results in providers' skills being underutilised; increases the likelihood of patients being referred; and raises doubts among women in the community about the overall quality of care. Participants mentioned the need for ultra-sonography (USG), commonly referred to as 'video x-ray', at facilities because women often associated the availability of ultra-sonogram with good quality services.

"... First of all, (hospitals) are in short supply of the facilities to provide services. It is only possible to give complete services if those services are well equipped, isn't it? Even

though they are capable of giving their best, their skills are being underutilised due to lack of resources. Because of the lack of equipment and facilities, they are not able to give the services at an optimum..... We need to go somewhere else even for a small operation. They cannot provide the service here..."

- FGD participant, Baglung

"..They don't have a video x-ray [ultrasound] in the district to know about the position of the baby whether it is in the correct or incorrect position and lets not talk about the health post. There is nothing other than giving iron pills and giving TT injection ..."

- FGD participant, Jumla

"...There should be all equipments like video x ray [ultrasound], x ray machine and operation machine so that we could get all the services."

-Brahmin women, Rasuwa

There were many reports of a lack of essential supplies, with gloves, oxygen, USG machine, suction machine, autoclave, and stove frequently reported by service providers as being inadequate or unavailable, especially in peripheral facilities.

Table 8.10 shows the availability of selected essential equipments in the facilities assessed. All facilities assessed had stethoscopes, blood pressure apparatus, and thermometers. All CEOCs and BEOCs had autoclaves/steamers, storage cupboards, and delivery sets, and episiotomy/suture sets. One CEOC lacked a refrigerator, and one an MVA set. There was a big shortage of vacuum sets, MVA sets and forceps for delivery at the lower level facilities which may explain the lack of assisted delivery services. One third of BEOCs and two thirds of birthing centres lacked an oxygen cylinder.

Table 8.10: Availability of Essential Equipment by Type of Facility

Essential equipment	Health facilities with essential equipment (%)		
	CEOC	BEOC	BC
Stethoscope	100.0	100.0	100.0
Blood Pressure	100.0	100.0	100.0
Thermometer	100.0	100.0	100.0
Emergency crash card (Adult/neonate ambu bag, laryngoscope, E.T. Tube in different size)	90.0	81.8	27.3
Oxygen cylinder with regulator and flow meter	100.0	63.6	27.3
Autoclave/Steamer	100.0	100.0	90.9
Storage cupboard for drugs/supplies	100.0	100.0	95.5
Refrigerator	90.0	81.8	45.5
Delivery Set	100.0	100.0	90.9
Episiotomy Set/suture set	100.0	100.0	81.8
Vacuum Set	100.0	72.7	13.6
MVA Set	90.0	72.7	13.6
Forceps for Delivery	100.0		NA
Operating Theatre			
Table	100.0	NA	NA
Lamp	100.0	NA	NA
Trolley	100.0	NA	NA
Suction	100.0	NA	NA
Anaesthesia	100.0	NA	NA
Oxygen	100.0	NA	NA
Emergency lighting	100.0	NA	NA
Total facilities assessed (n)	10	11	22

Registers

The facility assessment check of availability of essential registers at the selected facilities revealed a good supply of maternity, antenatal care and family planning registers in all facilities, with the exception of the FP register in one CEOC facility and, with the exception of the maternity register in one birthing centre, there were no reports of being out of stock for longer than two weeks in the last 12 months (Table 8.11). There were more problems with birth certificates (only present in one third of BEOCs and BCs at the time of visit); and the partograph was only present in 80 percent of CEOCs and 73 percent of BEOCs. All facilities should have clinical management guidelines, however, the percentage of facilities actually having them on-site was very small.

Table 8.11: Availability of Essential Registers by Type of Facility

Essential registers	Availability of registers (%)					
	In stock at the time of visit			Stock out > 2 weeks in last 12 months		
	CEOC	BEOC	BC	CEOC	BEOC	BC
Maternity register	100.0	100.0	95.5	0	0.0	4.5
Antenatal care register	100.0	100.0	100.0	0	0.0	0.0
Family planning register	90.0	100.0	100.0	0	0.0	0.0
Birth certificate	100.0	36.4	31.8	0	27.3	59.1
Partograph	80.0	72.7	27.3	0	18.2	68.2
Clinical Management Guidelines	22.2	0.0	31.8	-	-	-
Operation register	100.0	NA	NA	0	NA	NA
Total facilities assessed (n)	10	11	22	10	11	22

8.1.5 Cost of Care

The anticipated direct and indirect costs of care deter many families from seeking care in the formal sector and prohibit women from receiving high quality care.

"... The main difficulty is that we need to pay. Yes, it costs. Service providers send those people without money back home ... We have to pay in government facilities, the same as in private (facilities) ... service providers say that they take only Rs. 25 in the government facility while private facilities take Rs.50. When we have to pay for medicines, it costs the same....."

- FGD with Dalit women, Rupandehi

The government of Nepal is in the process of implementing a maternity financing scheme to provide financial assistance to women having institutional deliveries, health care providers and institutions. It is important to note that many women felt that the provision of the maternity incentive is a big relief for women. These qualitative data were collected after the introduction of the Maternity Incentive Scheme, but before the introduction of free delivery care.

"Nowadays we are getting 1,000 rupees as an incentive for delivering at the health post. It is a great relief... Provision of money has helped women contribute to the delivery expenses."

- A Dalit woman, Baglung

Despite this intervention, our study revealed that the cost of reaching and receiving care is still a problem for many women. Most participants felt that if a health facility was far away, the transportation cost alone made the treatment too costly. All types of participants were of the opinion that the fear of incurring high expenses leads many women to have delivery at home without skilled personnel, and only seek care once a

complication occurs. An illiterate woman from Kailali, who was working as a labourer, had eclampsia during her last pregnancy explained how the cost of care nearly prevented her from having an institutional delivery.

"...When I was taken to Dhangadhi for delivery, they said baby is inverted. At that time, video x-ray [ultrasound] was taken and got operated. Initially, doctor of Health Post (MCHW) told me about my inverted baby, but due to the financial condition, I didn't go. My husband used to send me money time-to-time when he was out. There wasn't much money when he returned back.... How one can collect money once the labour starts?..."

- A woman from Kailali

"... Some people may be in a weak financial condition, so mother-in-laws and father-in-laws wait for the delivery at home and if the delivery couldn't be at home there won't be any other options other than taking to hospital. And again they will be thinking about the costs.... This is the main problem..."

- An informal provider, Okhaldhunga

Women revealed that the expectation of being transferred to a facility far away, and the costs associated with such a referral, deterred them from visiting their closest facility. The increased costs associated with referral include the cost for those accompanying patients of staying in a distant place for several days, transportation costs and treatment costs. These costs also made women and their families reluctant to visit referral facilities after being referred.

"...It costs us money so that is also a problem. They ask us a few things and tell us to go to places far away, such as Surkhet... We have a financial problem. ... Therefore, we feel that it is better to die rather than visiting that place...."

-Dalit women, Surkhet

"...I thought if I were to die then I would die because we did not have anyone at the hospital, no money and no one to look after us. Who is going to look after someone like us?"

- A woman who had retained placenta in the last pregnancy, Jumla

"...We have problem of (availability of) money, a stretcher and basket and we also need people to carry. We will need a lot of money to take women in labour to the hospital therefore it is convenient to deliver at home. We won't need a lot of money, it won't be necessary to search for people (to help carry our daughter?) so we won't have to give trouble to others. There will not be a need to search for a vehicle or make arrangements for money...."

- An informal provider, Baglung

8.1.6 Health Facility Management Committees

Overall, 88 percent of the health facilities visited for the facility assessment had management committees. This includes 90 percent of CEOCs, 83 percent of BEOCs and 91 percent of birthing centres. Five districts were reported to have management committees in all of the selected facilities (Okhaldhunga, Rasuwa, Baglung, Surkhet and Jumla). The facilities with no management committee included one CEOC - AMDA in Rupandehi.

8.2 Human Resources

8.2.1 Availability of Staff

The importance of care provided by a skilled birth attendant, working within an enabling environment (including an adequate emergency and referral system), is being increasingly recognised. Most of the study participants interviewed, including service providers, were

of the opinion that lack of human resources is a common problem, especially regarding senior providers and in remote areas. In some instances the number of sanctioned posts and staffing structure is out-dated, while in others the number and type of posts sanctioned is adequate, but many of these are vacant.

"...the population of Nepal has more than doubled in the last years. However, the organogram of our health care providers for district hospitals and various levels haven't changed. So, the capacity of district hospitals, for example, with two medical officers and few nurses - they are not able to deal with the increasing load of the patients and the types of patients that come to the health facilities...."

- National stakeholder

"..We don't have the full number of staff as per the posting. We are supposed to have 11 staff nurses but we have only 7 of them. And on top of that once they receive training there is the procedure for transfer, which inconveniences us even more, but still those of us that are here have been providing services."

- Service provider, Kailali

"...It would be better if staff posts were filled. Now, in this PHCC, three positions are there, but only I am working. One of the ANM, is in Kaaj in Rampur and one is in Rumjataar now."

- Service provider, Okhaldhunga

"..For the service providers, the difficulty is that we lack trained manpower, the sanctioned postings are not fulfilled, the work load is excessive and we have not been able to provide quality services."

- Service provider, Kailali

"Though our hospital is taken as BEOC and CEOC centre providing 24 hour service, and is preparing to be a Zonal hospital, we have to refer simple cases...This is because of lack of gynae doctors and (the fact that) we do not have senior level providers either."

- District stakeholder, Jumla

With many posts vacant, this increases the pressure on those who are in post. Thus these staff are often over-worked; unable to give patients the full attention they require; and sometimes have little choice other than to transfer them to another facility.

"....there aren't sufficient numbers of staff compared with case load. One to two staff will have to look at 50-60 cases. Sometimes there are even 100-150 cases. Therefore they have not been able to provide as much services as they are needed because the case loads are more...."

- Service provider, Kailali

The shortage of staff is exacerbated by staff absenteeism and retention due to providers living far from facilities; attending training; inadequate pay and benefits; lack of staff housing and being unmotivated due to high workload, obsolete staffing practices and frequent staff transfers. Frequent staff transfers also increase the likelihood of there being a mis-match between the services offered; available equipment; and staff in place with the necessary training. In these instances equipment or skills are redundant; resources wasted; and patients fail to receive the necessary care.

"... At present we don't have a person to operate the x-ray that we have with us. We also don't have well-trained doctors here and the one we have keeps on changing. If there were gynaecologists we would have learnt the things that we didn't know. Added to that, available doctors also keep on going for training. ..."

- Health service provider, Jumla

"... The main difficulty is that the specialists don't stay in the hospitals where caesarean section has to be performed. There is a lot of effort in that regard from the government but that still remains a big issue. They are looking for ANMs but they can't find enough. Human resources are not where they need to be. ..."

- National stakeholder

Some service providers don't feel confident in managing the complications or procedures that are expected of them. They complained that they had not received the necessary training to perform what is expected of them, and they lack back-up support because senior health providers and skilled health workers are often absent or over-worked. Furthermore, the high workload has a knock-on effect in regards to the service provided and the client-provider relationship. In regards to training, they also complained about the disparity in training opportunities.

"...We are unable to provide service as planned. If there was a gynaecologist we could provide service with confidence. We can't take risks; we don't put our hands inside in hurry. Our confidence would increase if we were trained. You can't take risks because if something happens to the patient and you have to refer that case and the plane never comes in time then the patient will die for sure. Because we don't take these risks, it is difficult for us..."

- Service provider, Jumla

"...A nurse has to do more or less (everything?) for ANC. Doctors do not do anything except checking the patient, all the work has to be done by nursing staff, including registering the names. This makes the service really complicated. In one place delivery is conducted and in ANC we sometimes fail to look after the patients properly. We don't even get to talk to them nicely due to over load. It creates difficulties when the nurse has to do everything..."

- Service provider, Surkhet

Service providers also raised concern about the lack of a supportive working environment for staff. A few said that unsupportive management and uncooperative attitude among other staff makes it difficult to provide a quality service.

"...Health workers that we have in health facilities are over loaded with work and to ask them to work extra...what I will say is when I give one responsibility to you, I cannot overload you with 3 other responsibilities. In that context if there is no supporting employer or institution then it is difficult to have increase in institutional deliveries..."

-National stakeholder

On a more positive note, where there were adequate numbers of skilled staff, they felt that it is easier to manage cases and are happier with the level of care they are providing.

"...The service here is very good. We are quite satisfied. We have an MBBS doctor around who handles cases if we have any problem. We try to solve their problem as much as we can. We refer cases only if we cannot deal with them.... There are no doctors in other facilities whereas we have 3 nursing staffs, a doctor, an H.A., and 2 CMAs here. That makes it easier to work here..."

-Service provider, Rasuwa

The lack of providers at facilities deters women from accessing these facilities in the future.

"... Before, I heard that (the hospital) was good and people from this community had said that they liked the services. So, I went there. But when I went there, there were no doctors. There were two young sisters and they didn't attend to me properly ..."

- A woman with complications in the last pregnancy, Rasuwa

“.. It hurt here (points at lower belly) and I went to health post for a check-up after I was unable to walk (anymore). I didn't meet the nurse on the day when I went there and then I didn't go (again) after that...”

- A dalit woman, Jumla

This facility assessment documented the availability of different health professionals in regards to sanctioned and filled posts, as well as their availability 24 hours a day (Table 8.12). The number of sanctioned posts is not necessarily adequate, and may be a reflection of demand in the past rather than current demand. In some cases the numbers of filled posts were actually higher than the number of sanctioned posts, this is due to additional posts being filled with local resources.

Table 8.12: Availability of Human Resource in the Facilities Assessed

Type of human resource	No. of facilities with posts sanctioned	Sanctioned posts	Filled posts		Facilities with all sanctioned posts filled		Facilities with at least one on duty for 24 hours	
	N		N	%	N	%	N	%
Obstetrician/Gynecologist	9	29	26	89.7	6	66.7	6	66.7
MDGP	3	6	11	183.3	3	100.0	3	100.0
Anaesthesiologist	8	23	23	100.0	7	87.5	7	87.5
Staff nurse	29	136	126	92.6	22	75.9	21	72.4
Health assistant	35	35	27	77.1	27	77.1	8	22.9
AHW	39	83	93	112.0	35	89.7	20	51.3
ANM	42	122	142	116.4	40	95.2	36	85.7
Lab technician	30	44	46	104.5	27	90.0	15	50.0
Radiologist	11	17	17	100.0	8	72.7	5	45.5
Pharmacist	4	6	5	83.3	3	75.0	1	25.0
Medical recorder	13	19	17	89.5	10	76.9	1	7.7

8.2.2 Competency of Staff

For maternal health services to be effective it is essential that service providers are technically competent. An adequate level of skill is obviously vital for a positive outcome of the treatment. Furthermore, community perceptions of the technical competence of health service personnel impacts on the utilisation of maternal health services. Some participants were of the opinion that the health workers are not competent enough to provide maternal health services and lack adequate knowledge, skills and experience.

“... We needs qualified doctors. The MCHW cannot detect whether a woman is pregnant or not. She even cannot detect the month of pregnancy of women. Therefore, there is no trust in the service provided there....”

- An informal provider, Jumla

“...I don't think they had knowledge about it, they couldn't say anything. They said I should go to Kathmandu immediately. They can't do anything there....”

- A woman who had APH, Rasuwa

A total of 83 service providers of various categories were assessed in the staff competency assessment across the eight districts (Table 8.13). Fifty-nine were ANMs/Staff Nurses, eight were Obstetricians/Gynaecologists and MDGPs, 13 were Medical Officers, two were Health Assistants and one Auxiliary Health Assistant.

Table 8.13: Type of Providers by District for Those Included in Staff Competency Assessment

District	Staff category				Total
	ANM/SN	Obs Gyne/MDGP	MO	Others	
Sunsari	10	1	2	0	13
Okhaldhunga	6	0	3	1	10
Rasuwa	4	0	1	0	5
Baglung	5	1	1	1	8
Rupandehi	12	4	1	0	17
Surkhet	10	1	3	0	14
Jumla	4		1	1	6
Kailali	8	1	1	0	10
Total	59	8	13	3	83

Nearly a quarter of providers assessed had received SBA training (24%) (Table 8.14). This included a quarter of ANMs/staff nurses (25%), half of the obstetricians/gynaecologists and MDGPs and 8 percent of MOs. Fifteen percent had received CAC training (7% of ANMs/staff nurses; 38% of obstetricians/gynaecologists; and 39% of MOs). Twenty two percent received IUCD insertion training (25% of ANMs/staff nurses; 25% of obstetricians/gynaecologists; and 8% of MOs).

Table 8.14: Training Received by Type of Provider for Those Included in Staff Competency Assessment

Training	ANM/ Staff Nurse		Obs/Gyne & MDGP		Medical Officer		Other		All	
	N	%	N	%	N	%	N	%	N	%
SBA	15	25.4	4	50.0	1	7.7	0	0.0	20	24.1
CAC	4	6.8	3	37.5	5	38.5	0	0.0	12	14.5
IUCD	15	25.4	2	25.0	1	7.7	0	0.0	18	21.7
Implant	5	8.5	1	12.5	0	0.0	0	0.0	6	7.2
Total	59		8		13		3		83	

8.2.2.1 Knowledge

The staff were given a twenty question multiple choice knowledge assessment, the results of which are displayed in Figure 8.2. One should note the sample sizes are small in some cases, see Table 8.13.

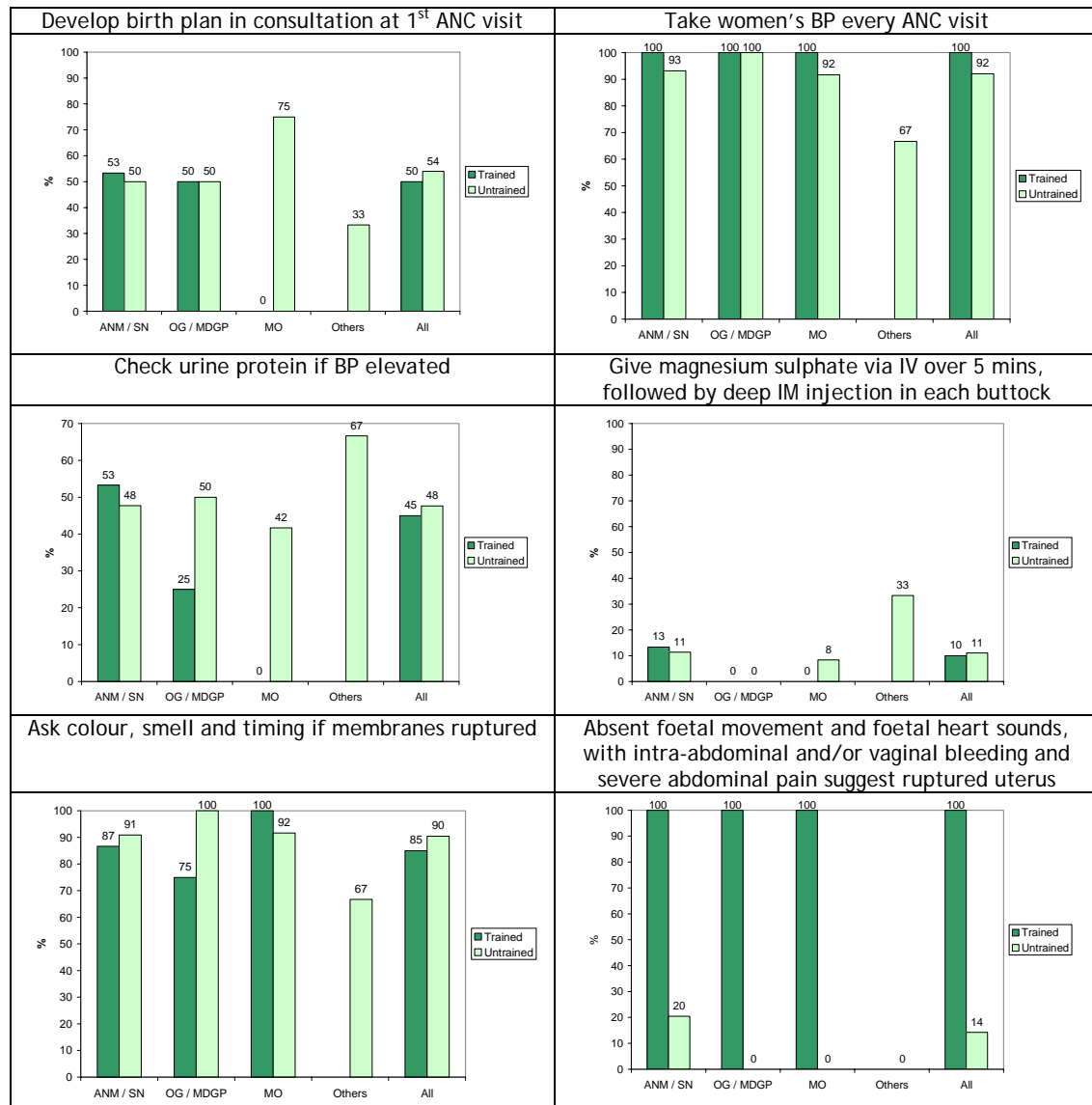
Overall there was good knowledge regarding checking blood pressure on every antenatal visit; asking women about the colour, smell and timing if her membranes have ruptured; to administer oxytocin intramuscularly and wait for uterus to contract before applying controlled cord traction in 3rd stage labour; to always examine vagina and perineum after delivery; to dispose of needles in sharp disposal container; and that the leading cause of exposure to HIV/Hep B is needle or sharp object injuries.

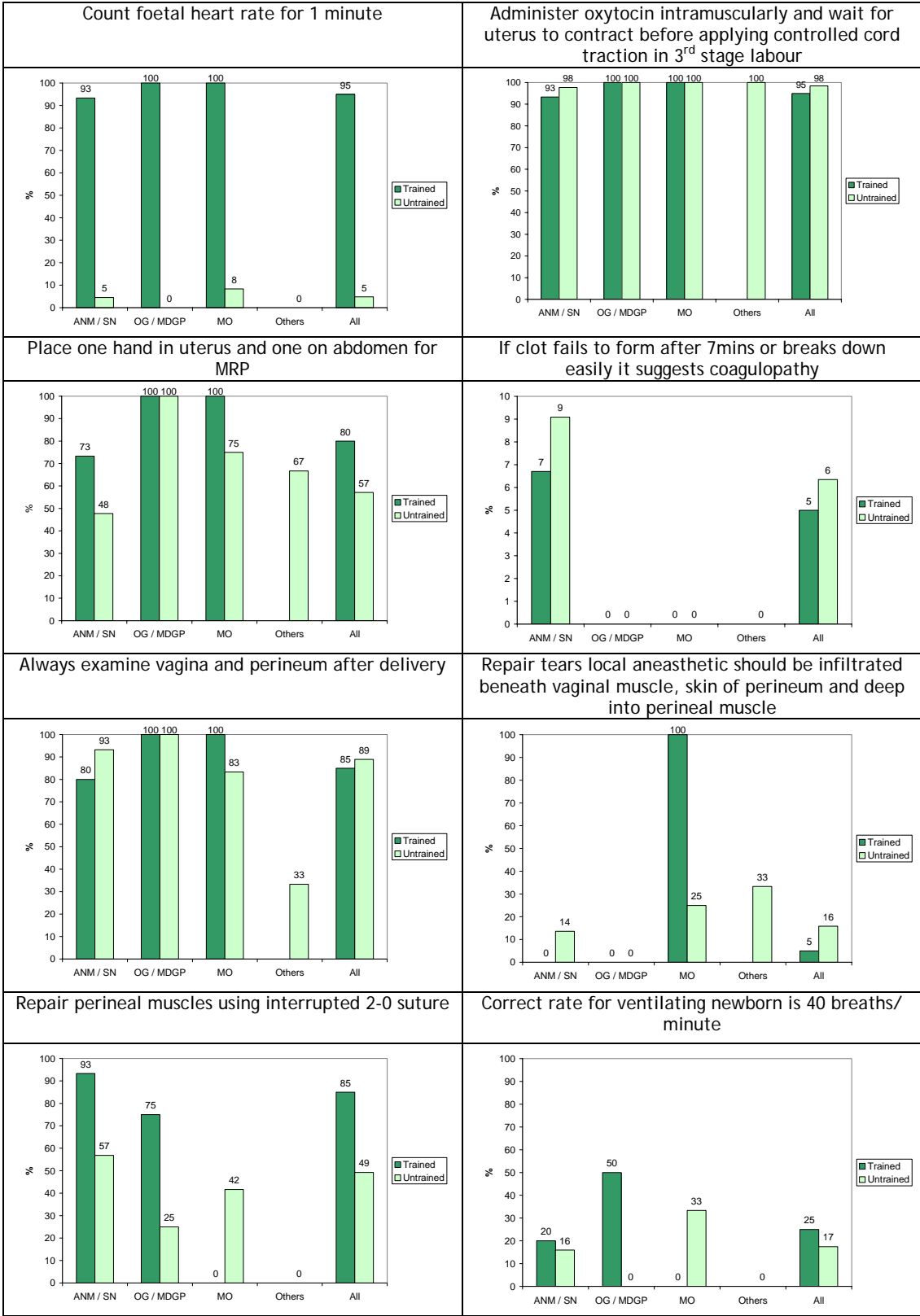
Knowledge was very poor regarding giving magnesium sulphate via IV over five minutes, followed by deep IM injection in each buttock; that the correct rate for ventilating newborn is 40 breaths per minute; and to repair tears local anaesthetic should be infiltrated beneath vaginal muscle, skin of perineum and deep into perineal muscle.

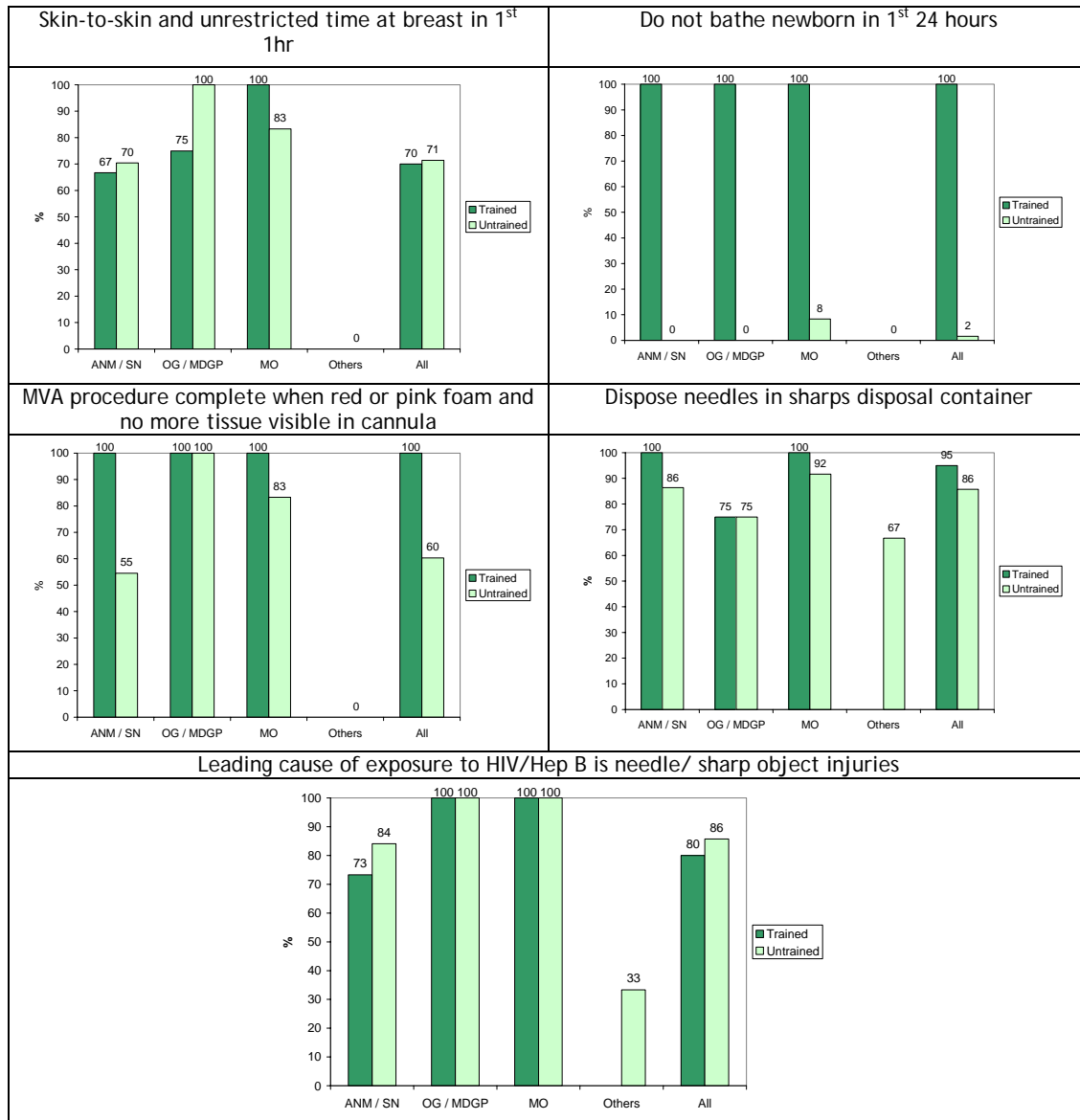
Knowledge was much greater among those who received SBA training in regards to counting the foetal heart rate for one minute; knowing that absent foetal movement and foetal heart sounds, with intra-abdominal and/or vaginal bleeding and severe abdominal pain suggest a ruptured uterus; to repair perineal muscles using interrupted 2-0 suture; to not bathe a newborn in the first twenty four hours; to place one hand in uterus and one on abdomen for MRP; and that an MVA procedure is complete when there is red or pink foam and no more tissue visible in the cannula.

For many of the questions there was little difference between trained and untrained: developing a birth plan at first ANC visit; taking BP every ANC visit; checking urine protein if BP elevated; asking about the colour, smell and timing when the membranes ruptured; to administer oxytocin intramuscularly and wait for uterus to contract before applying controlled cord traction in the third stage labour; to always examine vagina and perineum after delivery; to do skin-to-skin and encourage unrestricted time at breast in the first hour after delivery; to dispose of needles in a sharps disposal container; and that the leading cause of exposure to HIV/Hep B is needle/sharp object injuries.

Figure 8.2: Results of the Knowledge Assessment by Type of Provider and Whether Received SBA Training or Not







8.2.2.2 Skills

All staff who undertook the staff competency assessment were assessed about EOC skills: whether they received training; whether they performed the skill in the last six months; and whether they were competent in performing the skill (Table 8.15).

The percentages for training, recently performing and confidence were high for managing normal labour and birth; repairing first and second degree tears and performing episiotomies; and assessing the progress of labour and foetal position. However, those who felt confident and were performing were not necessarily trained. MOs tended to have the biggest mismatch in regards to not receiving training, but performing and feeling confident.

Only eight obstetricians/gynaecologists were assessed in this exercise. Their level of training and confidence in all areas was notably higher than ANMs/Staff nurses and MOs. The areas where the obstetricians/gynaecologists confidence was weakest included performing craniotomy; performing local anaesthesia for caesarean section or laparotomy;

performing external cephalic version; performing a pudendal block; performing ketamine anaesthesia; performing a subtotal hysterectomy; performing a spinal anaesthesia; and managing heart failure.

Life Saving Skills for Selected Competencies

Haemorrhage: nearly 58 percent of ANM/staff nurse were not confident managing bleeding in early pregnancy; the equivalent figures for managing bleeding in late pregnancy and labour. Only 31 percent of MOs were trained but their confidence was considerably higher except for managing bleeding in late pregnancy and labour where less than 50 percent were confident in managing this. Sixty two percent of ANMs had been trained to manage shock from bleeding, 88 percent of obstetricians/gynaecologists and 31 percent of MOs.

Pre-eclampsia and eclampsia: Forty nine percent of ANM/Staff Nurses were not confident managing pre-eclampsia and over 54 percent were not confident managing eclampsia. Among MOs only 31 percent had been trained in both but over 60 percent stated they were confident in managing this.

Fever: With regards fever before and after delivery, 45 percent and 35 percent of ANMs/Staff nurses were not confident in managing these, with about 60 percent being trained to manage fever in these situations.

Manual removal of the placenta: Despite being a key skill necessary for a BEOC and CEOC site only 36 percent of ANM/Staff nurses and 15 percent of MOs had been trained to perform this.

Assisted Delivery: Nurses and ANMs are only taught vacuum delivery, not forceps, as part of their SBA training. Only 30 percent of ANMs/Staff nurses were trained to perform assisted vacuum delivery and only 31 percent of MOs.

Resuscitation: Only 75 percent obstetricians/gynaecologists, 30 percent of MOs and 52 percent of ANM/Staff nurses were trained in adult resuscitation. The figures were similar for newborn resuscitation. Fifteen percent of ANM/Staff nurses, 50 percent of obstetricians/gynaecologists and 23 percent of MOs had been trained to manage heart failure with higher percentages of obstetricians/gynaecologists and MOs feeling confident in managing this - but less than 70 percent for both groups.

For obstetricians/gynaecologists the percentage trained in all the above was 88 percent with 100 percent confident in all the above.

Table 8.15: Staff Category by Training Received, Skill Performed in Last 6 months and Confidence in Performing the Skill

Training in competency area	ANM / Staff Nurse			Obs / Gyne & MDGP			MO		
	Trained	Performed in last 6 months	Confident in performing	Trained	Performed in last 6 months	Confident in performing	Trained	Performed in last 6 months	Confident in performing
Manage bleeding in early pregnancy	54.2	44.1	42.4	87.5	100.0	100.0	30.8	69.2	76.9
Manage bleeding in late pregnancy and in labour	55.9	45.8	39.0	87.5	100.0	100.0	30.8	76.9	46.2
Manage post-delivery bleeding	67.8	66.1	74.6	87.5	100.0	100.0	30.8	76.9	69.2
Manage pre-eclampsia	61.0	44.1	50.8	87.5	100.0	100.0	30.8	69.2	69.2
Manage eclampsia	59.3	37.3	45.8	87.5	100.0	100.0	30.8	69.2	61.5
Manage a fever before delivery (amnionitis)	59.3	45.8	54.2	87.5	100.0	100.0	23.1	61.5	61.5
Manage a fever after delivery (endometritis)	62.7	49.2	64.4	87.5	100.0	100.0	30.8	84.6	76.9
Perform manual vacuum aspiration	37.3	27.1	32.2	87.5	100.0	100.0	38.5	69.2	53.8
Assess the foetal position	79.7	88.1	84.7	87.5	87.5	100.0	30.8	100.0	84.6
Assess progress of labour	78.0	84.7	83.1	87.5	87.5	100.0	30.8	92.3	92.3
Use a partograph	72.9	61.0	61.0	75.0	75.0	87.5	30.8	84.6	69.2
Manage normal labour	83.1	93.2	93.2	87.5	100.0	100.0	30.8	92.3	92.3
Manage abnormal early labour (latent phase)	55.9	49.2	47.5	87.5	100.0	100.0	30.8	61.5	69.2
Manage abnormal first stage of labour	55.9	49.2	50.8	87.5	100.0	100.0	30.8	76.9	61.5
Manage abnormal second stage of labour	54.2	49.2	47.5	87.5	100.0	100.0	30.8	92.3	61.5
Manage abnormal third stage of labour	64.4	54.2	61.0	87.5	100.0	100.0	30.8	76.9	53.8
Induce labour	47.5	35.6	27.1	87.5	100.0	100.0	30.8	76.9	69.2
Manage labour after prior caesarean section	32.2	23.7	30.5	87.5	100.0	100.0	23.1	46.2	46.2
Manage normal birth	84.7	96.6	93.2	87.5	87.5	100.0	30.8	84.6	76.9
Perform a forceps delivery	NA	NA	NA	50.0	50.0	75.0	7.7	15.4	7.7
Perform a vacuum delivery	30.5	20.3	20.3	87.5	100.0	100.0	30.8	69.2	38.5
Recognize breech presentation	76.3	62.7	74.6	87.5	100.0	100.0	30.8	84.6	76.9
Manage a breech delivery	62.7	54.2	71.2	87.5	87.5	100.0	30.8	38.5	46.2
Manage a transverse lie	15.3	10.2	8.5	87.5	75.0	100.0	30.8	30.8	23.1
Manage a prolapsed cord	44.1	22.0	28.8	87.5	100.0	100.0	30.8	30.8	30.8
Manage malaria	13.6	25.4	22.0	75.0	87.5	100.0	23.1	46.2	38.5
Manage heart failure	15.3	11.9	13.6	50.0	50.0	62.5	23.1	46.2	61.5
Perform an amniotomy	62.7	59.3	62.7	87.5	87.5	100.0	30.8	69.2	76.9
Make and repair an episiotomy	78.0	79.7	83.1	87.5	87.5	100.0	30.8	84.6	92.3
Repair first degree tears	78.0	83.1	78.0	87.5	87.5	100.0	38.5	76.9	84.6
Repair second degree tears	76.3	83.1	76.3	87.5	100	100.0	38.5	76.9	69.2
Repair third degree tears	40.7	32.2	27.1	87.5	87.5	100.0	15.4	30.8	46.2
Repair a cervical tear	35.6	16.9	18.6	87.5	87.5	100.0	7.7	53.8	46.2
Perform manoeuvres for shoulder dystocia	49.2	22.0	35.6	87.5	75.0	100.0	7.7	23.1	23.1
Manage twin delivery	55.9	37.3	54.2	87.5	75.0	87.5	23.1	38.5	46.2

Training in competency area	ANM / Staff Nurse			Obs / Gyne & MDGP			MO		
	Trained	Performed in last 6 months	Confident in performing	Trained	Performed in last 6 months	Confident in performing	Trained	Performed in last 6 months	Confident in performing
Perform manual removal of placenta	35.6	32.2	47.5	87.5	75.0	100.0	15.4	53.8	46.2
Perform curettage or vacuum aspiration for retained products	30.5	18.6	22.0	87.5	100.0	100.0	30.8	46.2	53.8
Perform bimanual compression	49.2	22.0	35.6	87.5	62.5	100.0	23.1	23.1	23.1
Manage abdominal aortic compression	45.8	10.2	27.1	75.0	50.0	87.5	15.4	7.7	15.4
Perform an IUD insertion after delivery or abortion	39.0	22.0	32.2	87.5	75.0	100.0	30.8	23.1	46.2
Provide family planning counselling	62.7	76.3	72.9	75.0	100.0	100.0	30.8	69.2	69.2
Perform a caesarean section	NA	NA	NA	62.5	87.5	100.0	15.4	23.1	23.1
Perform local anaesthesia of perineum	67.8	67.8	79.7	75.0	87.5	87.5	38.5	84.6	76.9
Perform a paracervical block	13.6	6.8	8.5	87.5	87.5	87.5	53.8	69.2	61.5
Perform a pudendal block	NA	NA	NA	25.0	37.5	37.5	NA	NA	NA
Perform local anaesthesia for caesarean section or laparotomy	NA	NA	NA	37.5	37.5	37.5	NA	NA	NA
Perform spinal anaesthesia	NA	NA	NA	37.5	50.0	50.0	NA	NA	NA
Perform ketamine anaesthesia	NA	NA	NA	37.5	37.5	37.5	NA	NA	NA
Perform normal newborn care	79.7	88.1	86.4	75.0	75.0	87.5	30.8	100.0	76.9
Perform newborn resuscitation	54.2	59.3	64.4	75.0	75.0	87.5	30.8	100.0	69.2
Conduct rapid assessment for emergencies	66.1	52.5	74.6	87.5	87.5	100.0	30.8	84.6	69.2
Manage shock from bleeding	62.7	47.5	69.5	87.5	87.5	100.0	30.8	84.6	76.9
Perform adult resuscitation	52.5	27.1	49.2	75.0	75.0	87.5	30.8	61.5	69.2
Implement infection prevention measures	72.9	78.0	83.1	87.5	87.5	100.0	38.5	84.6	76.9
Provide FP counselling to post-abortion patients	69.5	79.7	86.4	87.5	100.0	100.0	30.8	69.2	53.8
Total (n)		59			8			13	

8.2.2.3 Case Studies

Two case studies were performed on a selection of staff: one for post partum haemorrhage (Table 8.16) and one to assess competence in using a partograph (Table 8.17). Note the small numbers of MO and obstetricians/gynaecologists. Note also that this exercise was not designed to evaluate the effectiveness of SBA training but rather the overall competence among those staff who are currently supporting women to deliver. Performance by training status is however compared in Tables 8.16 and 8.17. In both these assessments the performance of staff who had undergone skilled birth attendant training was better than those who had not received this training.

Table 8.16: Case Study: Post-partum Haemorrhage

PPH management	(Percent correct)								
	SBA Trained				SBA Untrained				
	ANM/ SN	Obs Gyne/ MDGP	MO	Total	ANM/ SN	Obs Gyne/ MDGP	MO	Others	Total
Knew the first action to take	100.0	100.0	100.0	100.0	86.4	75.0	91.7	66.7	85.7
Understood most common reason for vaginal bleeding immediately after delivery in the presence of a well-contracted uterus	86.7	100.0	100.0	90.0	70.5	50.0	83.3	100.0	73.0
Knew the next step	86.7	100.0	100.0	90.0	75.0	50.0	91.7	33.3	74.6
Knew what to direct assistant to do while they perform the examination	100.0	100.0	100.0	100.0	72.7	75.0	75.0	66.7	73.0
Most appropriate manner to repair a cervical laceration	80.0	75.0	0.0	75.0	63.6	50.0	83.3	33.3	65.1
Most appropriate plan of care	100.0	100.0	100.0	100.0	95.5	100.0	91.7	66.7	93.7
Total	15	4	1	20	44	4	12	3	63

Table 8.17: Case Study: Partograph

Use of partograph	(Percent correct)								
	SBA Trained				SBA Untrained				
	ANM/ SN	Obs Gyne/ MDGP	MO	Total	ANM/ SN	Obs Gyne/ MDGP	MO	Others	Total
Knew the foetal heart rate at admission	100.0	100.0	100.0	100.0	81.8	100.0	100.0	66.7	85.5
Knew the foetal heart rate at 12:30 PM	93.3	75.0	100.0	90.0	68.2	75.0	90.9	33.3	71.0
Knew when the membranes ruptured	60.0	75.0	100.0	65.0	54.5	25.0	63.6	33.3	53.2
Knew the condition of the liquor at admission	86.7	100.0	100.0	90.0	72.7	75.0	100.0	33.3	75.8
Knew how much moulding of the foetal head was recorded	60.0	50.0	100.0	60.0	61.4	75.0	36.4	33.3	56.5
Knew the dilatation of the cervix on admission	100.0	75.0	100.0	95.0	65.9	100.0	100.0	33.3	72.6
Knew the station of the head on admission	73.3	75.0	100.0	75.0	54.5	100.0	45.5	33.3	54.8
Described the contractions at 9 AM	86.7	75.0	100.0	85.0	59.1	75.0	81.8	33.3	62.9
Listed the vital signs on admission	86.7	100.0	100.0	90.0	59.1	100.0	90.9	33.3	66.1
Knew how many vaginal exams were performed during the course of labour	93.3	75.0	100.0	90.0	68.2	100.0	100.0	33.3	74.2
Knew what actions should be taken when the cervical dilatation passes the alert line	93.3	100.0	100.0	95.0	70.5	100.0	90.9	33.3	74.2
Described the contractions at 11 AM	93.3	100.0	100.0	95.0	61.4	100.0	81.8	33.3	66.1
Knew the intervention	66.7	75.0	100.0	70.0	38.6	50.0	54.5	33.3	41.9
Knew where to mark the administration of oxytocin	86.7	75.0	100.0	85.0	40.9	50.0	63.6	33.3	45.2
Knew what action should be taken when the partograph crossed the action line	80.0	100.0	100.0	85.0	63.6	75.0	81.8	33.3	66.1
Knew correct reason for action	80.0	50.0	100.0	75.0	54.5	75.0	63.6	33.3	56.5
Total	15	4	1	20	44	4	11	3	62

8.2.3 Client-provider Relationship

A good client-provider relationship is crucial for increasing the uptake of maternal health services and improving the level of care provided. A sufficient information exchange between clients and providers, as well as treating clients equally, with dignity and respect, is pivotal to providing quality care. The qualitative findings showed mixed responses regarding client-provider relationships. Most of the women who had survived

complications said that the service providers were co-operative, friendly, polite and provided emotional support.

"...It was good. I was given all type of facilities well, they treated well. Everybody treated well but there were some doctors who used to ask about the health, I liked that,

- Illiterate women who had eclampsia, Kailali

"...The sister who provides the service is very nice, whatever we say she replies nicely, doesn't get angry and makes us understand (everything) clearly"

- Brahmin women, Rasuwa

"...I liked the service very much. They showed love and respect towards me. They were conscious if I had any problem...."

- A woman who had PPH, Rupandehi

However, there are also strong negative perceptions about the provider's behaviour and attitude. Some mentioned that service providers are rude and unfriendly. They felt that providers scold them for insignificant things; do not show concern, even when they are in pain; get angry; and make them wait for unnecessarily long periods of time.

"... Nurses scolded and do not let us shout there like we shout at home. Because of that women deliver at home."

- Brahmin woman, Rasuwa

"When I got to the regional hospital (Surkhet) a nurse asked me in a very loud voice about what had happened to me and I just didn't feel like talking after that. She even said- 'can't you talk?' I felt really bad and I thought: 'what would they do if this had happened to them? ..."

- Brahmin woman, Surkhet

"... Some doctors and nurses scold even for small things. ... Some just get angry and scold; I didn't like that. ... They injected the intravenous cannula and then they disappeared. I requested them to take it away but they asked for some time and again disappeared. ..."

- A woman, Kailali

Participants accused service providers of preferential treatment, giving priority to those they know and like, or treating clients differently depending on a patients' caste or language. The negative attitude of staff discourages women from accessing services.

"... As we do not understand Nepali language, they behave badly with us. Sometimes they beat us. Therefore, we go to India. They used to scold us for giving birth to too many babies...."

- Muslim women, Rupandehi

"...If a poor person goes then they will treat them very badly and if a little rich person goes then they will treat them nicely. They also treat those they know nicely. And if it is a person that they don't know then they get irritated."

- A woman who had antepartum haemorrhage, Sunsari

Being attended to by a male service provider adversely affects the client-provider relationship. Most participants mentioned that women felt embarrassed talking openly about their problems to male service providers. Furthermore, a few women reported that internal examinations make them feel uncomfortable and humiliated, and the fear of having one prevents them from going to certain facilities.

"....It's difficult to express problems in front of male physicians (doctors). Women would visit more frequently if there were female doctors instead of male ones. They don't go because of their shy nature."

- A woman who had eclampsia, Surkhet

“...I was checked as soon as I reached there.... I did not like the way they examined me by putting hand inside. Then I thought ‘what could I do?’ because everyone was examined in the same way. That is why I didn’t go to the hospital. I felt bad the way they examined me...”
 - A woman who had complication, Rupandehi

8.2.4 Provider’s Perception Regarding Quality of Care

All providers included in the staff competency assessment were asked to give their perception regarding the main problems they face, up to a maximum of two per provider (Table 8.18). The responses show that 60 percent of providers stated problems with the infrastructure with 30 percent saying lack of equipment and beds was their main problem. Forty nine percent mentioned a problem regarding manpower, with 42 percent stating there was an overall lack of manpower, with some specifying ‘trained’ manpower. Thirty six percent mentioned a problem regarding training, with half of these specifically mentioning a lack of SBA training in CEOC sites, and 11 percent mentioned about a lack of refresher training in EOC. Eight percent mentioned that the lack of CEOC services was a problem. Six percent highlighted the problem of patients arriving late due to the distance travelled, and a further 6 percent highlighted referral problems, such as no transport arrangement for the patients and early referral from facilities without doing any life saving measure.

Table 8.18: Providers' Perceptions of the Main Problems They Face (max. of 2 per provider)

Providers' perceptions	Number	Percent
Infrastructure	50	60.2
<i>Lack of equipment/beds</i>	25	30.1
<i>Lack of infrastructure</i>	7	8.4
<i>Lack of physical facility</i>	5	6.0
<i>Lack of medicine</i>	4	4.8
<i>Problem of waste disposal - placental pit</i>	2	2.4
<i>Lack of staff facilities</i>	2	2.4
<i>Electricity problem</i>	2	2.4
<i>Lack of maintenance of equipment/beds</i>	2	2.4
<i>Lack of water supply</i>	1	1.2
Manpower	41	49.4
<i>Lack of manpower/trained manpower</i>	35	42.2
<i>Doctor not available round the clock</i>	2	2.4
<i>High workload of MDGP</i>	2	2.4
<i>Lack of coordination among service providers</i>	2	2.4
Training	30	36.1
<i>Lack of SBA training in CEOC site</i>	15	18.1
<i>Lack of refresher training in EOC</i>	9	10.8
<i>Insufficient IP whole site training</i>	2	2.4
<i>Not involved in any training programme due to non-govt. hosp</i>	1	1.2
<i>Govt policy - SDI only for government staff</i>	1	1.2
<i>Not confident in performing delivery</i>	1	1.2
<i>Lack of anaesthesia management</i>	1	1.2
Services	10	12.0
<i>No CEOC services</i>	7	8.4
<i>Paediatric service urgently needed</i>	2	2.4
<i>Lack of separate gynae/obs department</i>	1	1.2
Clients	9	10.8
<i>Late arrival of patient due to distance</i>	5	6.0
<i>Lack of community awareness</i>	2	2.4
<i>Lack of community support</i>	1	1.2
<i>Low caseload</i>	1	1.2
Referral	5	6.0
<i>No transport arrangement for patient</i>	4	4.8
<i>Early referral without doing any life saving measure</i>	1	1.2
Total	83	

8.3 Evidence Based Practices

Table 8.19 illustrates the occurrence of evidence based practices by type of facility, in regards to whether selected practices reportedly occur routinely or never in the facility.

Companion allowed during delivery

One of the factors that came out of the qualitative discussions was a woman's preference for a home delivery, and that many only want to go to a facility if they have to, i.e. if a complication occurs. One of the reasons they prefer being at home is due to the support they receive from family members, for example female relatives massaging their abdomen with oil (see Chapter 7). Only 30 percent of CEOC reported a routine practice of allowing companion to stay with a mother during labour, while 30 percent stated that they would never allow this practice. If a greater number of facilities allowed companions to stay this may increase utilisation of facilities. One barrier faced is the lack of space (Mullany 2006) at some facilities and it may be more common at lower level facilities because of the lower patient load at these facilities.

Mothers encouraged to be mobile during labour

Mothers should be encouraged to be mobile during their labour, and this was more reportedly common at higher level facilities, with 80 percent of CEOC, 73 percent of BEOC and 54 percent of birthing centres. Despite positive provider attitudes towards the potential benefits of mobility during delivery, the lack of space in many overcrowded facilities may serve as a direct barrier to the practice (Lugina et al. 2004).

Delivery position

Mothers should be encouraged to use the squatting/upright/lateral tilt position for labour because as this has been found to reduce the time needed for expulsion and the need for the use of forceps (Racinet et al. 1999; Lavender & Mlay 2006). However, no facility did this on a routine basis and most never did so. In contrast nearly three-quarters of facilities reported that they routinely position women in the supine/lithotomy position, with no facility reporting that they never do this. In contrast, most facilities practised the supine/lithotomy position on a routine basis (70% of CEOCs, 82% of BEOCs and 73% of birthing centres). Not only is the squatting position clinically proven to be more effective for childbirth, it is also often more culturally acceptable as this is what many are used to in home deliveries.

Oxytocic drugs given before and after delivery

Oxytocic drugs should not be routinely given to mothers prior to delivery, but it is beneficial to do so afterwards since it reduces the risk of blood loss associated with PPH (Elbourne et al. 1988). All facilities, except 5 percent of birthing centres, reported routinely giving these drugs afterwards. However, 30 percent of CEOC facilities, 18 percent of BEOC and 14 percent of birthing centres reported giving them to mothers routinely before delivery.

Magnesium sulphate for eclampsia

Magnesium sulphate is WHO's drug of first choice for women with eclampsia as it has been found to more than halve the risk of eclampsia in pregnant women (Duley et al. 2004) and was reportedly routinely used as the drug of first choice in all sample CEOC facilities. However, this was reportedly only the case in half of BEOC facilities and one third of

birthing centres. Furthermore, it was reportedly never used in over one fourth of BEOC facilities and half of birthing centres.

Management of incomplete abortions

Induced and incomplete abortions should be managed by manual vacuum aspiration (MVA) as this procedure results in low levels of pain and blood loss and is unlikely to lead to morbidities and complications such as uterine perforation (Forna & Gülmezolgu 2001). However, the findings highlight that evidence based practice is not universal and hence more needs to be done. Just over half of BEOC facilities (64%) and 14 percent of birthing centres reportedly use MVA on a routine basis, and 36 percent of BEOC facilities and 18 percent of birthing centres never used MVA.

Episiotomy

Episiotomy should not be performed on a routine basis as restricted use is found to have a more positive impact on maternal outcomes (Viswanathan et al. 2005). It was relatively rare for facilities to routinely perform an episiotomy. However, 18 percent of BEOC facilities and 5 percent of birthing centres reportedly did this on a routine basis.

Enemas and Perineal shaving

Enemas and perineal shaving are unnecessary for delivery and may make women feel uncomfortable and thus discourage them from having an institutional delivery. Enemas are not found to shorten the length of labour nor to reduce the risk of infection to mother or child (Reveiz et al. 2007); furthermore, studies have found that perineal shaving has no significant impact upon perineal wound infection and dehiscence, neonatal infection, or puerperal infection (Kovavisarach & Jirasettasiri 2005). Fortunately, most facilities did not do either of these practices. However 9 percent of BEOCs reportedly did both routinely, and 9 percent of birthing centres performed perineal shaving routinely.

Withhold oral fluids during labour

There are no proven benefits for restricting women's intake of liquids during delivery (Singata et al. 2010); women should therefore be encouraged to drink fluids during labour. However, 30 percent of CEOC, 9 percent of BEOC, and 23 percent of birthing centres reportedly withhold oral fluids during labour.

Use of partograph

Only 70 percent of CEOC, 64 percent of BEOC and 23 percent of birthing centres reportedly used a partograph on a routine basis. One fifth of CEOC (20%), 18 percent of BEOC and nearly three quarters of birthing centres (73%) never used a partograph.

Prophylactic antibiotics

Prophylactic antibiotics should be given to mothers routinely during caesarean section, as this is found to significantly decrease the risk of endometritis and wound infection (Smaill & Hofmeyr 2002). However, 20 percent of CEOC facilities did not do this on a routine basis and 10 percent never did. This is not applicable to lower level facilities as they do not perform caesarean sections. Furthermore, they should be given routinely to women with premature rupture of membranes, however, 20 percent of CEOC and 27 percent of BEOC facilities do not do this, with 10 percent of CEOC and 27 percent of BEOC never doing so.

Table 8.19: Percentage Distribution of Facilities Performing and Not Performing the Evidence Based Practices

Evidence based practices	Frequency of evidence based practices					
	Routine Practice			Never		
	CEOC	BEOC	BC	CEOC	BEOC	BC
Best Practice						
Companion allowed with mother during labour	30.0	54.5	40.9	30.0	9.1	0.0
Mothers encouraged to be mobile during labour	80.0	72.7	54.5	0.0	0.0	4.5
Squatting/upright/lateral tilt position for delivery	0.0	9.1	0.0	60.0	54.5	63.6
Magnesium sulphate for women with eclampsia	100.0	54.5	31.8	0.0	27.3	54.5
Oxytocic drugs given to mother after baby is born	100.0	100.0	95.5	0.0	0.0	4.5
Prophylactic antibiotics during caesarean section	80.0	NA	NA	10.0	NA	NA
Prophylactic antibiotics given to women with premature rupture of membranes	80.0	72.7	59.1	10.0	27.3	18.2
Manage induced and incomplete abortion by MVA	90.0	63.6	13.6	0.0	36.4	18.2
Use of partograph for women in labour	70.0	63.6	22.7	20.0	18.2	72.7
Discouraged						
Routine Episiotomy	0.0	18.2	4.5	20.0	9.1	50.0
Enema	0.0	9.1	0.0	80.0	81.8	90.9
Perineal shaving	0.0	9.1	9.1	100.0	81.8	81.8
Withhold oral fluids during labour	30.0	9.1	22.7	70.0	81.8	77.3
Supine/lithotomy position for delivery	70.0	81.8	72.7	10.0	0.0	0.0
Routinely giving oxytocic drugs to mother before delivery	30.0	18.2	13.6	30.0	0.0	27.3
Total facilities assessed (n)	10	11	22	10	11	22

Table 8.20 shows the results from the knowledge component of the staff assessment regarding evidence based practices. On the whole providers were knowledgeable about recommended practices, and there was very little difference between SBA trained and untrained. The one practice that many did not recognise as being beneficial was encouraging a non-supine or squatting position during delivery. There was a bigger difference between SBA trained and untrained in regards to practices that are discouraged. Ten percent of trained thought it was useful to use D&C to manage induced or incomplete abortions; 45 percent of trained thought the supine position should routinely be used during labour compared to 73 percent of untrained; and 10 percent of trained felt it was useful to routinely give oxytocics to women before delivery.

Table 8.20: Knowledge of Evidence Based Practice by Type of Provider, and Whether Received SBA Training or Not

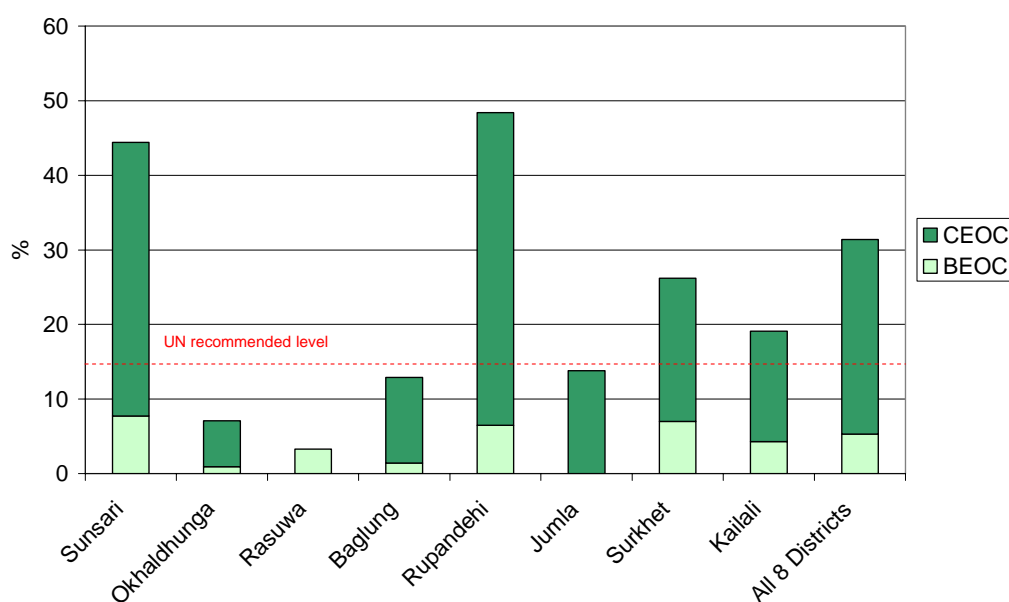
Evidence based practices	% thought practice was useful								
	SBA Trained				SBA Untrained				
	ANM/SN	O/G/MDGP	MO	All	ANM/SN	OG/MDGP	MO	Others	All
Best Practice									
Use of partograph	100.0	100.0	100.0	100.0	98.0	100.0	100.0	67.0	97.0
Encourage mobility during labour	93.0	75.0	100.0	90.0	96.0	100.0	67.0	100.0	91.0
Allow companion during labour	80.0	100.0	100.0	85.0	86.0	75.0	100.0	67.0	87.0
Encourage non-supine position in labour	67.0	100.0	100.0	75.0	27.0	50.0	42.0	33.0	32.0
Routinely give oxytocics after delivery	100.0	100.0	0.0	95.0	100.0	100.0	100.0	100.0	100.0
Give magnesium sulphate to women with eclampsia	100.0	100.0	100.0	100.0	93.0	100.0	100.0	67.0	94.0
Prophylactic antibiotics during caesarean section	87.0	100.0	100.0	90.0	73.0	100.0	67.0	0.0	70.0
Prophylactic antibiotics give to women with prolonged rupture of membranes	100.0	75.0	100.0	95.0	91.0	100.0	100.0	33.0	91.0
Manage induced/incomplete abortions by MVA	100.0	75.0	100.0	95.0	84.0	75.0	83.0	33.0	81.0
Discouraged									
Manage induced/incomplete abortions by D&C	7.0	0.0	100.0	10.0	48.0	50.0	58.0	33.0	49.0
Routine use of supine position during labour	53.0	25.0	0.0	45.0	80.0	50.0	58.0	67.0	73.0
Routinely giving oxytocics before delivery	13.0	0.0	0.0	10.0	21.0	0.0	42.0	0.0	22.0
Total staff assessed (n)	15	4	1	20	44	4	12	3	83

8.4 UN Process Indicators

8.4.1 Proportion of births in Emergency Obstetric Care (EOC) Facilities

The UN recommended minimum level for the proportion of deliveries in an EOC facility (both basic and comprehensive) is 15 percent. The overall average for the eight districts was higher than this minimum recommended level, with 31 percent of deliveries taking place in EOC facilities (Figure 8.3, Appendix 8.1, 8.2 & 8.3). However, this average was influenced by the higher number of deliveries in districts with higher proportions of deliveries in EOC facilities, and substantial variations exist between the eight districts. Four districts had a higher proportion of deliveries in EOC facilities than the minimum recommended level (Sunsari, Rupandehi, Surkhet and Kailali). Rupandehi had the highest proportion, at more than three times this minimum recommended level (49%) and Sunsari has just under three times the minimum recommended level at 44 percent. Four districts had below the minimum recommended level (Jumla, Okhaldhunga, Baglung and Rasuwa) with very low levels in Okhaldhunga (7%) and Rasuwa (3%). Overall 26 percent of deliveries were in CEOC and 5 percent in BEOC. With the exception of Rasuwa, which had no CEOC deliveries, all districts had a higher percentage of deliveries in CEOC facilities. Overall 82 percent of EOC deliveries were in CEOC, with a high of 89 percent in Baglung.

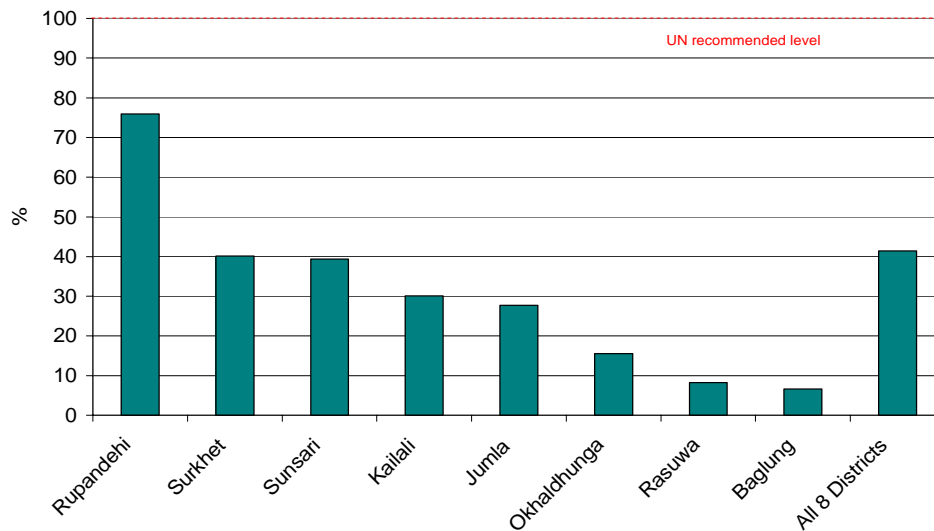
Figure 8.3: Proportion of Births in EOC Facilities



8.4.2 Met Need for EOC

The UN recommended acceptable level for the met need for treating direct life-threatening obstetric complications is 100 percent. The overall average for the eight districts is just 41 percent, indicating a very high unmet need at 59 percent (Figure 8.4). No district meets the recommended 100 percent level and there is substantial variation between the districts. Rupandehi has by far the highest met need at 76 percent; this is followed by Surkhet (40%) and Sunsari (39%). Rasuwa and Baglung have very low levels of met need at 8 percent and 7 percent respectively.

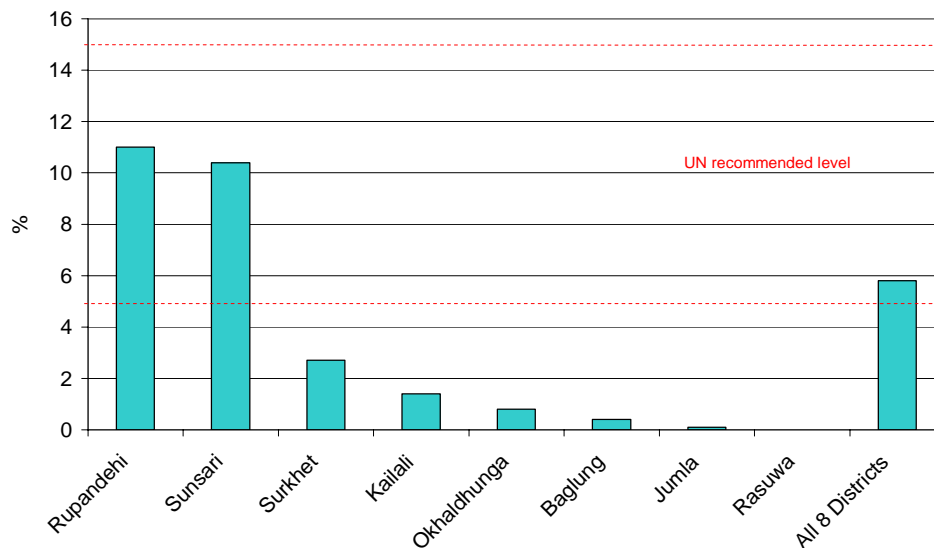
Figure 8.4: Met Need for EOC



8.4.3 Caesarean Section Rate

The UN recommended level for caesarean section rates is between 5 percent and 15 percent of all births. For Nepal 5 percent is taken as the desired level. The average caesarean section rate for the eight districts is 6 percent, and thus is above the desired level (Figure 8.5). This does however, hide a lot of district variation, as just two of the districts (Rupandehi and Sunsari) have rates higher than 5 percent, at 11 percent and 10 percent respectively. The caesarean section rate alone can be very misleading and bear no reflection to the actual met need for caesarean sections. Therefore there is a need to audit all caesarean cases, in particular in regards to whether they were performed out of medical need. Anecdotal evidence suggests it is becoming increasingly common for women who can afford it to have an elective caesarean section, without having a medical need, especially in urban areas (Lumbiganon et al. 2010); furthermore, studies suggest that women who have previously delivered by caesarean procedure are much more likely to choose to repeat (Jha 2009).

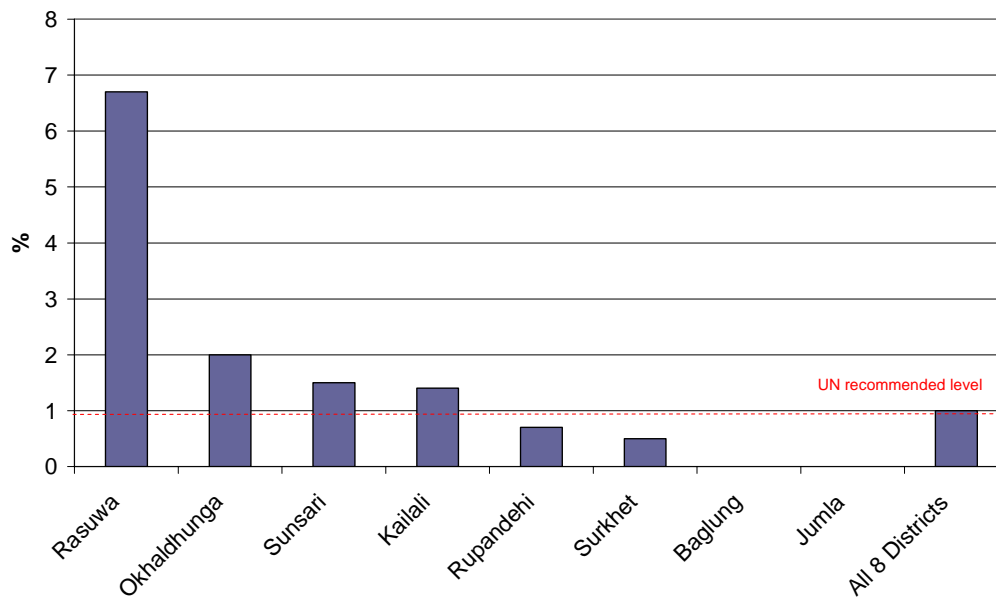
Figure 8.5: Caesarean Section Rates



8.4.4 Case Fatality Rates

The UN recommended minimum acceptable level for case fatality rates in EOC facilities is less than 1 percent. This is an indicator of quality of care. The overall rate for the eight districts combined is 1 percent, but substantial district variation exists (Figure 8.6). Four districts have rates at 1 percent or higher, i.e. above the acceptable level: Rasuwa (7%); Okhaldhunga (2%); Sunsari (2%); and Kailali (1%). This indicates there is a lot of room for improvement in the quality of care in these districts, however, this indicator does not reflect the condition of women on arrival and whether delays in arrival at the facility contributed to the deaths and thus may be misleading.

Figure 8.6: EOC Facility Case Fatality Rates



8.5 Summary of Findings

There is reportedly good provision of antenatal, postnatal and routine delivery care at the assessed facilities, however, there is an urgent need for improvement regarding provision of manual removal of placenta and assisted vaginal deliveries at the assessed BEOC and birthing centres. There were some concerning stock outs of essential drugs, including a reported stock out of ampicillin for longer than two weeks in the last twelve months at 30 percent of CEOCs and 18 percent of BEOCs. Magnesium sulphate was reportedly routinely used as the drug of first choice for women with eclampsia in all CEOC facilities. However, this was only the case in half of BEOC facilities and one third of birthing centres. It was never used in one third of BEOC facilities and half of birthing centres. The use is partly reflected in the availability of the drug. However, at the time of visit it was only in stock in 73 percent of BEOCs and just 18 percent of birthing centres. Furthermore, 10 percent of CEOCs and 27 percent of BEOCs had a stock out for longer than two weeks in the last twelve months.

Regarding evidence based practices; oxytocic drugs were reportedly routinely given to mothers after delivery in all facilities, except for 5 percent of birthing centres. However, 30 percent of CEOC facilities, 18 percent of BEOC and 14 percent of birthing centres reportedly gave them to mothers routinely before delivery. Twenty percent of CEOC facilities reported not routinely give prophylactic antibiotics to mothers during caesarean

section, and 10 percent never did this. Twenty percent of CEOC and 27 percent of BEOC facilities reported not routinely give prophylactics to women with premature rupture of membranes, with 10 percent of CEOC and 27 percent of BEOC never doing so. Only 70 percent of CEOC, 64 percent of BEOC and 23 percent of birthing centres reported using a partograph on a routine basis. One fifth of CEOC (20%), 18 percent of BEOC and nearly three quarters of birthing centres (73%) reported that they never used a partograph. Use is partly explained by availability, as the partograph was only present in 80 percent of CEOCs and 73 percent of BEOCs.

The qualitative findings showed mixed responses regarding client-provider relationships. Most women who survived complications said providers were co-operative, friendly, polite and provided emotional support. However, there were also strong negative perceptions, describing providers as rude and unfriendly: scolding patients for insignificant things; not showing concern (even when in pain); getting angry; and making them wait for unnecessarily long periods of time. Women reported that the closure of facilities at night time is prohibitive to seeking care. It was particularly a problem for women in remote and mountainous areas, as they have fewer alternatives where they can seek care. The lack of 24 hour laboratory facilities caused problems, affecting the timely detection of high risk conditions for pregnant women, such as eclampsia or low haemoglobin. Although many of the BEOC and BC's have laboratories, very few were available twenty four hours. There were reports of referral systems not functioning effectively. Service providers acknowledged that in many instances patients were not referred in a timely manner; referred to an inappropriate facility; and that they had no clear mechanism for following up clients once they are referred to another facility. Factors preventing an efficient referral system included a lack of awareness among those accompanying patients; lack of money; lack of transportation between facilities; no established referral mechanism between facilities; no referral slips; inadequate information on referral slips; and lack of a support system.

8.6 Discussion

Interviews with national level stakeholders indicated that multiple strategies are being implemented and there have been improvements in the quality of maternal health care in recent years. The national stakeholders emphasised the various efforts that were underway. Some of the major initiatives highlighted by the policy makers were financial incentives to providers and users; free health services; infrastructure development; placing resources at the disposal of district level managers; and targeting remote areas and marginalised populations.

".....Every year we are planning to strengthen more facilities, train more human resources and put them in place and the MoHP is also working towards developing an incentive package especially in Karnali zone and more difficult districts because without more positive incentives, both financial and non-financial, the health care providers are not attracted to remain in difficult districts. ...On the whole, the government is trying to make services accessible, affordable and of good quality and increase the coverage of services....."

- National stakeholder

".....Human resources at the mid level and higher level and their retention, their timely back up, facilitation and encouragement to them, maintenance of equipment, etc are the various things that we are working for... About the equipment, we are buying equipment in order to tackle the problems in the districts. Among the resources received by the Department of Health Services, we will allocate around 70 percent to 75 percent of them to the district and hand over the responsibility to them so that they do not need to wait for the central decision even to accomplish minor things like water, toilet equipment,

facility?, repairing and maintenance, purchasing medical equipment etc. We are going to handover almost all the resources to them..."

- National stakeholder

Since the national safe motherhood programme was launched in 1997 and designated a (P1) priority programme, substantial financial and other resources have been invested in the effort to reduce the high national MMR. The 2006 NDHS indicated encouraging success, with a much reduced MMR, however, a further analysis (Pant et al. 2008) indicates this is not solely the result of improved care, as evidence shows modest progress in this respect, at best. For example, even in the fiscal year 2008/09 only 23 percent of women delivered in a health facility, and in 2005/06 this figure was only 14 percent. A growing body of international evidence indicates that other socio-economic changes, such as increased educational levels among women, improved roads and communications and higher incomes are likely to be bigger factors, and most importantly of all, the substantially reduced total fertility rate which dropped from 4.6 in 1996 to 3.1 in 2006.

That said, there is evidence that the quality of maternal health care at health facilities is improving, although the pattern is rather uneven across districts and geographical areas, with hill and mountain areas faring worse than the Terai. This is reflected in the gradually increasing rate of facility delivery, which is influenced by women's perceptions of the improved care available at facilities. Even without an increase in the percentage of deliveries, the numbers attending will increase due to population growth and hence will increase demands on workload. One of the key interventions being implemented by the Nepal government is a major programme of infrastructure development, including new constructions built to standard designs to suit not only the purpose but also geographical terrain. Clear definitions of the functions of different levels of health facility have been developed and for the future, all new health posts will have an integrated birthing unit and all PHCCs a basic EOC unit, in recognition of the fact that these peripheral facilities are currently often ill suited to providing maternity care. A new strategy is also being implemented for planned maintenance, to ensure facilities remain fit for their purpose. While new buildings are not everything, they play a major role in motivating health staff and increasing public confidence, as well as making it easier to maintain hygiene and infection prevention practices and client privacy, key factors affecting quality of services and public perceptions of a facility.

Efforts to improve procurement processes for equipment and drugs include more systematic procedures for developing cost estimates and implementing quality control checks, although there is still a need to speed up both requisitioning and delivery of supplies and equipment to facilities. Many staff complained about a lack of essential equipment that had been requested, which is clearly demoralising for those who are trying to improve services but are powerless to address this critical point. Equipment maintenance is also a key area of need, and a bio-medical equipment technician training course has been developed and is being implemented by the National Health Training Centre to enable technicians based in health facilities to maintain and repair essential equipment.

CHAPTER 9: BARRIERS TO MATERNAL HEALTH CARE

9.0 Introduction

This chapter explores the barriers related to accessing maternal health care in the study districts. Barriers can be broadly divided into supply and demand side. Both can seriously jeopardise women's health and make them more vulnerable to mortality and morbidities (O'Donnell, 2007; Ensor et al. 2004). Demand side barriers are multifaceted and embedded in social, economic and cultural aspects of households and communities, and this chapter sets out to explore the broad range of factors in the community that prevent women from seeking care. Supply side barriers relate to the availability and delivery of maternal health care. Barriers were discussed in focus groups with women in the community who had given birth during the last ten years; in-depth interviews with women who had pregnancy related complications in the past two years; in-depth interviews with service providers (both formal and informal); and in-depth interviews with key stakeholders. Additional information was obtained from the maternal death verbal autopsies and maternal death reviews, based on respondents' perception of delays and the factors that could have potentially saved the lives of the deceased women. Comparisons have been made to 1998 data.



9.1 Demand Side Barriers

9.1.1 Lack of Understanding

Study participants, especially service providers and key stakeholders, identified lack of awareness among women as one of the factors contributing to low utilisation of maternal health services in their area. Recognising that pregnancy and childbirth warrant health care is clearly a prerequisite for service utilisation. While most service providers and women believed that many women in their communities knew they should have routine antenatal check-ups, there were still women, particularly from illiterate, rural and marginalised communities, who did not understand the importance of seeking routine antenatal care. Many were of the view that they should only seek care once a complication occurs.

"At the community level, women have the concept that pregnancy is a normal thing. It probably means that there is no awareness ... they do not understand that they should seek health care on time and that pregnancy is an important thing or they should do this many check-ups or they should get this many vaccinations or get timely care from trained health workers."

- District stakeholder, Rupandehi

"... People in the villages are not educated so they don't come. Some educated people know that they have to come for check up and they do. But, when we give them medicine they don't even complete the dose. They think they are fine after taking one dose of medicine so they stop taking it. They don't come until the time when they have a problem."

- Service Provider, Rasuwa

"... they don't come because of lack of awareness ... they don't come because they are ignorant."

- Dalit woman, Jumla

"I did not know that an expectant mother could develop such complication and faith healer's efforts do not have any effect on it."

- Verbal Autopsy Respondent

"At one and half month pregnancy she had become unconscious once and at the third month she developed swelling of body, abdominal pain and was again unconscious. We thought she was caught by an evil spirit so did not seek medical treatment."

- Verbal Autopsy Respondent

While some women did not understand the need for routine care, others did not know where to go for care. Even women who were aware of available services only sought care after the onset of a complication, often when the condition had become very serious.

"Peritonitis, following curettage of incomplete abortion, lead to the woman's death. Early diagnosis of the condition of the patient and early referral to the hospital and the management of fresh blood could have saved the woman."

- Head of Department, Maternal Death Review

In general, study participants mentioned that women were more aware of the need for and availability of antenatal and delivery services than they were for postnatal care. Focus group discussions revealed that women believe that after the child is born, everything is back to normal. Some women and a few service providers cited difficulties associated with travelling to a health facility during postpartum period as the reason for low utilisation of postnatal care. On the other hand, service providers also said that offering postnatal care is difficult when most deliveries occur at home and providing these services in the community is not feasible.

"A feeling has developed that pregnancy is a risky condition and after delivery life should return to normal. The fact that PPH can cause maternal death has not reached their mind. ... Due to lack of knowledge, people think that PPH is normal whereas they immediately come to the health post for APH. They are not aware that the post-partum period is dangerous."

- Service provider, Surkhet.

"I was unaware about it. FCHV did not suggest to me that I should go for a postnatal check up. If she had told me, I would have gone. I thought everything was fine. I have not gone anywhere after this baby was born."

- Woman who had PPH, Surkhet

Women said that taking medicines during pregnancy, including iron tablets, caused nausea, and feared it might lead to enlargement of the foetus or even miscarriage. Service providers said that, despite their advice, few women take iron tablets regularly.

"Those iron tablets were big and we had nausea after taking them...so most women don't take them. Even at the time of eating food we felt nauseas. You can't imagine what happens if we take those tablets."

- Tamang woman, Rasuwa

"Family members argue about going for antenatal check-up and say that taking vitamins would make the foetus bigger; and makes it difficult to give birth. Some mothers-in-law throw away the medicines that are brought from the health post after the check-up."

- Informal provider, Kailali

There were numerous assertions from women, service providers and key stakeholders that awareness about the importance of maternal health has increased.

“These days, we test blood and urine. We take iron tablets and TT injections. There has been a change in care seeking behaviour as well. We were hesitant to express our problems before, but now we have understood that we need to ask questions for our own benefit. Now we are more open in expressing our problems.”

- Dalit woman, Baglung

“Women these days are comfortable talking about pregnancy, they have started going for check-ups thrice during their pregnancy. Some even come monthly. They do not need to be told to come for vaccination after delivery. Earlier, we had to tell them repeatedly. Now they have realised the importance of health education. They know where to go for care (services)..... There has been an increase in the number of women who feel they should deliver at hospitals. In-laws of women have also begun to understand things better. People have begun to realise that deliveries should be done by an experienced health person only.”

- Informal provider, Surkhet

9.1.2 Culture of Silence

Reproductive health issues are often viewed as private and sensitive for women in Nepal, and pregnancy and childbirth is seen as a ‘normal’ process that all women go through. Furthermore, women are often made to feel their lives are of little value and they frequently lack self-esteem. The perception among men that if their wife dies they can marry again makes women feel disposable. Women therefore commonly feel compelled to deal with any problems themselves, without discussing them with others, even their closest family members. This ‘culture of silence’ was apparent in the relatives’ description of the events leading up to maternal deaths, where they often inferred it was a positive character trait that the women ‘never complained’ prior to their death (Box 9.1). The low status of women in the home and community can have serious implications for receiving or delaying care.

Box 9.1: Quotes from maternal death verbal autopsies highlighting the ‘culture of silence’

“She was not menstruating since the last two months and had taken an injection from the local medical shop. She developed bleeding after five days of taking the injection. She was bleeding since last five days before her death but she never complained of it with anyone. Her bed was full of blood at the time of death”.

“She had gone alone for the abortion and did not tell us until she developed severe abdominal pain. As her condition got deteriorated with loss of weight her daughter took her to Family Planning Clinic after four days of abortion”.

“At two months of pregnancy she developed fever and dizziness along with headache and lower abdominal pain but she neither complained of it nor attended any facility. She was taken to the local medical shop only when the situation got deteriorated with discharge of foul smelling white liquid”.

“Her situation got deteriorated. We decided to take her to hospital but she refused to go saying ‘Nothing has happened to me; why should I go now’. At about three o’clock in the morning she complained of severe abdominal pain. Her complaint meant she was having a very severe pain because she never complained at normal condition”.

9.1.3 Family and Social Restriction

Family and social restrictions affect women's care seeking behaviour. Women, service providers and traditional birth attendants believed that social norms discouraged women from seeking care, and women often did not have enough time to visit a health facility due to social obligations and household chores. Respondents also felt that a lack of

support from family members, particularly mothers-in-law, restricted women's access to care. This was a commonly held view across all study districts and women of all ethnic groups. Mothers-in-law often believed their daughters-in-law should deliver without medical attention, just as they themselves had done in the past.

"Some (women) face problems at home. As for me, my family sometimes behaves badly, and sometimes behaves well. My mother-in-law says- 'why take injections? I gave birth to 10- 12 children in the forest while collecting wood and carrying heavy loads and living on spice soup."

- Dalit woman, Baglung

Generally, the decision to take a woman to health facility lies in the hands of family members, especially the elders. Significant time delays are caused when in-laws decide to wait and see if the delivery can occur at home, they or seek help from traditional healers or traditional birth attendants instead. A woman from Okhaldhunga who had prolonged labour narrated her long ordeal when her mother-in-law did not allow her go to the hospital:

"...I was working when my stomach started to hurt a bit and I also had difficulty breathing. Then I realised I was having labour pain... Then I told my mother-in-law she said that nothing would happen and told me to continue working. She said that the baby would come out when it had to...I spent two days like this but on the third day...I experienced excruciating pain that I could no longer bear...I told my mother-in-law that if she was not going to take me to the Mission Hospital then I would take someone else and go. Only then did she say that she would take me. Then on my way to the hospital the baby was born but the umbilical cord didn't come out so the sisters at the Mission Hospital had to take it out."

- Woman who had prolonged labour, Okhaldhunga

Women from focus groups and in-depth interviews also said they were unable to visit the health facility for check-ups due to household chores such as cooking, cleaning, tending cattle, farming, collecting firewood and cattle fodder.

"There's a health-post nearby. In villages, people are concerned with household chores as well. It is a matter of concern about who is going to look after the cattle and collect wood and do the house work if they go to health-posts. So these things restrict women from going for check-ups."

- Dalit woman, Baglung

However, the vast majority of participants admitted that family and social values were changing, albeit slowly, making a more conducive environment for women to seek care. Most female respondents stated that they were allowed to rest and not made to do heavy work during pregnancy, others said that they were given nutritious food.

During the study period there were frequent bandhs (strikes) across the country, often lasting many days. They caused great difficulties for those trying to access care, and in some cases cost women their lives.

"She had Typhoid. Fever persisted even after taking medicine. We had decided to take her to PHCC and arranged money, and were also prepared for Nepalgunj but could not do so because of the continuous bandh for 7-8 days. Her situation further deteriorated with difficulty in breathing at midnight on the 24th day after delivery. She died at about three o'clock in the afternoon."

- Verbal Autopsy Respondent

9.1.4 Traditional Beliefs and Practices

In all the study districts, the 'tradition' or 'customary practice' of home delivery was preferred. One woman in Surkhet who had a complication said:

"... Everyone delivers at home so I felt I also would deliver at home ..."

- Woman who had eclampsia, Surkhet

Participants revealed that seeking help from traditional healers such as *dhami*, *jhakri* and *guruwa* for problems during pregnancy, delivery and postpartum period was apparent in the study districts. There were a few cases in which traditional healers were asked to assist with deliveries and only when they were not able to resolve complications, women were then taken to a health facility. Sometimes traditional healers were seen first during pregnancy just to ensure that everything was normal.

"We know that we should go to hospital (PHCC) during pregnancy. However, we believe that we should go to the jhankri (traditional healer) once, to know whether something is wrong. In case of bleeding during pregnancy, we go to the jhankri to let him see if something is wrong."

- Magar woman, Baglung

"If the traditional healer (Dhami Jhakri) says that the delivery can be managed (in the home) it is fine, but if he says 'it is unmanageable here' then only the women are taken to the district hospital."

- Chhetri woman, Jumla

"Within half an hour after normal delivery at home she developed fever and we gave her Cetamol and some locally prepared herbs to control fever. She was also given a lot of locally prepared alcohol with noodles and egg as per our tradition. After four days she developed sever fever, chest pain and cough with pus like sputum. A village health worker gave IV drips and started some medicines against typhoid and referred her to Mission hospital but we could not take her as we were busy in agricultural work. We could have saved her if we had taken her to the Mission hospital on time instead of attending faith healer and if we had not given alcohol and eggs when she was having high fever."

- Verbal Autopsy Respondent

"She started vomiting water-like fluid continuously at about 4 in the morning at fourth month of her pregnancy. At first a faith healer attended her; referred to hospital; we arranged money; and then took her to hospital at about nine; reached there at ten o'clock. We wasted important time by seeking care from an unskilled person and in managing money."

- Verbal Autopsy Respondent

Besides traditional healers, women also sought help from traditional birth attendants who were considered experts in childbirth. In some instances, women were only taken to the health facility if a TBA was unable to conduct the delivery.

"Generally we call the experienced old mother; who has been conducting deliveries from the past after labour pain starts. If the mother can't deliver the baby even after 24 hours of labour pain then we take her to the hospital."

- Brahmin woman, Rasuwa

"Labour pain started at four in the afternoon. Hand of the baby exposed out at about 4:30. Thinking that the traditional birth attendant was the only "skilled attendant" I went to call her but unfortunately she was not at her house. So I went to her maternal house. It was already 8:30 when we returned. By the time we returned home her condition was further deteriorated. The attendant examined her and found that the foetus was in

transverse position. If it was the day time we could have taken her to health facility but could not do so because it was already late in the evening. She died at about 9.30."

- Verbal Autopsy Respondent

"..... From 7 a.m. I got labour pain. First, TBA came. Then my husband went and called doctor..... She had checked and left saying that it was the delivery time. Then one of my mother-in-laws had called another TBA.. but father-in-laws said that the TBA is not experienced, and he would call another experienced TBA and he called mother of the TBA..., and she said the delivery would not be possible at home. Then I was taken to Dhangadhi (Hospital)....."

- Woman with eclampsia, Kailali

A religious practice that was most common among Hindu participants was the ceremony of *Nwaran*, before which women could not leave the premises of the house or touch anyone. In most cases, women were kept in a separate room for 11 days after delivery. Practices such as this prevent women from seeking postnatal care.

"Touching others is forbidden and since you are not allowed to touch others you should stay separate. We have a stove here but you can't touch it either. I didn't touch anyone and I had my food on a separate plate and my mother-in-law put my meal on it maintaining a distance from me."

- Woman who had sepsis, Jumla

While some traditions may be seen as harmless they may delay or prevent life saving treatment. One tradition that discouraged women from utilising services was the belief that they should not cross a river during pregnancy. This belief was a serious deterrent in communities located across a river from a health facility. Such was the case for one community in Jumla.

"The hospital in the market area is far away from here and they say that you should not go there as you would be haunted by ghosts while crossing the river and they say that the foetus will be haunted by a bad spirit and you will have to sacrifice animals. We seek treatment when the health worker comes to the village and take iron pills if the volunteer gives them. But generally women are not sent to the health post."

- Chhetri woman, Jumla

"We have a tradition that a woman should not cross her doorsteps after she has labour pain and if one does so she will be haunted by ghosts."

- Rai woman, Okhaldhunga

Another belief is that by putting hairs in a woman's mouth it will assist the delivery of the placenta:

"We helped her vomit three-four times by introducing hairs into her mouth and then she expelled placenta within half an hour of delivery. Her condition further deteriorated with development of dizziness within half an hour of expelling the placenta. Then she developed severe abdomen and chest pain with backache. Suddenly her body appeared bluish in colour and she developed frothing."

- Verbal Autopsy Respondent

"Labour pain started at ten in the morning. Traditional birth attendant was prepared to insert her hand into vagina to deliver the baby as it was molar presentation but I urged to wait for some time and take her to health post if needed. She delivered a baby at about 2:30. However, the placenta retained even after massaging. Placenta had retained for three days at one of my deliveries so I asked my daughter-in-law not to worry and advised to insert some hairs into her mouth to induce vomiting for pushing the placenta out. She did so, vomited but the placenta retained. Soon after that she developed severe bleeding

and her body appeared bluish in colour. She died after three and half hours of delivery. It was her fate."

- Verbal Autopsy Respondent

9.1.5 Too Shy or Ashamed to Seek Care

Laaj or shyness/shame was one of the main reasons that women gave for not going to a health facility. *Laaj* has been established as a barrier in seeking care among Nepalese women by previous studies and there is ample evidence from this study that corroborates these findings. In the study districts, women felt particularly ashamed if a service provider was male.

"It is said here that they (older women) had not lifted their skirts above their knees until now but women these days go to hospitals and everything is seen by the doctors."

- Dalit woman, Baglung

Some women from focus groups also thought it was shameful to go for check-up during pregnancy.

"I have met women who will say that they don't want to go for a check up because they are shy. When we tell them that they should go and that they will know about the baby's condition and they will also get to know about any difficulties, then they say that they had their earlier children without a check up. They think it's shameful to go."

- Brahmin woman, Surkhet

However, findings also revealed that with the change to increased awareness and openness, women were overcoming their shyness and seeking care to a limited extent.

"When there was problem at both of my deliveries my husband assisted me. During my earlier deliveries when I was told about going to hospital... I said, because of shame, I would rather die than go to a hospital but I understand these things nowadays."

- Dalit woman, Jumla

All respondents across the study districts, including women, service providers and traditional birth attendants highlighted the importance of having female staff at the health facilities. Shyness makes women reluctant to seek care from male providers especially for maternity care that entails examination of genitalia. Participants mentioned that women may return home without having a check-up or they may not go to the health facility altogether if there are only male providers.

"... It's better to have examination from a woman rather than a man. Women don't like to be seen by a male doctor...One of my relatives took me with her for her check-up in the PHCC. There, the sister (nurse) let the doctor do the exam. Then I complained, and asked the sister (nurse) why she had called the doctor.It would be better if the Government had sent a lady doctor for the service...."

- Dalit woman, Rupandehi

"...the third barrier in Nepal's context is that most health workers at S/HP are male and culturally women are embarrassed and they don't go for a check up if the providers are male."

- National stakeholder

9.1.6 Distance to Health Facilities and Lack of Transport

As discussed in Chapter 8, the long distance to health care facilities, particularly primary health centres and district hospitals, and the lack of readily available and affordable means of transport, constitute major physical obstacles for women trying to access health

care. These factors are particularly problematic for women living in remote or mountainous areas.

"...the location of the health institution also comes into play because if the health institution is not in a convenient place then it becomes difficult for women to come for services. Also, because of our geographical situation, health posts are not very near in mountainous and hilly regions. If the health institution is far away, then women will not be able to come, even though they want to come...."

- National stakeholder

"We had money for her treatment but it was very difficult for us to take her to the health facility as there was no means of transportation. We could have saved her if we had taken her to a health facility instead of attending to a faith healer."

- Verbal Autopsy Respondent

"We had money for her treatment but it was very difficult for us to take her to the health facility as there was no any means of transportation."

- Verbal Autopsy Respondent

".....there is the difficulty with transportation. From geographical point of view, to get to the health post takes up to 4 hours from some wards. For example, it takes pregnant women from Saramthali VDC, Ward no. 2 and 4, exactly 4 hours to get here. Despite all that, (pregnant women) are unsure whether they will get services or not...."

- Service provider, Rasuwa

".... The main problem for the people here is (lack of) transportation facility. It is difficult for them to walk all the way here..... Due to the transportation problem they can't bring the patient on time. Only if the hospital provides all the services for free then the perception of the people may change and the numbers may increase. Otherwise, the number is not going to increase. Although we have been giving Rs. 1,000 but even then there are not much people who have been coming...."

- District stakeholder, Okhaldhunga

"....The health post is a bit too far from villages. It is not much of a problem in the initial third or fourth months but in the later period, it becomes quite difficult to walk long distances due to women's large stomach. They have to walk up and downhill, so it is difficult for pregnant women to walk here."

- Dalit woman, Baglung

Participants, including women, service providers and key stakeholders, noted that in hill and mountain districts there is seldom easy access to motorable roads or vehicles, and therefore women rely on slower forms of transport such as *doko* (bamboo basket), *jholungo* (hammock), oxen cart and stretcher. Often these require people to carry the women to the facility or the nearest motorable road, which is difficult to arrange in some places, particularly at night.

"...Another problem is the geographical remoteness of this area. .it is difficult to reach health service..... Moreover, we don't even have a stretcher in our village... People still have to carry women in a jholungo (hammock). You can imagine the conditions."

- Rai women, Sunsari

"We called ambulance from hospital but it was not functioning at that time so we had to explore the possibility of getting a stretcher. We neither could get that."

- Verbal Autopsy Respondent

"I had difficulty reaching the hospital. I had severe pain due to retention of urine. I was carried up to the road by family members. Then, I was taken to the hospital in a rickshaw and then in a motor vehicle from there onwards."

- Magar woman, Kailali

"We managed money within 10 minutes but it took about two hours for us to manage vehicle and about one and half hour to reach the hospital. She died because of long distance to health facility and unavailability of transportation."

- Verbal Autopsy Respondent

9.1.7 Cost of Health Care

Studies have long established that out-of-pocket costs are a significant constraint in seeking maternal health services (Wyszewianski, 1986; Doorslayer et al., 2006; Hotchkiss et al., 1998, Puri et al., 2008). Financial barriers are not limited to the direct costs of treatment incurred at a health facility, but also include indirect costs such as transport; expenses by those accompanying the women; and opportunity costs forgone while seeking care, including loss of income. As noted in Chapter 8, affordability is still a major barrier to women accessing care.

The financial barriers to seeking care were more salient among the poor and strongly influenced their decision-making. There were frequent instances of people having to sell their assets or borrow money, which often forced them to put their home or farm as collateral, to cover all the costs associated with seeking formal care. Often the decision is taken late, and the time taken to accumulate the assets delays care further. For instance, a Muslim focus group discussion participant in Rupandehi stated:

"Foremost is the financial problem. Well-to-do people immediately take women to different places for treatment. Poor people think many times before finally deciding to take a woman for treatment. Only then do they start to search for money."

- Muslim woman, Rupandehi

"Labour pain started at about eleven in the morning but she could not deliver even after twelve hours. She did not agree to go to a facility saying that all her previous deliveries were also prolonged so nothing would happen and it would cost much if she is taken to a facility. She died at about five in the morning."

- Verbal Autopsy Respondent

"We decided to take her to the zonal hospital but had no money. The neighbours collected some money and took her to the hospital. It took about four hours to reach the hospital though it was at two kilometre distance."

- Verbal Autopsy Respondent

In interviews with women who had experienced a complication, and in focus group discussions with women, it was said that women may forgo treatment or seek care in the informal sector when they experience problems during pregnancy due to the high cost of care in the formal sector. This was the case for a woman from Jumla who was bleeding during her pregnancy and had a retained placenta after delivery:

"I started to bleed and could not walk and carry heavy things. There was no one else to do the work...it was difficult but I didn't do anything about it for 2 months as I had no money. I took some ayurvedic herbs instead but it didn't stop."

- Woman who had retained placenta, Jumla

Respondents, particularly women in focus group discussions and those who had had complications, said that limited financial resources meant families have consider carefully how best to spend their money. Women said that they would rather spend money on food, clothes and other items than on hospital delivery.

“Money spent in hospital could be used for getting proper food after the delivery. The in-laws also say the same thing. Money spent on staying in hospital can be utilised for getting better at home. That is why they say it is better to deliver at home.”

- Dalit woman, Baglung

For some women, the institutional delivery incentive was not enough to offset the cost of transport. For instance, a woman in Kailali who had pre-eclampsia and had to be taken to the zonal hospital said the Rs.500 she received was not enough:

“We had not arranged money at home. We had sold one pig. So, we had some money leftover from that. We could not arrange an ambulance and had to reserve a bus which cost more money...Rs. 4,500 was left out of Rs. 5,000 that was earned by selling the pig. That amount of money was totally spent on transportation.”

- Woman who had pre-eclampsia, Kailali

9.1.8 Demand Side Barriers Contributing to Maternal Deaths

Community Perception

All maternal death verbal autopsy respondents said the families experienced multiple delays in the community during the period leading up to the death.

“We did not take her to health facility because we had no money; there was no transport; health facility was far away; and we had trust in the faith healer.”

- Verbal Autopsy Respondent

Figure 9.1 quantifies the verbal autopsy respondents' perceptions of the main delays in the community contributing to maternal deaths. The results highlight delays in recognising there is a problem (48%); deciding to seek care (37%); the long distance to health facilities (33%); first seeking care from the informal sector (29%) lack of transport and time taken to arrange transport (28%); lack of finance and time taken to arrange finance (21%); too late at night (18%); and performing traditional rituals (18%). The findings are supported by the qualitative findings. The difficulty of seeking care at night is frequently over-looked as a factor in delayed care seeking, but the narrative sections of the verbal autopsies highlighted the importance of this. The respondents also recognised this as a problem in nearly one-fifth of cases.

Provider Perception

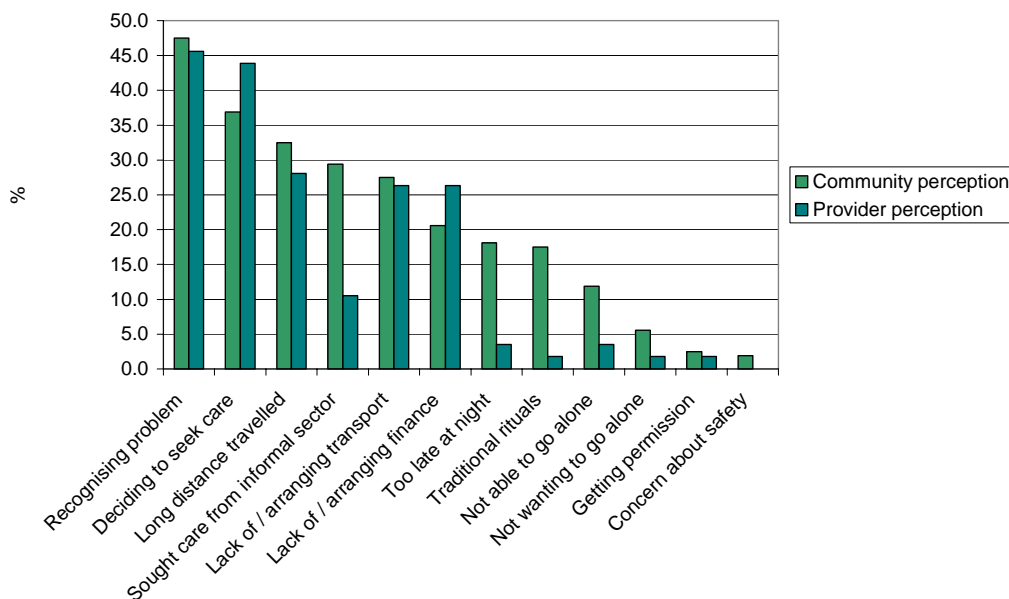
All providers who conducted maternal death reviews gave their perception of the delays faced in the community for hospital based maternal deaths (see Figure 9.1). Once again, in all cases multiple delays were recognised. The results again showed delays in recognising there is a problem (46%); deciding to seek care (44%); the long distance to a facility (28%); lack of finance and time taken to arrange finance (26%); lack of transport and time taken to arrange transport (26%); and delays caused by first seeking care from the informal sector (11%).

Agreement between community and providers

There was substantial agreement between the perceptions of communities and providers regarding the main delays in the community that may have contributed towards the maternal deaths (Figure 9.1). They agreed on the ranking of the leading three delays (recognising there was a problem; deciding to seek care and the long distance between communities and facilities). Interestingly members of the community were far more likely to recognise seeking care from the informal sector first as a problem. They were also more

likely to highlight the delays caused by night-time; traditional rituals; and not being able to or wanting to seek care alone or needing permission to seek care.

Figure 9.1: Perceptions of Delays Faced in the Community for Maternal Deaths



9.2 Supply Side Barriers

9.2.1 Availability of Services and Referral

Service users frequently experience long waiting periods at a facility, with some services unavailable at certain facilities or restricted to specific times or days, or when the required providers are available. These factors affect client satisfaction and their utilisation of services.

“ANC check-up is only given once a week so we will have to wait...They should provide the services daily.”

- Brahmin woman, Surkhet

The absence of regular services and previous experiences of not receiving care may discourage women from seeking care in the future. As discussed extensively in Chapter 8, the major factors affecting the availability of services were inadequate levels of human resources and lack of physical resources and facilities, which are discussed further below.

When services are unavailable or facilities unable to treat a complication, women may be referred to another facility, often incurring further delays due to the time taken to reach the facility; lack of transport and increased costs.

“At two months of pregnancy she developed fever and dizziness along with headache and lower abdominal pain. Later she developed foul smelling white discharge and she was taken to a medical shop. The discharge was controlled but she started heavy bleeding with clots. She was then taken to the primary health care centre. The PHCC referred her to a higher facility stating that management of ante partum haemorrhage was not possible there. The bleeding got worst on the way while travelling on the cart. We first took her to home and then reached hospital in the city after about three hours travel on a tractor. She died at about three at night the same day.”

- Verbal Autopsy Respondent

"She was admitted to the district hospital but the labour did not progress after eight hours. The hospital referred her to a private medical college at about eight o'clock stating that the baby was large in size and her cervix was also not dilated. She was admitted to the hospital. The next day at about ten o'clock in the morning the doctor informed the family they might do a caesarean section. However, the doctor waited until about three in the afternoon. She was given oxygen and was being taken to the operation theatre, but she died before reaching the operation table. She died of the doctor's negligence."

- Verbal Autopsy Respondent

"The delay in referral from the previous facility led to the death of the woman. She could have been saved if the previous facility referred her timely."

- Head of Department, Maternal Death Review

9.2.2 Quality of Facilities

Testimonies indicate that some women and service providers viewed health facilities as being cold, dilapidated and inadequate buildings. The appearance of the buildings discourages patients from going to facilities for care. Service providers reported that facilities were not patient-friendly.

"There is only one room for doing a check-up. Moreover, the building (of PHCC) was constructed in 2052 B.S. I am afraid it will collapse."

- Service provider, Okhaldhunga

Another service provider from a PHCC in Surkhet who was providing services through a makeshift VDC building said:

"...the thing is we don't have our own building. We are staying in VDC building and use the same room for ANC check up and for providing family planning services, IUD. We have to give everything from there. We provide counselling from the same place. Therefore, we haven't been able to provide enough services."

- Service provider, Surkhet

Participants pointed out that women were also discouraged from having an institutional delivery if they perceived the health facilities to be cold and uncomfortable.

"In the hospital we have to lie on cold bedding. They also put on cold saline and there is no one to hold us. Therefore it is so difficult for us there but it is very easy at home...at home we have far better care because we light a fire, have hot foods and get massage, which is not done in the hospital."

- Tamang woman, Rasuwa

Participants, mainly service providers, mentioned lack of equipment such as ultrasound machines (often referred to in the community as video x-rays), suction machines, blood pressure and weighing machines as a barrier to providing care. A few women said they have to travel to bigger facilities to get a sonogram because the health post or sub-health post in their community does not have the facilities.

"I had gone to the health post... a sister was there but she said they didn't have the required materials and asked us to go to the hospital. They said they couldn't do anything. I was experiencing excruciating pain and did not know what I was supposed to do!"

- Woman who had APH, Sunsari

"There are doctors but no equipment for giving the services. We have problems because there is no X-ray there (at the HP). We would not have to go all the way to Trisuli and Kathmandu if those facilities were available here."

- Brahmin woman, Rasuwa

Some service providers and a few women also stated that lack of basic amenities like water and electricity posed a serious challenge to service delivery.

"We have difficulty as we don't have light, if we ask the doctor to light something, he also doesn't have anything to make light with. They have to look for pine splinters (Salla ko diyalo) if a patient comes."

- Dalit woman, Jumla

Some women, service providers and key stakeholders felt there was no privacy during consultations, check-ups and even delivery, due to lack of space. Some service providers also said they had some space designated for maternal services but it was congested.

"There aren't enough beds and sometimes there will be two to three women delivering and at that time there won't be a place for the women to lie down. So we need more beds and rooms."

- Brahmin woman, Surkhet

9.2.3 Availability of Drugs and Supplies

The lack of drugs and supplies in health facilities contributes to delayed treatment. Women from focus groups and in case histories said that health facilities do not have medicines and hence they have to go to private pharmacies to purchase the required medication. Some women also complained about out of date medicines at the health facility. For some the lack of blood supply and essential equipment cost them their lives.

"They (health post) don't have medicine. They send us to buy it. They may not have medicine inside. The government doesn't provide. What can they do?"

- Dalit woman, Surkhet

"She was admitted to the hospital and after 3-4 hours she was taken to the operation theatre, at 10 pm; delivered a baby weighing 3.5 kg at 10:45 and was taken out after half an hour. She regained consciousness after half an hour but was not able to speak. She developed chest pain, restlessness and started taking out all the stitches, which led to bleeding from the operation site. Doctor asked for blood transfusion. We could not get blood as there was no electricity and the generator was also not working at that time. They managed for the oxygen supply but the first one did not work so they had to get a second one. We were able to get blood at about three o'clock in the morning but she died before the blood transfusion; four hours after delivery."

- Verbal Autopsy Respondent

"After delivery the woman was restless and her blood pressure had dropped, the patient's party was told to arrange blood for a transfusion, but they could not get the blood. Her condition was critical and she finally expired due to unavailability of blood."

- Staff Nurse, Maternal Death Review

"We did basic investigation and gave antibiotics. Due to unavailability of stock blood in blood bank, we transfused only few units of whole blood, but it was not sufficient."

- Death Review Respondent

Service providers also said that health facilities were short of drugs and supplies. They mentioned dextrose (saline), syntocin, oxytocin, methacin and haemacil as some of the drugs that are often out of stock at their facilities. They also said that the health facilities lacked delivery and suture kits, autoclaves for sterilisation, gloves, and pads for delivery. Both women and service providers stated that those accompanying the patient are asked to purchase these items externally. Women felt that such drugs should be readily available at health facilities and that they should not be responsible for procuring them.

"We don't have injections. We need dextrose, syntocin, oxytocin and sterile pads which we don't have. We need to send people to buy the sanitary towel...we don't have syntocin. When the delivery case comes we need to send someone to buy it."

- Service provider, Rasuwa

Lack of laboratory facilities was highlighted by a few women, service providers and key stakeholders. Service providers said they have to send women to another facility even for simple blood and urine tests, presenting another barrier for women seeking care, including the resultant increased costs.

"Financial constraints delayed the purchasing of emergency drugs, arrangement of blood and laboratory investigation. Besides that, the unavailability of a ventilator, deteriorated her condition and she finally died."

- Head of Department, Maternal Death Review

9.2.4 Availability and Ability of Staff

Lack of human resources was a major factor affecting the quality and responsiveness of maternal health services, as has been extensively discussed in chapter 8. Shortage of staff was a problem in all the study districts, but was more pronounced in remote, hill and mountain regions compared with Terai districts. The negative impact of this on quality of care is reflected in low utilisation. Some service providers said that inadequate staffing meant they could not spend sufficient time with each patient and were forced to rush through consultations. Similarly, women felt that they did not receive enough time and attention during their check-up.

"The doctor was unavailable for consultation and advice when the complication occurred so time was lost for the arrangement of blood and rapid management had not been done, this led to the death of woman."

-Staff Nurse, Maternal Death Review

"There is always a rush when there are only 2 or 3 of them (clinical staff) which is stressful for them and for us (clients). Its better if they don't get angry and check everyone slowly, I feel like that."

- Woman who had PPH, Jumla

"People from different villages come to a health centre after walking long distances... When they reach the facility, after walking for several hours, they are unable to find a health worker in the facility."

- National stakeholder

"There's a possibility of not receiving the service on time because there are only a few doctors there. It's a small health centre, that's why we have to wait."

- Dalit woman, Baglung

Participants lamented that in the absence of doctors or senior staff, patients were frequently referred elsewhere, even for minor procedures. Lack of skilled providers meant quality of care was compromised, as patients did not receive accurate, timely diagnosis or treatment.

"The lack of proper monitoring and management of eclampsia led to the death of 26 yrs old lady."

- Medical Officer, Maternal Death Review

"My wife was using Depo. She had gone to the health facility to get the injection but was not able to find the health worker even after three visits. She conceived. During the seventh month (20 days prior to her death) she developed vaginal bleeding. The next day

she attended the nearby sub health post but she was told this was normal during pregnancy. The next day at about four in the morning, she developed severe bleeding. The maternal and child health worker suggested to wait for some time as she thought it was not very severe."

- Verbal Autopsy Respondent

"There was no doctor when we reached the private nursing home where she had her antenatal care. We asked the authority to call the doctor who had attended her during antenatal visit but he came only after half an hour, after our continuous pressure. After the preliminary examination she was referred to a medical college. It was about seven o'clock in the evening when we reached the emergency ward of the hospital but there were no doctors on duty. She developed fits while she was there in the hospital. Despite her deteriorating condition we were informed that the doctor would attend her only at 10 o'clock in the next morning. We decided to take her to Kathmandu rather than waiting for the doctor, but other health workers did not allow us to take her out. The health workers gave her 4-5 injections while she was in the emergency ward but nothing improved. So at about two o'clock in the midnight we discharged her at our own risk and moved to Kathmandu. She died on the way."

- Verbal Autopsy Respondent

Women were discouraged when they went to the health facility and found health workers absent or coming late. Service providers cited training, personal leave and *kaaj* (deputation) as the main reasons for their absence.

"They don't have a person readily available to provide service. Once, when I went there, the person in-charge was not present. We had to call him."

- Woman who had APH, Rasuwa

"She was taken to medical college at about seven o'clock in the morning. There were no doctors on duty in the emergency ward and despite her deteriorating condition no one attended her for half an hour. The other staff started medicines including IV drips and oxygen for three hours. Then doctor came, examined her and said that she was anaemic and had low blood pressure. She died within 3-4 hours of arriving at the hospital, before blood was transfused and treatment was started."

- Verbal Autopsy Respondent

"At about one o'clock in the afternoon she complained of abdominal pain and bleeding. I called the nurse on duty but without even seeing her she said that it was normal and there was nothing to be worried about. Her condition deteriorated, with severe bleeding, vomiting and dizziness. On my second request the nurse phoned a doctor and asked for two injections, which she gave her, but nothing improved. The doctor came after 10-15 minutes but soon after that she died."

- Verbal Autopsy Respondent

Service providers felt that frequent transfer of staff between facilities affects staff motivation and the quality of service provided. Women also have to overcome the discomfort of seeing unfamiliar faces during successive visits and are often discouraged when a service provider they like is transferred. This affects service utilisation.

"...At that time the nurse was really nice she was not rude but now she has been transferred."

- Brahmin woman, Surkhet

"Politics has affected the quality of services ... for example, with change in the government, staff are transferred. This makes services unpredictable."

- District stakeholder, Jumla

9.2.5 Staff Attitude

As discussed in Chapter 8, both positive and negative experiences with service providers were reported. While positive encounters were reported, women said that negative attitudes and behaviour of health care staff discouraged them from utilising government maternal health care services. Participants reported carelessness and indifference on the part of service providers.

"... Doctor didn't say anything throughout the day ... when it became night they (health workers) said that they could not manage. I was about to die due to bleeding ... The nurses sat outside and sang songs. ..."

- Woman who had prolonged labour, Rasuwa

"After examination, the nurse in the emergency ward said "It's nothing serious; the doctor will attend her tomorrow only, so it's up to you whether or not to get her admitted". The hospital does not take care of the patients. If they had admitted and treated her the first night we attended the hospital, she could have been saved."

- Verbal Autopsy Respondent

The negative perceptions of government facilities, whether based on hearsay or actual experiences, can have serious consequences, as women choose to take the risks associated with home delivery rather than visit a health facility.

"They (women) prefer to deliver at home. They think health workers use stitches and forcibly take the baby out which would be more dangerous (than delivering at home). They said it is better to endure labour for 2-3 days and deliver at home because they use stitches in hospitals and it is expensive too. They think it would be comfortable to deliver at home and stitches would not be necessary either."

- Woman who had PPH, Baglung

In contrast, some women related good experiences of seeking care from service providers. They said that, compared with the past, health facility staff behaviour has improved.

"I liked the counselling given (by health workers). I was told I had become weak because I had been bleeding heavily so I was told to take vitamins and take care of the baby as well. They said I would have died if I had not gone to the PHCC; they gave me a new life. They advised me to take medicines and to stay away from the cold. I liked their advice."

- Dalit woman, Baglung

Many women interviewed who delivered at a health institution were pleased with the care they received. They were impressed by the politeness of service providers; prompt service; suggestions; advice; medicines; arrangements for mother and baby; and regular examinations and monitoring by the service providers.

"...I went to Maternity hospital for the first time too. They have good facility for both the mother and the child. The pregnant women can be relaxed. Most of the women have been going there....."

- Woman with complication, Rasuwa

"... I liked it very much because Madam behaved very politely. She is a very soft-spoken person. I liked Doctor's behaviour too. He looked after me very well. Things like giving medicines on time and their advice to pacify me were worth praising...."

- Woman with PPH, Baglung

"...I found everything right/good there. They provided good service. They checked me as soon as I arrived. They gave good advice, they would check every hour. ..."

- Woman with eclampsia, Surkhet

9.2.6 Supply Side Barriers Contributing to Maternal Deaths

Community perceptions

For all those who made it to a facility, families faced multiple supply side delays. Figure 9.2 quantifies the verbal autopsy respondents' perceptions of the main delays that contributed to the maternal deaths. They were overwhelmingly related to the inability of facilities to treat problems, either at the final facility visited (18%) or the previous facility (13%). Other barriers included inadequate clinical expertise (10%); shortage of health personnel (6%); the lack of blood (4%); delay in receiving treatment on admission (3%); the lack of transport from the referral facility (1%); and poor communication between facilities (1%); inadequate equipment (1%); lack of female personnel (1%); refusal of treatment on admission (1%); lack of essential drugs (1%).

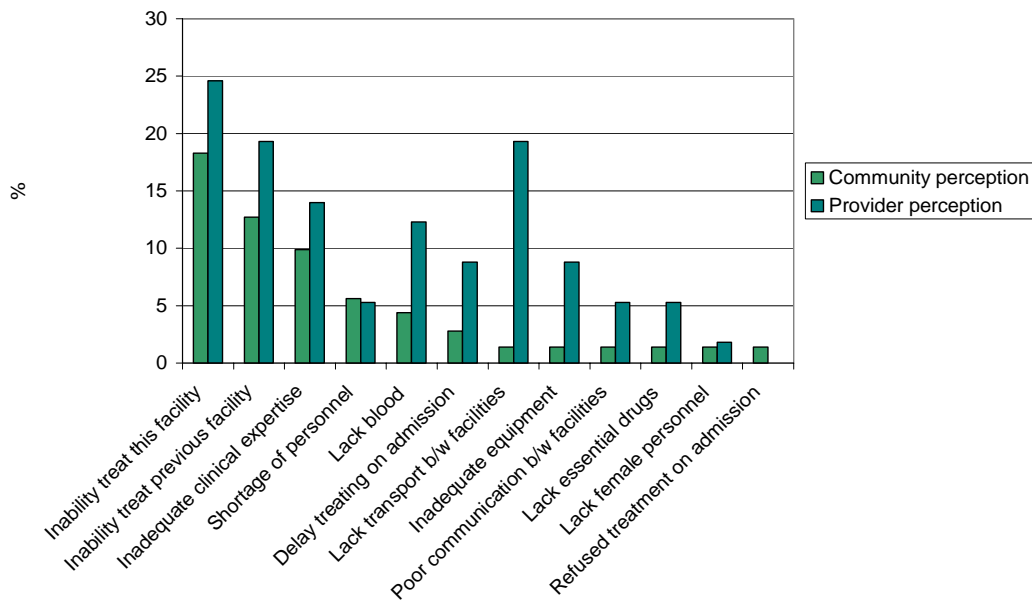
Provider perceptions

The Providers' perceptions of the main supply side delays contributing to maternal deaths are also shown in Figure 9.2. They were: inability to treat the problem at the facility (25%); inability to treat the problem at the previous facility (19%); lack of transport from the referring facility (19%); inadequate clinical expertise (14%); lack of blood (12%); inadequate equipment (9%); delay in receiving treatment in the facility (9%); poor communication between facilities (5%); shortage of health personnel (5%); lack of essential drugs (5%); and shortage of female health personnel (2%).

Agreement between community and providers

Both providers and the community felt that the inability to treat patients, either the initial facility or the final facility, was a major problem, as well as a lack of clinical expertise. Surprisingly a higher percentage of providers felt that lack of transport between facilities was a problem, compared with members of the community.

Figure 9.2: Perceptions of Delays Faced in the Facility for Maternal Deaths



9.3 Summary of Findings

A multitude of demand and supply side barriers contribute to maternal mortality and morbidity. At community level the main delays were in recognising there was a problem; deciding to seek care; and long travel times to a facility. One delay that is frequently overlooked was waiting until the next morning before seeking care when a problem occurred during the night. The level of understanding in the community regarding the need for routine care, and where to go, has reportedly increased, but it is still common practice to approach the informal sector first, and only seek formal care once it is clear a complication cannot be treated in the community. Women's low status, and the view that pregnancy and childbirth are 'normal' events that all women experience, often prevents their speaking out when they need medical assistance. This 'culture of silence', combined with heavy work commitments and initial opposition to their accessing care from family members, particularly mothers-in-law, often reduces the time available to get to a health facility, which may be far away. However, it was reported by many that family and social values have improved somewhat, making it easier for women to seek care and encouraging them to rest, limit heavy work and have a more nutritious diet during pregnancy.

Cultural practices also delay access to formal care, such as *Nwaran* (which forbids women from leaving the house or touching anyone for eleven days after delivery) and a superstitious belief that women should not cross a river during pregnancy. Use of TBAs was frequently cited as delaying access to formal care, although verbal autopsy narratives indicate they often recognise when they cannot treat a problem and refer on. In contrast, traditional healers and informal health workers are more likely to use inappropriate methods to try to treat the problem themselves, often delaying referral until a critical stage.

Many women prefer home deliveries. Some are influenced by peers - they see them having home deliveries so they expect to do the same; some prefer the home environment (warmth from a fire, hot food and massage) to the expense of a long, difficult journey to a cold, uncomfortable facility which lacks privacy and basic amenities; some are reassured by traditional healers that their delivery can be managed at home; while some are too shy to seek care from a health facility, especially if they have to see a male health provider. Those who do want to access formal care are often discouraged from doing so by the long distance to a health facility; limited transport options and the associated direct and indirect costs.

On the supply side, the absence of services at facilities, due to insufficient staffing, lack of drugs and supplies and poor quality buildings, may delay or even prevent women receiving treatment. Previous bad experiences, including poor staff attitudes and behaviour, may discourage them from seeking care in the future. As a result of supply side inadequacies, those accompanying patients frequently have to purchase the required medications externally. Women may experience multiple referrals when facilities are unable to treat a complication or lack laboratory testing facilities, incurring further delays due to the time taken to reach the next facility, including arranging transport and finding money to meet the increased costs.

9.4 Discussion

As noted in chapter 7, despite substantial inputs over a number of years on the part of the Nepal government and its safe motherhood partners, significant barriers still exist for women needing to seek maternal health care, on both the supply and demand side. The two are inextricably entwined and most barriers need to be addressed from both community and supply side to achieve meaningful change; single point interventions are

unlikely to be successful in removing entrenched barriers. For example the cost barrier needs to be tackled at community level (through emergency funds) and facility level (through maternity incentives and free delivery care) in order to really make a difference to poor families. The reluctance of women and their families to go to a health facility may be rooted in community beliefs and traditions, or lack of information about the importance and availability of services, but may also be the result of previous bad experiences (of poor services or no services at all) at a facility, or hearing of the bad experiences of others. Social exclusion and discrimination also operate at both community level, through exclusion from activities where information is provided, and in facilities, where staff may discriminate against poor and excluded women (World Bank & DFID 2006). Women led community mobilisation has proved successful in addressing some of these issues (Thomas 2008), but programmes also need to work with men and boys to transform gender-biased attitudes and practices (Barker et al. 2007). Positive results have been achieved through interventions, such as appreciative inquiry review and planning, that build communications and understanding between health service providers and communities, enabling each to understand the perspectives of the other and empowering communities to expect quality services as their right (Barker et al. 2007; VaRG 2009) and to work with facility staff to improve services.

Experiences of the SSMP Equity and Access Programme have also shown that targeted approaches are needed to eliminate barriers to care for marginalised groups, addressing the underlying issues of social exclusion and financial protection. The Nepal government has also recognised the need for special measures to help women in remote areas, with the development of a set of remote area guidelines outlining interventions that can be used to improve access for women under the extreme conditions of these areas (MoHP 2009).

While there is evidence of substantial improvements resulting from safe motherhood interventions such as those referred to above, addressing physical access barriers needs to go beyond the sub-sector to, for example, improve roads and communications (Babinard & Roberts 2006); improve coverage of reproductive health in education curricula and promote girls' education; and improve livelihoods to address the economic problems of poor families. Advocacy work with civil society organisations is also important to develop the political will to bring the equitable social and economic changes needed (Ensor et al. 2008).

CHAPTER 10: THE NEWBORN – LIVE BIRTHS, STILLBIRTHS AND NEONATAL MORTALITY



10.0 Introduction

This chapter presents the key findings related to the newborn; related to live births, stillbirths and neonatal mortality. The data presented in this chapter comes from a number of different study components. The surveillance system established across the eight study districts identified all live births, to provide a denominator for the maternal deaths and thus enable the computation of the MMR in Chapter Five. As stillbirths were not captured by this surveillance system, it is not possible to compute a crude birth rate for the study districts, however, the live birth rate has been computed. The surveillance system also collected information on the age of the mother, ethnicity and date of the birth, (the latter allowing seasonality of live births to be looked at). The EOC monitoring data provided information on stillbirths and neonatal deaths from all EOC facilities in the study area. The maternal death verbal autopsy data provided information on the birth outcome for all residents of the study districts who died from maternal causes. Throughout the chapter, comparisons are made with other studies providing community and facility-based data on crude birth rates, stillbirth rates and neonatal mortality in Nepal.

10.1 Live Births

During the study period 69,775 live births were recorded across the eight study districts (Table 10.1). It was not possible to compute the crude birth rate due to resource constraints, but comparisons can still be made between districts by looking at the number of live births per 1,000 population. Overall there was little variation between the study districts, although higher rates were seen in Surkhet (26 live births per 1,000 population) and Jumla (32 live births per 1,000 population).

Table 10.1: Live Births Identified to Usual Residents by District

District	Number of live births	Population 2008/09	Number of live births per 1,000 population
Okhaldhunga	3,268	177,117	18.5
Sunsari	13,826	740,113	18.7
Rasuwa	996	51,553	19.3
Baglung	6,075	306,110	19.8
Rupandehi	17,165	838,916	20.5
Kailali	16,331	745,362	21.9
Surkhet	8,839	336,853	26.2
Jumla	3,275	102,295	32.0
Total	69,775	3,298,319	21.2

10.1.1 Age of Mother

Table 10.2 shows the age of the mother, with nearly three quarters (73%) in their twenties, 11 percent under the age of twenty, 10 percent in their early thirties and 6 percent thirty-five or older. There was some variation between districts: Surkhet, for example, had the highest proportion of teenage mothers (21%), nearly double than that of the next highest, Baglung (12%). Okhaldhunga and Rasuwa had the highest proportions of women over thirty (26% and 28% respectively), compared with the overall rate of 16 percent.

Table 10.2: Age of Mother of Live Births Identified to Usual Residents by District

District	< 20 (%)	20-24 (%)	25-29 (%)	30-34 (%)	35+ (%)	Total number of live births
Sunsari	8.5	45.3	31.9	9.8	4.6	13,826
Rupandehi	7.5	41.5	32.0	12.9	6.1	17,165
Kailali	11.9	49.7	27.0	7.4	4.0	16,331
Okhaldhunga	11.0	36.8	26.5	13.1	12.7	3,268
Baglung	12.0	43.4	25.3	11.5	7.8	6,075
Surkhet	20.8	45.2	22.0	7.5	4.5	8,839
Rasuwa	9.2	36.7	25.8	15.3	13.0	996
Jumla	9.7	39.9	28.4	12.5	9.5	3,275
Total/Average	11.1	44.4	28.5	10.2	5.8	69,775

10.1.2 Ethnicity

The ethnicity of all live births to usual residents across the study area is shown in Table 10.3, broken down according to the groups given in Chapter One. In Jumla over three-quarters were Brahmin/Chhetri (77%); in Rasuwa most were Janjati (82%); and Baglung and Surkhet had the highest proportions of Dalits (30% and 31%). Sunsari and Rupandehi had the highest proportions of Terai/Madhesi/other castes, at 19 percent and 38 percent respectively, and these were the only two study districts with a notable proportion of Muslim births at 17 percent and 11 percent respectively. Okhaldhunga had the largest proportion of Newar births, at 6 percent.

Table 10.3: Ethnicity of Live Births Identified to Usual Residents by District

District	Brahmin/Chhetri (%)	Janjati (%)	Dalits (%)	Terai/Madhesi/other castes (%)	Muslim (%)	Newar (%)	Other (%)	Total number of live births
Sunsari	13.9	31.2	14.8	19.4	17.0	2.6	1.1	13,826
Rupandehi	19.0	18.4	12.3	38.1	10.7	1.5	0.0	17,165
Kailali	36.5	43.8	16.7	1.4	1.1	0.4	0.2	16,331
Okhaldhunga	34.8	48.4	11.1	0.0	0.0	5.7	0.0	3,268
Baglung	37.7	31.0	29.6	0.1	0.1	0.8	0.8	6,075
Surkhet	47.4	21.1	30.6	0.1	0.4	0.4	0.0	8,839
Rasuwa	14.1	82.0	2.8	0.0	0.0	1.1	0.0	996
Jumla	77.2	1.4	21.2	0.0	0.0	0.1	0.1	3,275
Total	30.7	29.8	17.9	13.6	6.3	1.4	0.3	69,775

10.1.3 Seasonality of Births

The number of live births by Nepalese month is shown in Figure 10.1, and Table 10.4 shows the same information for the corresponding one-month period in the Gregorian calendar. The months with the highest number of live births are Kartik through to Margh (mid-October to mid-December), just after the end of the monsoon period. The months with the lowest number of live births are those during the monsoon period: Ashadh to Ashwin (mid-June to mid-October).

Figure 10.1: Number of Live Births by Nepalese Month

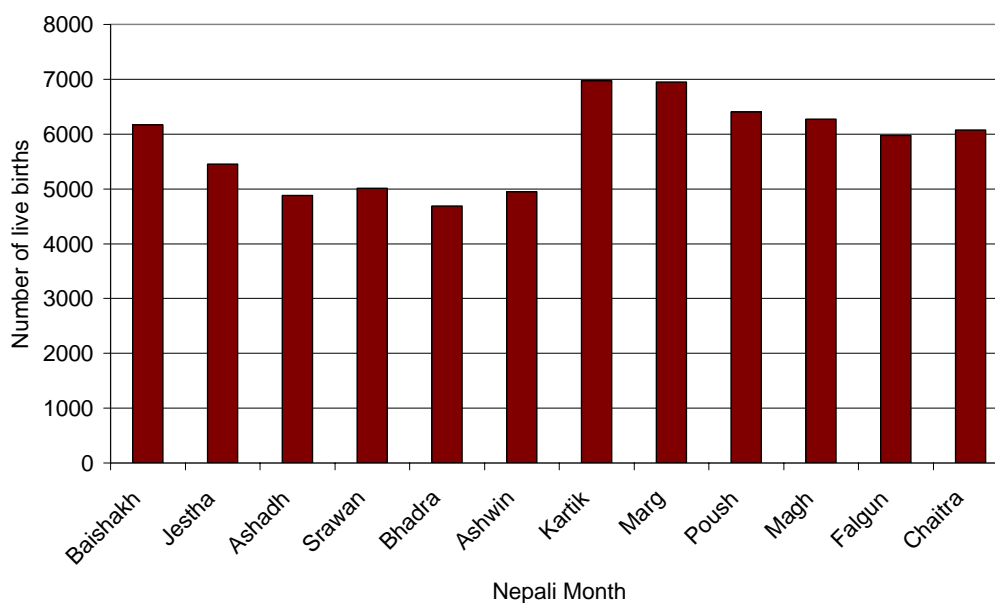


Table 10.4: Live Births by Gregorian Month of Delivery

Nepali month	Gregorian	Number of live births	Percent
Baishakh	April - May	6,166	8.8
Jestha	May - June	5,454	7.8
Ashadh	June - July	4,879	7.0
Shrawan	July - August	5,008	7.2
Bhadra	August - September	4,688	6.7
Ashwin	September - October	4,945	7.1
Kartik	October - November	6,972	10.0
Marg	November - December	6,947	10.0
Poush	December - January	6,401	9.2
Magh	January - February	6,269	9.0
Falgun	February - March	5,971	8.6
Chaitra	March - April	6,075	8.7
Total		69,775	100.0

10.1.4 National Crude Birth Rate Estimates

Table 10.5 shows the national Crude Birth Rate (CBR) estimates in Nepal since 1996, indicating a steady decline, from 37 per 1,000 population in 1996 (NFHS, 1996) to 23 in 2009 (CIA, The World Factbook). The 2009 figure is similar to our overall live birth rate of 21 per 1,000 population.

Table 10.5: National Crude Birth Rates

Reference	Date of Study	Crude Birth Rate per 1,000
NFHS 1996	1996	37.0
Population Census	2001	33.1
NDHS 2002	2001	33.5
NDHS 2007	2006	29.2
UNICEF	2008	28.0
CIA, The World Factbook	2009	23.2

10.2 Stillbirths

10.2.1 Stillbirths at EOC Facilities

The overall Stillbirth Rate (SBR) at the EOC facilities in the study districts is 22 per 1,000 births, ranging from a low of 11 per 1,000 births in Sunsari to 43 per 1,000 in Jumla and 78 per 1,000 in Okhaldhunga (Table 10.6). The rate in Okhaldhunga is very high, it is feasible that there has been some misclassification between stillbirths and neonatal deaths. More investigation is needed.

Table 10.6: Births, Stillbirths and Neonatal Deaths at EOC Facilities

District	Number of births	Number of live births	Number of stillbirths	Number of neonatal deaths	Stillbirth rate (per 1,000 births)	NMR (per 1,000 live births)
Sunsari	8,787	8,687	100	262	11.4	30.2
Rupandehi	10,473	10,183	290	250	27.7	24.6
Kailali	3,743	3,662	81	8	21.6	2.2
Okhaldhunga	309	285	24	6	77.7	21.1
Baglung	1,061	1,048	13	0	12.3	0.0
Surkhet	2,495	2,423	72	10	28.9	4.1
Rasuwa	37	36	1	0	27.0	0.0
Jumla	352	337	15	3	42.6	8.9
Total	27,257	26,662	596	539	21.9	20.2

10.2.2 National Stillbirth Rate Estimates

The overall stillbirth rate of 22 per 1,000 births from EOC facilities across the eight study districts is consistent with the national rate of 22 per 1,000 births (NDHS, 2007) shown in Table 10.7, and with the rate from the previous NDHS survey, since which there appears to have been little progress.

Table 10.7: National Stillbirth Rates

Reference	Date of Study	Stillbirth Rate per 1,000 births
NDHS, 2002	2001	21.9
NDHS, 2007	2006	22.2

10.3 Neonatal Deaths

10.3.1 Neonatal Deaths at EOC Facilities

Table 10.6 shows the overall Neonatal Mortality Rate (NMR) at the EOC facilities in the eight study districts was 20 per 1,000 live births (Table 10.6), with a good deal of district variation, due to small sample sizes.

10.3.2 National Neonatal Mortality Rate Estimates

The national estimates for neonatal mortality show a steady decline, from 50 per 1,000 in 1991 (NFHS 1997) to 33 per 1,000 in the 2006 NDHS (Table 10.8). These national figures are higher than the 20 per 1,000 calculated from the EOC monitoring data in the study districts (Table 10.6), but this would be expected, since the EOC data is facility based and most births in Nepal take place at home. However, a facility based study for the period of August 2002 to July 2004 in Dhanusha district found a NMR of 20 per 1,000 live births from a sample of 600 live births (Osrin et al. 2005).

Table 10.8: National Neonatal Mortality Rates

Reference	Date of Study	Neonatal Mortality Rate per 1,000 births
NFHS, 1997	1996 (0-4 years before the survey)	49.9
NDHS, 2002	2001 (0-4 years before the survey)	38.8
NDHS, 2007	2006 (0-4 years before the survey)	33.0
UNICEF, 2009	2004	32.0

10.4 Neonatal Outcome

The study attempted to record the neonatal outcome for all mothers who suffered from a maternal death (Table 10.9). Although the sample size is small, the results do indicate a poor neonatal outcome in the instance of a maternal death. Only 54 percent of the infants were alive at the time of visit: 16 percent were stillborn; 7 percent suffered an early neonatal death (0-6 days) and 9 percent a late neonatal death (7-28 days).

Table 10.9: Outcome for Infants of Mothers Who Suffered a Maternal Death

Outcomes for infants	Number	Percent
Alive now	57	53.8
Stillborn	17	16.0
Died aged 0-6 days	7	6.6
Died aged 7-28 days	9	8.5
Died after 28 days	4	3.8
Missing	12	11.3
Total	106	

10.5 Summary of Key Findings

The overall live birth rate of 21 per 1,000 population was found in the eight study districts is similar to the national CBR estimate of 23 per 1,000 in 2009 (CIA, The World Factbook). Nearly three-quarters (73%) of mothers in the study districts were in their twenties, with some variation of distribution among the districts. Surkhet had the highest percentage of teenage mothers (21%), while Okhaldhunga and Rasuwa had a higher proportion of older mothers (26% and 28% over 30 years respectively). The birth rate was lowest during the monsoon period and highest just after the end of the monsoon. The stillbirth rate for EOC facilities in the study districts was similar to the national average, but the neonatal mortality rate was lower, though similar to other facility based data. Poor outcomes were seen among the infants of those who suffered a maternal death, with only 54 percent alive at the time of the visit: 16 percent were stillborn, 7 percent were early neonatal deaths and 9 percent late neonatal deaths.

10.6 Discussion

The 2005 WHO World Health Report cites neonatal mortality as the most significant component of under-five child mortality, accounting for 37 percent of infant deaths globally between 2000-2003 (WHO 2005). Achieving the fourth Millennium Development Goal (to reduce under-five mortality by two-thirds by the year 2015) therefore requires a reduction in neonatal deaths. UNICEF shows that out of the 60 MDG priority countries, Nepal is one of only seven that are on track to meet MDG 4. Under-five mortality has declined from 145 per 1,000 live births in 1990 to 76 in 2004, an average annual reduction

rate that exceeds that required (0.5%) to meet the target figure of 48 deaths per 1,000 by 2015.

However, while it is encouraging to see evidence of positive results from the commitment to child health, some degree of under reporting of mortalities is likely, as most available data is facility based. The main causes of neonatal mortality are low birth weight; premature birth; birth asphyxia; pneumonia; sepsis; tetanus and hypothermia, many of which need to be addressed as part of maternal health care programmes. These have included the 1991 National Health Policy, which had the goal of reducing maternal and child mortality through the expansion of health services (Pant et al. 2008). This included development of the new cadre of MCHWs to provide community based maternal and child care, and provision for establishment of Primary Health Care Centres (PHCC) in all districts. The National Safe Motherhood Programme, initiated in 1997, represented a further commitment to reducing maternal mortality and neonatal deaths.

In 2002 Save the Children US published an in-depth review of the reasons behind the high prevailing rates of neonatal death in Nepal (Save the Children 2002), despite an overall decline in the infant mortality rate. The report states that neonatal mortality comprises a growing proportion of child mortality, due to a lack of skilled attendance at delivery, including aftercare, and the preference for home deliveries and traditional practices related to pregnancy and childbirth. These include restricting a pregnant woman's food intake to avoid the difficult delivery caused by a large baby; delivering in the animal shed because of pollution considerations and isolating the mother for up to a month after delivery. Lack of birth preparation, poorly ventilated rooms and disregard for hygiene put vulnerable newborns at risk of developing fatal illness. Knowledge of neonatal danger signs is typically low, meaning that often help is not sought until it is too late. Even when professional assistance is sought, the level of neonatal health training, especially in rural areas, is often poor.

There is increasing international recognition of the necessity for a holistic approach that embraces both maternal and child health, which has prompted the Nepal government to develop policies that target neonatal as well as maternal health. In its 2004 National Neonatal Health Strategy, the MoHP recognised that:

'prenatal and neonatal outcomes are inseparable from a women's health status and the quality of care available during pregnancy, delivery and the post partum period...the mother and baby should be treated as one entity and to be successful, any range of interventions that seek to prevent perinatal and neonatal deaths must address both maternal and neonatal factors.'

The strategy acknowledges that obstetric complications may directly impact upon foetal and newborn health, and that many maternal health initiatives will also improve neonatal health. These include, not only direct safe motherhood programmes, but also reproductive health initiatives, such as encouraging birth spacing, immunisation and nutrition education. The strategy also recognises the importance of behaviour change, proposing a wide-ranging approach to engage all factions of the community, in parallel with improving the competence and coverage of the public health system. The need for postnatal visits that provide standardised quality care is particularly emphasised.

The recently initiated Aama Programme, providing free delivery care and maternity incentives for delivery in a public health facility, is also expected to have a positive impact upon neonatal health in Nepal, as it encourages mothers to seek skilled delivery and postpartum care, a primary factor in reducing neonatal deaths.

REFERENCES

Chapter 1

Bennett, L., Dahal, D., & Govandasamy, P. (2008). 'Caste Ethnicity and Regional Identity in Nepal: Further Analysis of the 2006 Nepal Demographic and Health Survey'. Calverton, Maryland, USA: Macro Int'l Inc.

MoHP, New ERA and Macro Int'l. (2007). 'Nepal Demographic and Health Survey 2006', Ministry of Health and Population (Nepal), New ERA, and Macro International Inc., Kathmandu, Nepal & Calverton, Maryland.

Pathak, Laxmi Raj., Malla, Dibya Shree., Pradhan, Ajit., Rajlawat, Radhika., Campbell, Bruce B., & Kwast Barbara. (1998). 'Maternal Mortality and Morbidity Study'. Kathmandu, Nepal, Family Health Division, Department of Health Services, Ministry of Health, His Majesty's Government of Nepal.

UNDP (2004). 'Human Development Report: Empowerment and Poverty Reduction', United Nations Development Programme (UNDP), Kathmandu, Nepal.

Chapter 2

Acharya, L. & Cleland, J. (2000). 'Maternal and child health services in rural Nepal: Does access or quality matter more?', *Health Policy and Planning* 15(2): 223-9.

Bondevik, G., Lie, R., Ulstein, M. & Kvåle, G. (2001). 'Maternal haematological status and risk of low birth weight and preterm delivery in Nepal', *Acta Obstetrica et Gynecologica Scandinavica* 80(5): 402-8.

Bondevik, G., Ulstein, M., Lie, R., Rana, G. & Kvåle, G. (2000). 'The prevalence of anaemia in pregnant Nepali women - a study in Kathmandu', *Acta Obstetrica et Gynecologica Scandinavica* 79(5): 341-349.

Bonetti, T., Erpelding, A. & Pathak, L. (2004). 'Listening to "Felt Needs": Investigating Genital Prolapse in Western Nepal', *Reproductive Health Matters* 12(23): 166-175.

Bongaarts, J (1978). 'A framework for analyzing the proximate determinants of fertility', *Population and Development Review* 4(1): 105-132.

Bongaarts, J. & Potter, R. (1983). 'Fertility, biology, and behavior: an analysis of the proximate determinants', New York, N.Y./London, England, Academic Press.

Brooker, S., Hotez, P. & Bundy, D. (2008). 'Hookworm-related anaemia among pregnant women: A systematic review', *PLoS Neglected Tropical Diseases* 2(9): e291.

Carlough, M. (1997). 'More than hospitals are needed in Nepal', *Ophthalmology* 24: 9-10.

Chandyo, R., Strand, T., Ulvik, R., Adhikari, R., Ulak, M., Dixit, H. & Sommerfelt, H. (2006). 'Prevalence of iron deficiency and anaemia among healthy women of reproductive age in Bhaktapur, Nepal', *European Journal of Clinical Nutrition* 61(2): 262-269.

- Chawdhary, R., Rana, A. & Pradhan, N. (2009). 'Mifepristone plus vaginal misoprostol vs. vaginal misoprostol alone for medical abortion in gestation 63 days or less in Nepalese women: A quasi-randomised controlled trial', *Journal of Obstetrics and Gynaecology Research* 35(1): 78-85.
- Choe, M., Thapa, S. & Mishra, V. (2005). 'Early marriage and early motherhood in Nepal', *Journal of Biosocial Science* 37(2): 143-162.
- Christian, P., Bentley, M., Pradhan, R. & West, K. (1998a). 'An ethnographic study of night blindness "ratauni" among women in the *terai* of Nepal', *Social Science and Medicine* 46(7): 879-889.
- Christian, P., Katz, J., Wu, L., Kimbrough-Pradhan, E., Khatry, S., LeClerq, S. & West, K. (2008). 'Risk factors for pregnancy-related mortality: A prospective study in rural Nepal', *Public Health* 122(2): 161-172.
- Christian, P., West, K., Khatry, S., Katz, J., LeClerq, S., Kimbrough-Pradhan, E. & Shrestha, S. (1998b). 'Vitamin A or beta-carotene supplementation reduces but does not eliminate maternal night blindness in Nepal', *The Journal of Nutrition* 128: 1458-63.
- Christian, P., West, K., Khatry, S., Kimbrough-Pradhan, E., LeClerq, S., Katz, J., Shrestha, S., Dali, S. & Sommer, A. (2000). 'Night Blindness During Pregnancy and Subsequent Mortality among Women in Nepal: Effects of Vitamin A and beta-Carotene Supplementation', *American Journal of Epidemiology* 152(6): 542-7.
- Cleland, J. & Wilson, C. (1987). 'Demand Theories of the Fertility Transition: an Iconoclastic View', *Population Studies* 41(1): 5-30.
- CREHPA (Centre for Research on Environment, Health and Population Activities) (1999). 'Management of abortion-related complications in hospitals of Nepal - A situation analysis'.
- CREHPA (2000). 'Women in Prison in Nepal for Abortion', Kathmandu, Nepal.
- CREHPA, WHO & GoN (MoHP, FHD) (2006). 'Unsafe Abortion Nepal Country Profile'.
- Dangal, G. (2008). 'A study of reproductive morbidity of women in the Eastern *terai* region of Nepal', *Nepal Journal of Onstetrics and Gynaecology* 3(1): 29-34.
- Dhakal, S., Chapman, G., Simkhada, P., van Teijlingen, E., Stephens, J. & Raja, A. (2007). 'Utilisation of postnatal care among rural women in Nepal', *BMC Pregnancy and Childbirth* 7(19).
- Dreyfuss, M., Stoltzfus, R., Shrestha, J., Pradhan, E., LeClerq, S., Khatry, S., Shrestha, S., Katz, J., Albonico, M. & West, K. (2000). 'Hookworms, malaria and vitamin A contribute to anaemia and iron deficiency among pregnant women in the plains of Nepal', *The Journal of Nutrition* 130(10): 2527-2536.
- Faisel, H. & Pittrof, R. (2000). 'Vitamin A and causes of maternal mortality: association and biological plausibility', *Public Health Nutrition* 3(3): 321-327.
- FHD, New ERA & Macro Int'l. (2002). 'Nepal Demographic and Health Survey 2001', Family Health Division, Ministry of Health (Nepal), New ERA, and Macro International Inc., Kathmandu, Nepal & Calverton, Maryland, USA.

- Furuta, M. & Salway, S. (2006). 'Women's position within the household as a determinant of maternal health care use in Nepal', *International Family Planning Perspectives* 32(1): 17-27.
- Gittelsohn, J., Thapa, M. & Landman, L. (1997). 'Cultural factors, caloric intake and micronutrient sufficiency in rural Nepali households', *Social Science and Medicine* 44(11): 1739-1749.
- GoN & UN (National Planning Commission (Nepal) & United Nations Country Team) (2005). 'Nepal Millennium Development Goals: Progress Report 2005'.
- Gorstein, J., Shrestha, R., Pandey, S., Adhikari, R. & Pradhan, A. (2003). 'Current status of vitamin A deficiency and the National Vitamin A Control Program in Nepal: results of the 1998 National Micronutrient Status Survey', *Asian Pacific Journal of Clinical Nutrition* 12(1): 96-103.
- Gurung, G., Rana, A., Amatya, A., Bista, K., Joshi, A. & Sayami, J. (2007). 'Pelvic organ prolapse in rural Nepalese women of reproductive age groups: What makes it so common?', *Nepal Journal of Obstetrics and Gynaecology* 2(2): 35-41.
- Ipas (2009). 'An exploratory analysis of complications from comprehensive abortion care: Improvement of the quality of CAC services in Nepal'.
- Jahn, A., Dar, I., Shah, U. & Diesfeld, H. (2000). 'Maternity care in rural Nepal: A health services analysis', *Tropical Medicine and International Health* 5(9): 657-665.
- Jiang, T., Christian, P., Khatry, S., Wu, L. & West, K. (2005). 'Micronutrient deficiencies in early pregnancy are common, concurrent, and vary by season among rural Nepali pregnant women', *The Journal of Nutrition* 135: 1106-12.
- Jimba, M., Poudyal, A., Wakai, S. (2003). 'The need for linking healthcare-seeking behaviour and health policy in rural Nepal', *Southeast Asian Journal of Tropical Medicine and Public Health* 34(2): 462-3.
- Justice, J. (1986). *'Policies, plans and people: Culture and health development in Nepal'*, University of California Press, Berkeley/Los Angeles/London.
- Kafle, K., Madden, J., Shrestha, A., Karkee, S., Das, P., Pradhan, Y. & Quick, J. (1996). 'Can licensed drug sellers contribute to safe motherhood? A survey of the treatment of pregnancy-related anaemia in Nepal.', *Social Science & Medicine* 42(11): 1577-1588.
- Karki, Y. & Agrawal, G. (2008). 'Effects of communication campaigns on the health behaviour of women of reproductive age in Nepal: Further analysis of the 2006 Nepal Demographic and Health Survey', Calverton, Maryland, USA: Macro International Inc.
- Katz, J., West, K., Khatry, S., Humphrey, J., LeClerq, S., Kimbrough-Pradhan, E., Pokhrel, R., Sommer, A. (1995). 'Night blindness is prevalent during pregnancy and lactation in Nepal', *The Journal of Nutrition* 125(8): 2122-2127.
- Linehan, M., Shrestha, A., Ban, B., Rycus, P. (1996). 'Xerophthalmia prevalence in ten districts of the far and mid-western regions of Nepal' Abstract, XVIIth International Vitamin A Consultative Group Meeting, Guatemala City, Guatemala.

- Maharatta, R., & Shah, A., (2003). 'Genital prolapse in women of Bhaktapur, Nepal', *Nepal Medical College Journal* 5(1): 31-33.
- Matthews, S., & Gubhaju, B., (2004). 'Contextual influences on the use of antenatal care in Nepal', DHS Geographic Studies 2, Calverton, Maryland, USA: ORC Macro.
- MoHP, New ERA & Macro Int'l. (2007). 'Nepal Demographic and Health Survey 2006', Ministry of Health and Population (Nepal), New ERA, and Macro International Inc., Kathmandu, Nepal & Calverton, Maryland
- Navitsky, R., Dreyfuss, M., Shrestha, J., Khatry, S., Stoltzfus, R. & Albonico, M. (1998). 'Ancylostoma duodenale is responsible for hookworm infections among pregnant women in the rural plains of Nepal', *The Journal of Parasitology* 84(3): 647-651.
- Niraula, B. (1994). 'Use of health services in Hill villages in Central Nepal', *Health Transition Review* 4: 151-66.
- NMSS 1998 (Ministry of Health, Nepal) (1998). 'Nepal Micronutrient Status Survey (NMSS) 1998', Kathmandu, Nepal: Ministry of Health, Child Health Division, HMG/N, New ERA, Micronutrient Initiative, UNICEF Nepal & WHO.
- Ojha, N., Sharma, S. & Paudel, J. (2004). 'Post legalisation challenge: Minimising complications of abortion', *Kathmandu University Medical Journal* 2(2): 131-6.
- Pant, P., Suvedi, B., Pradhan, A., Hulton, L., Matthews, Z., & Maskey, M. (2008). 'Investigating recent improvements in maternal health in Nepal: Further analysis of the 2006 Nepal Demographic and Health Survey', Calverton, Maryland, USA: Macro International Inc.
- Panter-Brick, C., (1996). 'Proximate determinants of birth seasonality and conception failure in Nepal', *Population Studies* 50: 203-220.
- Pathak, Laxmi Raj., Malla, Dibya Shree., Pradhan, Ajit., Rajlawat, Radhika., Campbell, Bruce B., & Kwast Barbara. (1998). 'Maternal Mortality and Morbidity Study. Kathmandu, Nepal', Family Health Division, Department of Health Services, Ministry of Health, His Majesty's Government of Nepal.
- Pradhan, A., Aryal, R., Regmi, G., Ban, B., Govindasamy, P. (1997) 'Nepal Family Health Survey 1996', Ministry of Health (Nepal), New ERA, and Macro International Inc., Kathmandu, Nepal & Calverton, Maryland.
- Presern, C. (1992). 'Maternal Mortality in Nepal', *Nursing Times* 88(9): 64-65.
- Ranabhat, R., (1997). 'Study on risk factors, beliefs and care practices of women with utero-vaginal prolapse, Kathmandu, Nepal'. Dissertation, *Tribhuvan University*, Kathmandu (unpublished).
- Rayamajhi, R., Thapa, M., & Pande, S., (2006). 'The challenge of grandmultiparity in obstetric practice', *Kathmandu University Medical Journal* 4(1): 70-4.
- SEARO (2007). 'Improving maternal, newborn and child health in the South-East Asia Region - Nepal', from <http://www.searo.who.int/en/Section260/Section1808/Section1933.htm>

- Shakya, M. & McMurray, C. (2001). 'Neonatal mortality and maternal health care in Nepal: Searching for patterns of association', *Journal of Biosocial Science* 33(1): 87-105.
- Sharma, S., Yothin, S., Buppha, S. (2007). 'Access to health: Women's status and utilization of maternal health services in Nepal', *Journal of Biosocial Science* 39(5): 671-92.
- Sigdel, S. (1998). 'Primary health care provision in Nepal', GTZ/Primary Health Care Project, Kathmandu, Nepal.
- Simkhada, B., van Teijlingen, E., Porter, M. & Simkhada, P. (2006). 'Major problems and key issues in Maternal Health in Nepal', *Kathmandu University Medical Journal* 4(2): 258-263.
- Starbuck, E. (1993). 'Night blindness during pregnancy as a risk marker for early infant death in Jumla, Nepal', Doctoral Thesis, Johns Hopkins University, Baltimore, Maryland, USA.
- Suwal, J. (2008). 'Maternal mortality in Nepal: Unravelling the complexity', *Canadian Studies in Population* 35(1): 1-26.
- Tamang, A. & Tamang, J. (2005). 'Availability and acceptability of medical abortion in Nepal: Health care providers' perspectives', *Reproductive Health Matters* 13(26): 110-19.
- Thapa, P., Thapa, S. & Shrestha, N. (1992). 'A hospital-based study of abortion in Nepal', *Studies in Family Planning* 23(5): 311-318.
- Tuladhar, H. (2005). 'An overview of reproductive health of women in Bajhang district', *Nepal Medical College Journal* 7(2): 107-111.
- UK APPG (UK All Party Parliamentary Group) on Population, Development and Reproductive Health (2009). 'Better off dead? A report on maternal morbidity'.
- UNFPA & IOM (United Nations Population Fund & Institute of Medicine, Tribhuvan University, Kathmandu, Nepal) (2006). 'Status of reproductive morbidities in Nepal: a reproductive morbidity report on a clinic-based survey'.
- UNFPA (2006). 'The fallen womb: A hidden tragedy', feature story on 10.07.06 from <http://www.unfpanepal.org/en/news/news.php?ID=7>
- UNFPA (2007). 'Nepal Ceasefire Allows Mobile Team to Care for Women's Health', feature story on 05.04.2007 from <http://www.unfpa.org/public/global/pid/303>
- UNICEF & MoH (United Nations Children's Fund & Ministry of Health, Kathmandu, Nepal) (1996). 'National Maternity Care Guidelines, Nepal', Family Health Division, Ministry of Health (Nepal) & UNICEF, Kathmandu, Nepal.
- WHO (World Health Organization) (2007). 'Maternal Mortality in 2005: estimates developed by WHO, UNICEF, UNFPA, and the World Bank', WHO, Geneva, Switzerland.
- World Bank (2001). 'Understanding the access, demand and utilization of health services by rural women in Nepal and their constraints', from <http://www.healthnet.org.np/healthstat/worldbank/women-health.pdf> (accessed on 22.06.09).

Chapter 3

DoHS (Department of Health Services, Nepal) Annual Health Reports 1998-2007.

Harvey, S., Ayabacab, P., Bucaguc, M., Djibrinad, S., Edsona, W., Gbangbadee, A., McCaw-Binns, A. & Burkhalter, B. (2004). 'Skilled birth attendant competence: an initial assessment in four countries, and implications for the Safe Motherhood movement', *International Journal of Gynecology Obstetrics* 87(2): 203-210.

Harvey, S., Wong Blandón, Y., McCaw-Binns, A., Sandino, I., Urbina, U., Rodríguez, C., Gómez, I., Ayabaca, P., Djibrina, S. & the Nicaraguan maternal and neonatal health quality improvement group (2007). 'Are skilled birth attendants really skilled? A measurement method, some disturbing results and a potential way forward', *Bulletin of the World Health Organization* 85(10).

Kak, N., Burkhalter, B. & Cooper, M. (2001). 'Measuring the competence of healthcare providers', *Operation Research Issue Paper* 2(1), published for USAID by the Quality Assurance Project.

Pathak, Laxmi Raj., Malla, Dibya Shree., Pradhan, Ajit., Rajlawat, Radhika., Campbell, Bruce B., & Kwast Barbara. (1998). 'Maternal Mortality and Morbidity Study. Kathmandu, Nepal', Family Health Division, Department of Health Services, Ministry of Health, His Majesty's Government of Nepal.

Sharma, S., Yothin, S., Buppha, S. (2007). 'Access to health: Women's status and utilization of maternal health services in Nepal', *Journal of Biosocial Science* 39(5): 671-92.

WHO (2004). 'World Health Report 2004 - changing history', Geneva, Switzerland.

World Health Organization (1999). 'A Standard Verbal Autopsy Method for Investigating Causes of Death in Infants and Children', WHO/CDS/CSR/ISR/99/4, Geneva, Switzerland

Chapter 4

Ahmadi, A. (2007). 'Suicide by self-immolation: Comprehensive overview, experiences and suggestions', *Journal of Burn Care and Research* 28(1): 30-41.

Ahmed, M., van Ginneken, J., Razzaque, A. & Alam, N. (2004). 'Violent deaths among women of reproductive age in rural Bangladesh', *Social Science and Medicine* 59(2): 311-319.

Beautrais, A. (2002). 'Gender issues in youth suicidal behaviour', *Emergency Medicine* 14(1): 35-42.

Bhatia, Z., Khan, M., Mediratta, R. & Sharma, A. (1987). 'High risk suicide factors across cultures', *International Journal of Social Psychiatry*. 33(3): 226-236.

Brockington, I. (2001). 'Suicide in women'. *International Clinical Psychopharmacology* 16: 7-19.

CBS (Central Bureau of Statistics) (2003). 'National Population Census of Nepal 2001'.

- Chandran, M., Tharyan, P., Muliylil, J. & Abraham S. (2002). 'Post-partum depression in a cohort of women from a rural area of Tamil Nadu, India', *British Journal of Psychiatry* **181**: 499-504.
- Fleischmann, A., Bertolote, J., De Leo, D., Botega, N., Phillips, M., Sisask, M., Vijayakumar, L., Malakouti, K., Schlebusch, L., De Silva, D., Nguyen, V. & Wasserman, D. (2005). 'Characteristics of attempted suicides seen in emergency-care settings of general hospitals in eight low- and middle-income countries', *Psychological Medicine* **35**(10): 1467-1474.
- Kanchan, Y. & Menezes, R. (2008). 'Suicidal poisoning in Southern India: Gender differences', *Journal of Forensic and Legal Medicine* **15**(1): 7-14.
- Khan, M. & Reza, H. (1998). 'Gender differences in non-fatal suicide behaviour in Pakistan: Significance of socio-cultural factors', *Suicide and Life Threatening Behaviour* **28**: 62-68.
- Khan, M. (2002). 'Suicide on the Indian sub-continent', *Crisis* **23**: 104-107.
- Kumar, V. (2003). 'Burnt wives - a study of suicides', *Burns* **29**: 31-5.
- Mathers, C. & Loncar, D. (2006). 'Projections of global mortality burden of disease from 2002 to 2020', *PLoS Medicine* **3**(11): 2011-2029.
- MoHP, New ERA and Macro Int'l (2007). 'Nepal Demographic and Health Survey 2006', Ministry of Health and Population (Nepal), New ERA, and Macro International Inc., Kathmandu, Nepal & Calverton, Maryland.
- Patel, V. & Kleinman, A. (2003). 'Poverty and common mental disorders in developing countries', *Bulletin of the World Health Organization* **81**(8): 609-615.
- Pathak, Laxmi Raj., Malla, Dibya Shree., Pradhan, Ajit., Rajlawat, Radhika., Campbell, Bruce B., & Kwast Barbara. (1998). 'Maternal Mortality and Morbidity Study. Kathmandu, Nepal', Family Health Division, Department of Health Services, Ministry of Health, His Majesty's Government of Nepal.
- Pearson, V., Phillips, M., He, F. & Ji, H. (2002). 'Attempted suicide among young rural women in the People's Republic of China: possibilities for prevention', *Life-Threatening Behaviour* **32**(4): 359-368.
- Rizzi, R., Cordoba, R., & Maguna, J. (1998). 'Maternal mortality due to violence', *International Journal of Gynecology and Obstetrics* **63**(1): 19-24.
- Sanghavi, P., Bhalla, K., & Das, V. (2009). 'Fire-related deaths in India: a retrospective analysis of data', *The Lancet* **373**(9671): 1282-1288.
- Saxena, S., Thornicroft, G., Knapp, M. & Whiteford, H. (2007). 'Resources for mental health: Scarcity, inequity, and inefficiency', *The Lancet* **370**(9590): 878-889.
- Sherer, R. (2002). 'Mental health care in the developing world', *Psychiatric Times* **19**(1).
- Vijayakumar, L. (2004). 'Suicide prevention: The urgent need in developing countries', *World Psychiatry* **3**(3): 158-159.

Vijayakumar, L., Nagaraj, K., Pirkis, J. & Whiteford, H. (2005). 'Suicide in developing countries', *Crisis* 26(3): 104-124.

WHO (World Health Organization) (1993). 'The ICD-10 Classification of Mental and Behavioural Disorders: Diagnostic criteria for research', Division of Mental Health, WHO Geneva, Switzerland.

Chapter 5

Barnett, S., Nair, N., Tripathy, P., Borghi, J., Rath, S. & Costello, A. (2008). 'A prospective key informant surveillance system to measure maternal mortality - findings from indigenous populations in Jharkhand and Orissa, India', *BioMed Central Pregnancy and Childbirth* 8(6).

Berhane, Y., Andersson, T., Wall, S., Byass, P. & Hogberg, U. (2001). 'Aims, options and outcomes in measuring maternal mortality in developing countries', *Acta Obstetrica et Gynecologica Scandinavica* 79: 968-972.

Horon, I. (2005). 'Underreporting of Maternal Deaths on Death Certificates and the Magnitude of the Problem of Maternal Mortality', *American Journal of Public Health* 95(3): 478-482.

Khan, K., Wojdyla, D., Say, L., Gülmezoglu, A. & Van Look, P. (2006). 'WHO analysis of causes of maternal death: a systematic review', *The Lancet*, 367(9516): 1066-1074.

Manandhar, D., Osrin, D., Shrestha, B., Mesko, N., Morrison, J., Tumbahangphe, K. Tamang, S., Thapa, S., Shrestha, D. & Thapa, B. (2004). 'Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial', *The Lancet* 364(9438): 970-979.

Rana, A., Pradhan, N., Manandhar, B., Diki Bitsta, K., Adhikari, S., Gurung, G. & Amatya, A. (2009). 'Maternal mortality over the last decade: A changing pattern of death due to alarming rise in hepatitis in the latter five-year period', *Journal of Obstetrics and Gynaecology Research* 35(2): 243-251.

Ronsmans, C. & Graham, W. (2006). 'Maternal mortality: who, when, where, and why.', *The Lancet* 368(9542): 1189-200.

WHO (2007a). 'International Statistical Classification of Disease and Related Health Problems (ICD-10): 10th Revision': <http://apps.who.int/classifications/apps/icd/icd10online/>

WHO (2007b). 'Maternal Mortality in 2005: estimates developed by WHO, UNICEF, UNFPA, and the World Bank', WHO Geneva, Switzerland.

WHO (2009). 'Monitoring Emergency Obstetric Care: A Handbook', WHO, UNFPA, UNICEF, AMDD, WHO Geneva, Switzerland.

WHO (World Health Organization) (1993). 'The ICD-10 Classification of Mental and Behavioural Disorders: Diagnostic criteria for research', Division of Mental Health, WHO Geneva, Switzerland.

Chapter 6

Farkouh, N., (2009). 'Reframing Maternal Health in Nepal', *Policy Matters Journal*, Spring 2009.

Filippi, V., Ganaba, L., Baggaley, R., Marshall, T., Storeng, K., Sombié, I., Ouattara, F., Ouedraogo, T., Akoum, M., Meda, N. (2007). 'Health of women after severe obstetric complications in Burkina Faso: a longitudinal study', *The Lancet* 370(9595): 1329-1337.

Geller, S., Rosenberg, D., Cos, S., Brown, M., Simonson, L., Driscoll, C., Kilpatrick, S. (2004). 'The continuum of maternal morbidity and mortality: Factors associated with severity', *American Journal of Obstetrics and Gynecology* 191(3): 939-944.

Hindin, M. (2007). 'Contraception, safe abortion, and maternal morbidity', *The Lancet* 370(9595): 1294-5.

Last, J. (1995). 'A Dictionary of Epidemiology', 3d ed., New York: Oxford University Press.
Simkhada, B., van Teijlingen, E., Porter, M. & Simkhada, P. (2006). 'Major problems and key issues in Maternal Health in Nepal', *Kathmandu University Medical Journal* 4(2): 258-263.

Smith, J., Lakhey, B., Thapa, S., Rajbhandari, S., Neupane, S. (1996). 'Maternal morbidity among women admitted for delivery at a public hospital in Kathmandu', 34(118-119): 132-140.

UK APPG (UK All Party Parliamentary Group) on Population, Development and Reproductive Health (2009). 'Better off dead? A report on maternal morbidity'.

Chapter 7

Campbell, O., & Graham, W. (2006). 'Strategies for Reducing Maternal Mortality: Getting on with what works', *The Lancet* 368(9543): 1284-1299.

Devkota, M., et al, (2006). Utilisation of Rural Maternity Delivery Services in Six Districts of Nepal: A Qualitative Study, Access Programme, USAID.

Ensor, T., & Cooper S. (2004). 'Overcoming barriers to health service access: influencing the demand side', *Health Policy and Planning* 19(2): 69-79.

Matsumura, M., & Gubhaju, B. (2001). 'Women's status, household structure and the utilisation of maternal health services in Nepal.', *Asia-Pacific Population Journal* 16(1): 23-44.

Murray, S., & Pearson, S. (2006). 'Maternity referral systems in developing countries: Current knowledge and future research needs', *Social Science and Medicine* 62(9): 2205-2215.

Shen, C., & Williamson, J. (1999). 'Maternal mortality, women's status and economic dependency in less developed countries: a cross-national analysis.', *Social Science and Medicine* 49(2): 197-214.

World Bank & DFID (2006). 'Unequal Citizens: Gender, Caste and Ethnic Exclusion in Nepal'

Chapter 8

Duley, L., Gülmezolgu, A., & Henderson-Smart, D. (2004). 'Magnesium sulphate and other anti-convulsants for women with pre-eclampsia', *Cochrane Database of Systematic Reviews*, Issue 4. Art. No.: CD000025.

Elbourne, D., Chalmers, I., & Prendiville, W. (1988). 'The effect of routine oxytocic administration in the management of the third stage of labour: an overview of the evidence from controlled trials', *British Journal of Obstetrics and Gynecology* 95(1): 3-16.

Forna, F., & Gülmezolgu, A. (2001). 'Surgical procedures to evacuate incomplete abortion', *Cochrane Database of Systematic Reviews* Issue 1, Art. No.: CD0011993.

Jha, M. (2009). 'Pregnancy Outcome of Single Previous cesarean Section', *Journal of Nepal Health Research Council* 7(1).

Kovavisarach, E., & Jirasettasiri, P. (2005). 'Randomised controlled trial of perineal shaving versus hair cutting in parturients on admission in labor', *Journal of the Medical Association of Thailand* 88(9): 1167–1171

Lavender, T., & Mlay, R. (2006). 'Position in the second stage of labour for women without epidural anaesthesia: RHL commentary', *The WHO Reproductive Health Library* Geneva: World Health Organization.

Lugina, H., Mlay, R., Smith, H. (2004). 'Mobility and maternal position during childbirth in Tanzania: an exploratory study at four government hospitals', *BMC Pregnancy & Childbirth* 4(3).

Lumbiganon, P., Laopaiboon, M., Gülmezoglu, M., Souza, J., Taneepanichskul, S., Ruyan, P., Attygalle, D., Shrestha, N., Mori, R., Hinh, N., Bang, H., Rathavy, T., Chuyun, K., Cheang, K., Festin, M., Udomprasertgul, V., Germar, M., Yanqiu, G., Roy, M., Carroli, G., Ba-Thike, K., Filatova, E. & Villar, J. (2010). 'Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007-08', *The Lancet* 375(9713): 490-499.

Mullany, B. (2006). 'Barriers to and attitudes towards promoting husbands' involvement in maternal health in Kathmandu, Nepal', *Social Science & Medicine* 62(11).

Pant, P., Suvedi, B., Pradhan, A., Hulton, L., Matthews, Z. & Maskey, M. (2008). 'Investigating recent improvements in maternal health in Nepal: Further analysis of the 2006 Nepal Demographic and Health Survey', Calverton, Maryland, USA: Macro International Inc.

Racinet C, Eymery P, Philibert L, Lucas C. (1999). 'Labor in the squatting position: A randomized trial comparing the squatting position with the classical position for the expulsion phase', *Journal de gynecologie, obstetrique et biologie de la reproduction* 28(3): 263-270.

Revez, L., Gaitán, H. & Cuervo, L. (2007). 'Enemas during labour', *Cochrane Database of Systematic Reviews*, Issue 4, Art. No.: CD000330.

Singata, M., Tranmer, J. & Gyte, G. (2010). 'Restricting oral fluid and food intake during labour', *Cochrane Database of Systematic Reviews*, Issue 1, Art. No.: CD003930.

Smaill, F. & Hofmeyr, G. (2002). 'Antibiotic prophylaxis for cesarean section', *Cochrane Database of Systematic Reviews*, Issue 3, Art. No.: CD000933.

Viswanathan, M., Hartmann, K., Palmieri, R., Lux, L., Swinson, T., Lohr, K., Gartlehner, G. & Thorp, J. (1995). 'The Use of Episiotomy in Obstetrical Care: A Systematic Review', Evidence Report/Technology Assessment No. 112. (Prepared by the RTI-UNC Evidence-based Practice Center, under Contract No. 290-02-0016.) AHRQ Publication No. 05-E009-2, Rockville, MD: Agency for Healthcare Research and Quality.

World Health Organisation (2009). 'Monitoring emergency obstetric care: A handbook', Geneva, Switzerland.

Chapter 9

Babinard, J. & Roberts, P. (2006). 'Maternal and child mortality development goals: what can the transport sector do?', World Bank, Washington DC.

Barker, G., Ricardo, C., & Nascimento, M. (2007). 'Engaging men and boys in changing gender-based inequity in health: Evidence from programme interventions', WHO/Promundo, Geneva, Switzerland.

Doorslayer, E., O'Donnell, O., Rannan-Eliya, R.P., Somanathan, A., Adhikari, S.R., Garg, C.C., Harbianto, D., Herrin, A.N., Huq, M.N., Ibragimova, S., Karan, A., Ng, C.W., Pande, B.R., Racelis, R., Tao, S., Tin, K., Tisayaticom, K., Trisnantoro, L., Vasavid, C. and Zhao, Y. (2006). Effect of payments for health care on poverty estimates in 11 countries in Asia: An analysis of household survey data, *The Lancet*, 368, pp1357-1364.

Ensor, T., Clapham, S., & Prasai, D. (2008). 'What drives health policy formulation: Insights from the Nepal maternity incentive scheme?', *Health Policy* 90(2): 247-253.

Hotchkiss DR, Rous RJ, Karmachrya K and Sangraula P (1998). Household health expenditure in Nepal. Implications for health care financing reform. *Health Policy and Planning*, 13(4): 371-383.

MoHP (Family Health Division, DoHS, MoHP) (2009). 'Guidelines for Safe motherhood Services in Remote Areas: Options for Improving Maternal Outcomes'

O'Donnell, O (2007). Access to health care in developing countries: breaking down demand side barriers. *Review*, 23 (12) 2820-2834.

Puri, M, Horstman, R, Matthews, Z, Falkingham, J, Padmadas, S and Devkota, S (2008). Examining out-of-pocket expenditures on reproductive and sexual health among the urban population of Nepal. *Population Review*, 47 (2) 50-66.

Thomas, D. (2008). 'Review of the Equity and Access Programme', SSMP Kathmandu, Nepal VaRG (Valley Research Group) (2009), End-line Survey on Knowledge, Attitude and Practices on Safe Motherhood and Neonatal Health conducted for SSMP/ActionAid Equity and Access Programme (unpublished).

World Bank & DFID (2006). 'Unequal Citizens: Gender, Caste and Ethnic Exclusion in Nepal' Wyszewianski, L (1986). Families with catastrophic health care expenditures. *Health Service Research*, 21(5) 617-634.

Chapter 10

Ajit Pradhan, Ram Hari Aryal, Gokarna Regmi, Bharat Ban and Pavalavalli Govindasamy (1997). *Nepal Family Health Survey 1996*. Kathmandu, Nepal and Calverton, Maryland: Ministry of health [Nepal], New ERA, and Macro International Inc.

CBS (Central Bureau of Statistics) (2001). 'National Census Report 2001', Kathmandu, Nepal.

CBS (Central Bureau of Statistics) (1995). 'Population Monograph of Nepal', Kathmandu, Nepal.

CIA, The World Factbook from <https://www.cia.gov/library/publications/the-world-factbook/geos/np.html> (accessed on 20.10.09).

Ministry of Health and Population (MoHP) [Nepal], New ERA, and Macro International Inc. (2007). 'Nepal Demographic and Health Survey 2006'. Kathmandu, Nepal: Ministry of Health and population, New ERA, and Macro International Inc.

Ministry of Health [Nepal], New ERA, and ORC Macro (2002). 'Nepal Demographic and Health Survey 2001'. Calverton, Maryland USA: Family Health Division, Ministry of Health; New ERA; and ORC Macro.

Osrin, D., Vaidya, A., Shrestha, Y., Baniya, R., Manandhar, D., Adhikari, R., Filteau, S., Tomkins, A. & del Costello, A. (2005). 'Effects of antenatal multiple micronutrient supplementations on birth weight and gestational duration in Nepal: double-blind, randomised controlled trial', *The Lancet* 365(9463): 955-962.

Pant, Prakash, Suvedi, Bal Krishna, Pradhan, Ajit, Hulton, Louise, Matthews, Zoe & Maskey, Maskey (2008). 'Investigating recent improvements in maternal health in Nepal: Further analysis of the 2006 Nepal Demographic and Health Survey', Calverton, Maryland, USA: Macro International Inc.

Save the Children (2002). 'State of the World's Newborns: Nepal'.

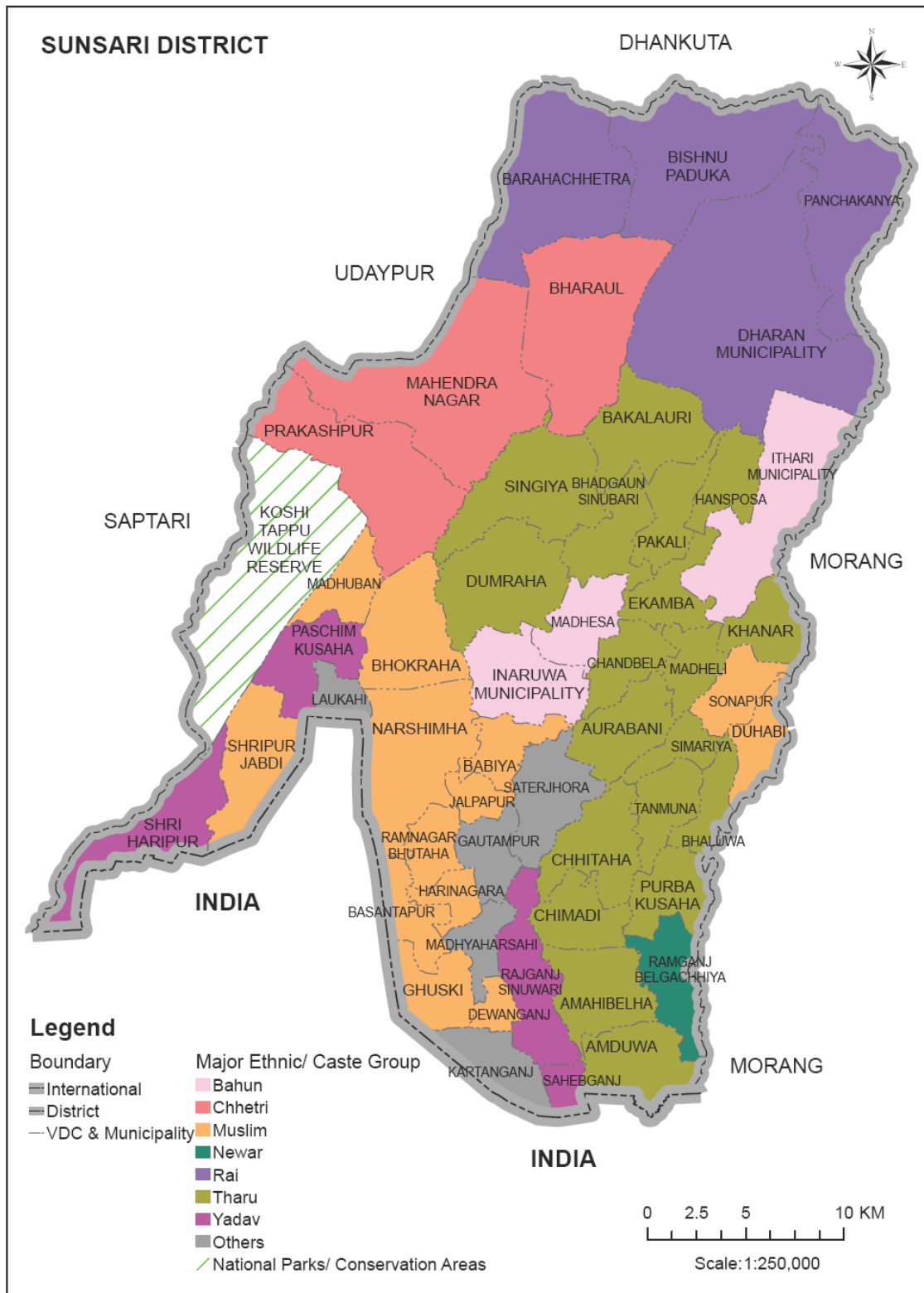
Unicef (2009). 'Tracking Progress on Child and Maternal Health Nutrition: A Survival and development Priority'. New York, USA.

UNICEF (MDG 4), 'Millennium Development Goal' 4 from <http://www.unicef.org/mdg/mortalitymultimedia/index.html> (accessed on 15.03.10).

WHO (World Health Organization) (2005). 'The World Health Report 2005 - Make every mother and child count', WHO Geneva, Switzerland.

APPENDICES

Appendix 1.1: Map showing the distribution of major ethnic/caste groups in Sunsari

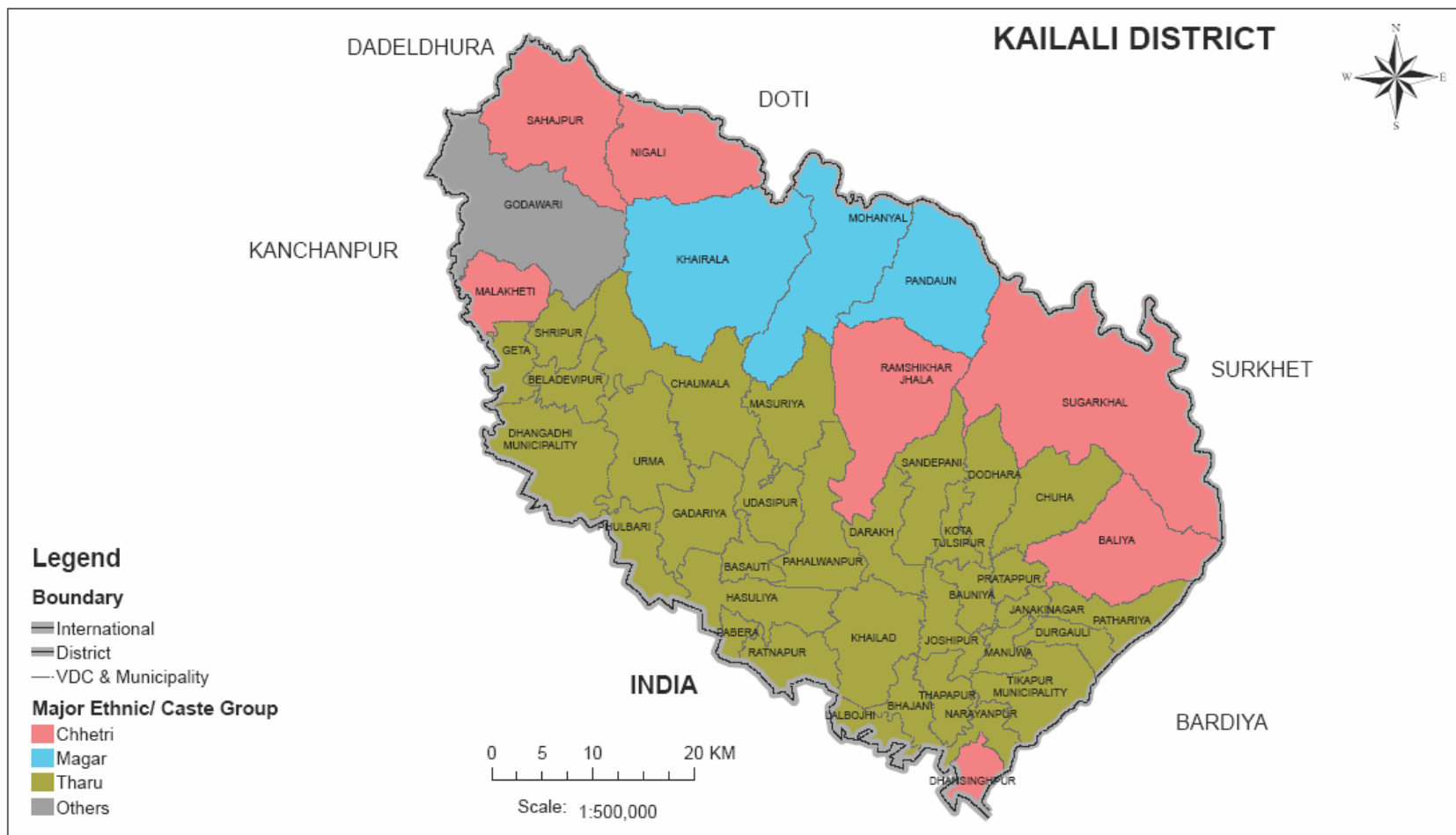


Data Source: Population Census of Nepal, 2001 Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

Appendix 1.2: Map showing the distribution of major ethnic/caste groups in Rupandehi



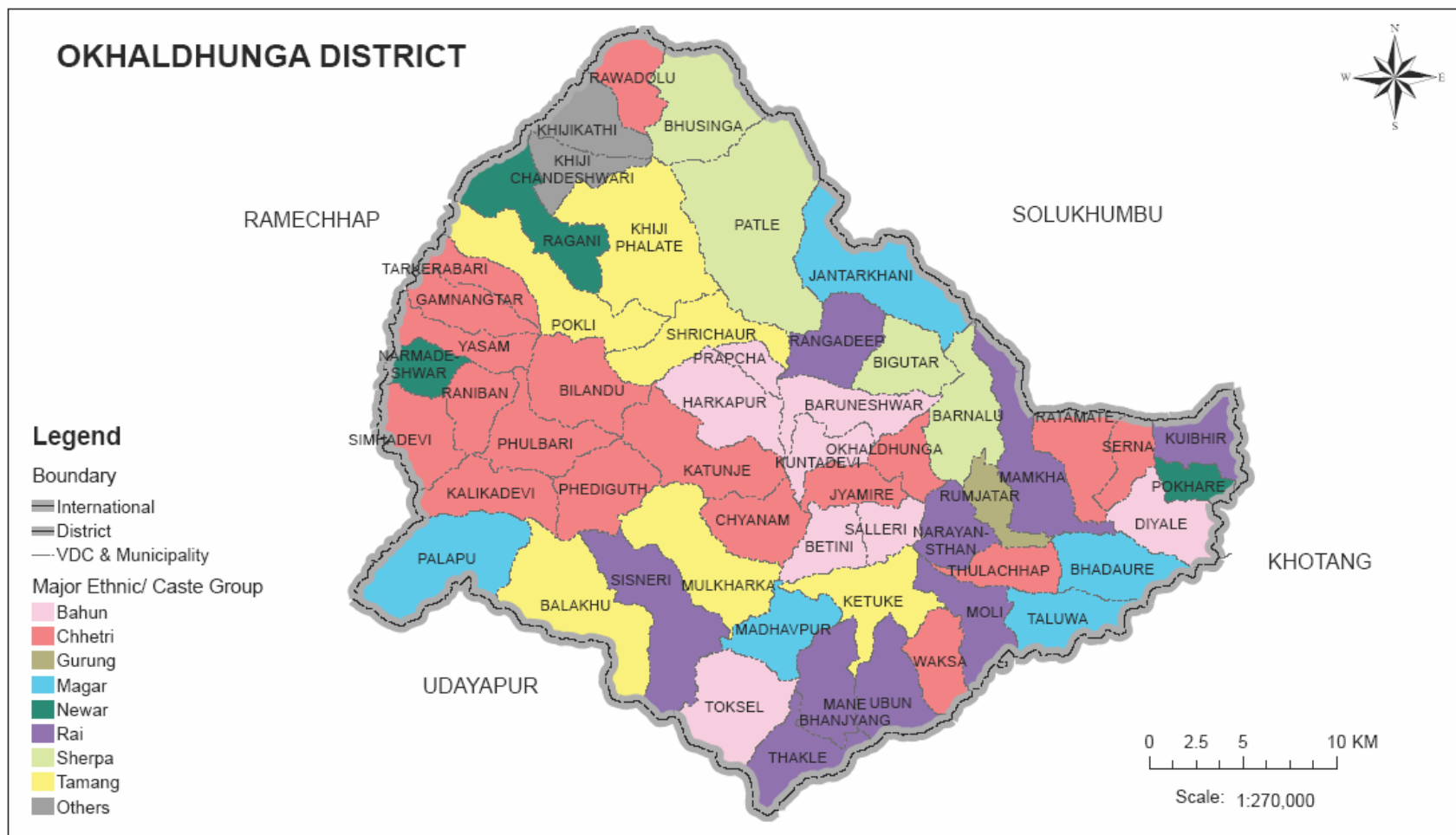
Appendix 1.3: Map showing the distribution of major ethnic/caste groups in Kailali



Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

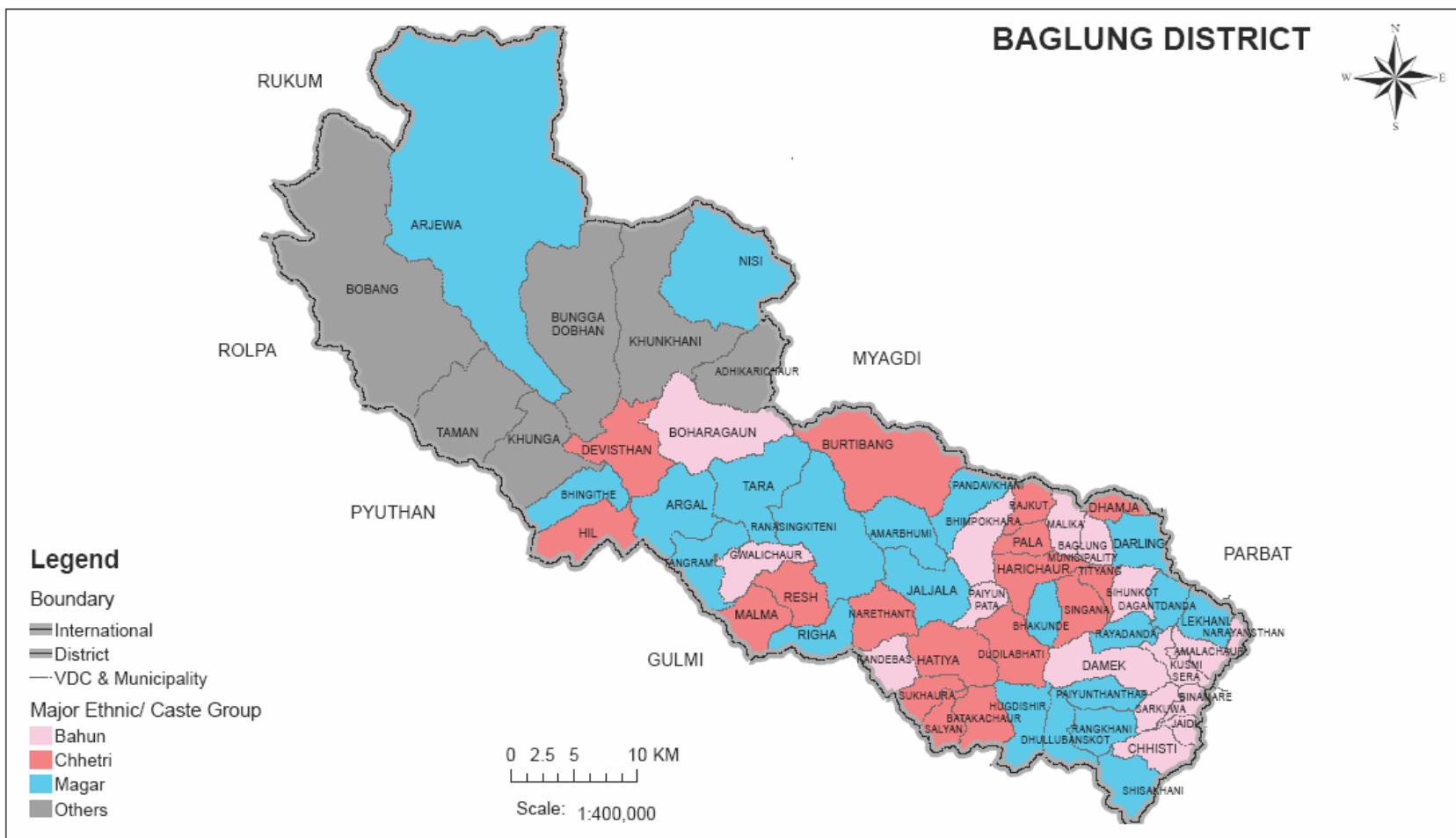
Appendix 1.4: Map showing the distribution of major ethnic/caste groups in Okhaldhunga



Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

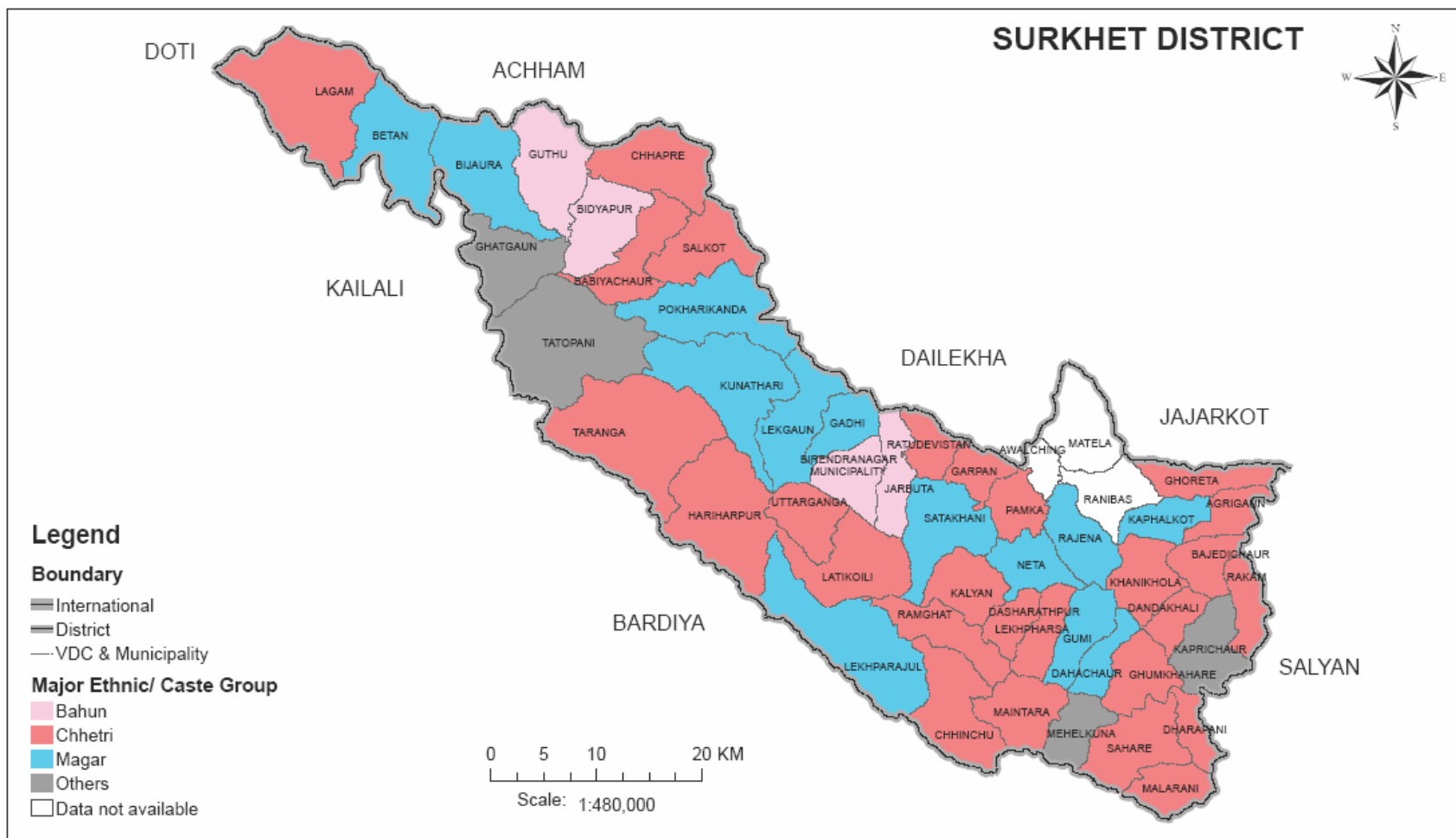
Appendix 1.5: Map showing the distribution of major ethnic/caste groups in Baglung



Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

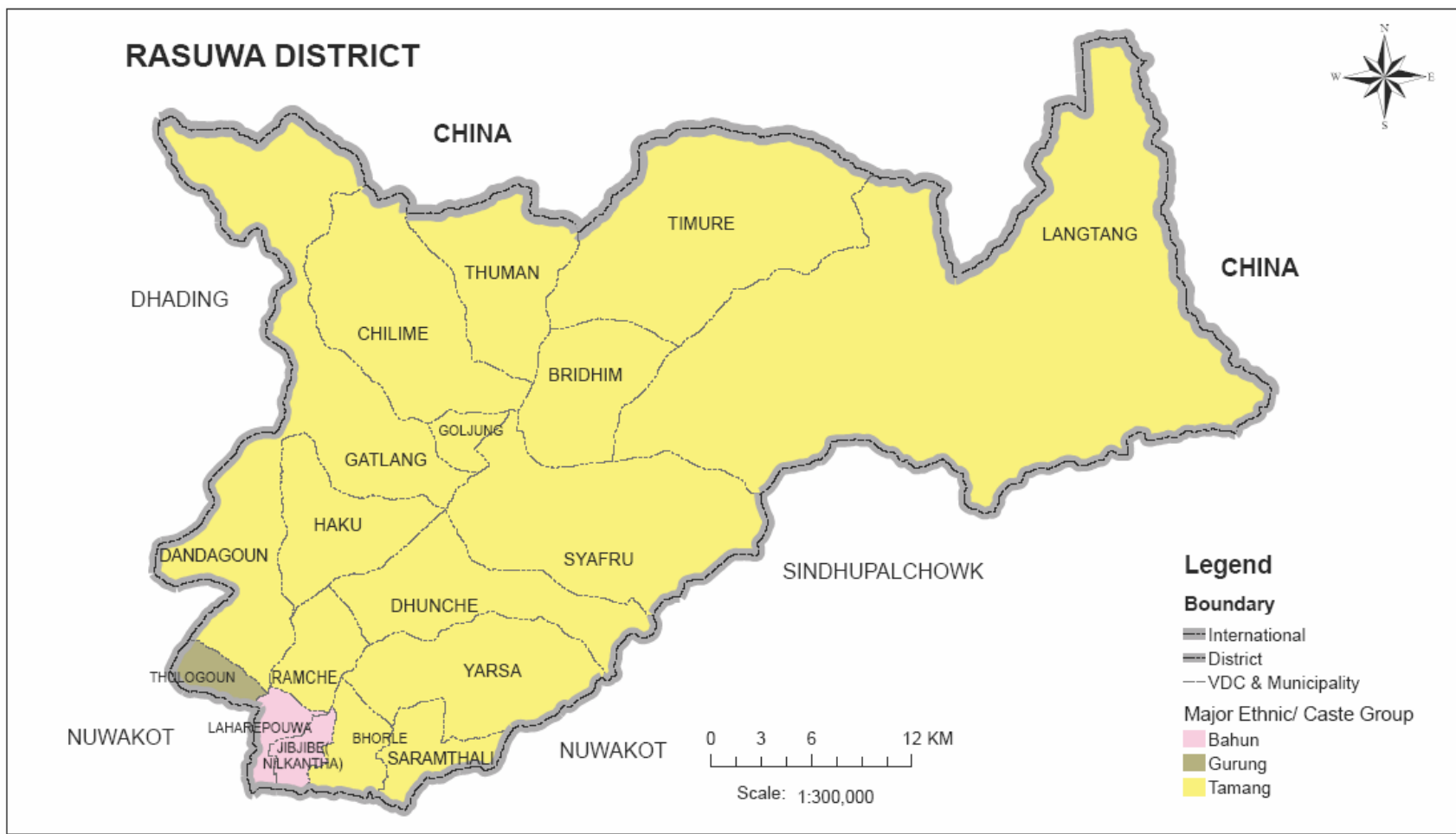
Appendix 1.6: Map showing the distribution of major ethnic/caste groups in Surkhet



Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

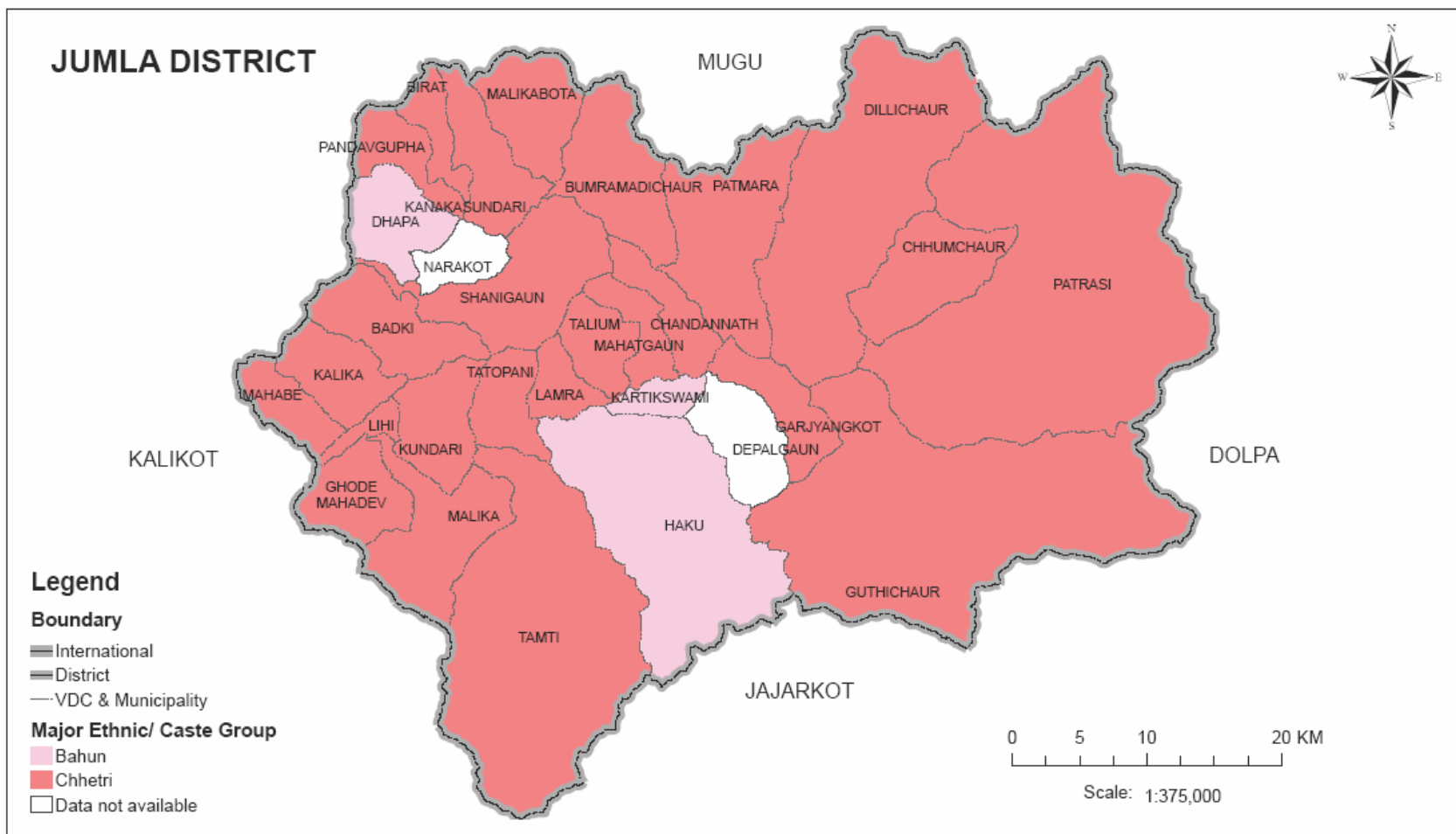
Appendix 1.7: Map showing the distribution of major ethnic/caste groups in Rasuwa



Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

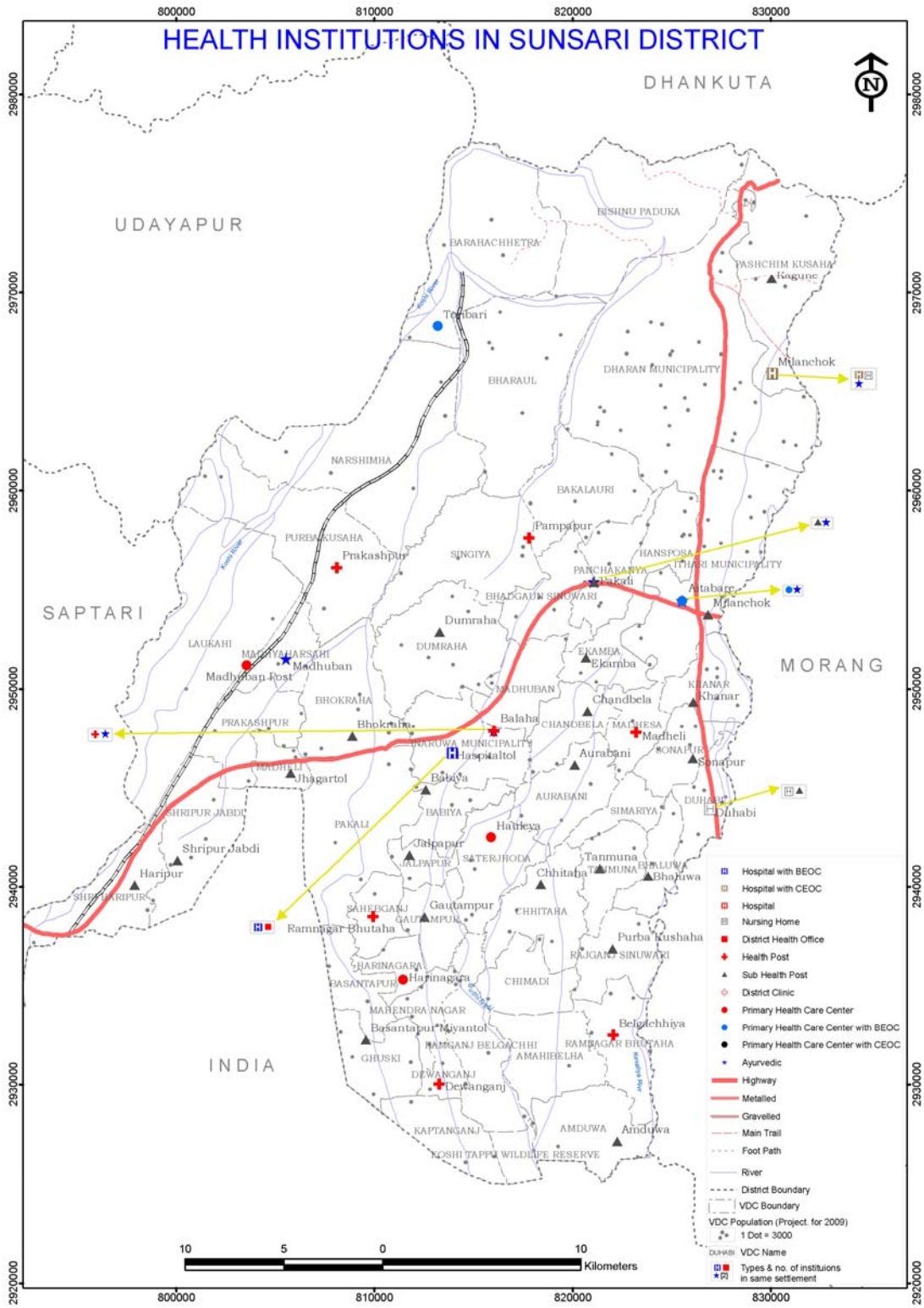
Appendix 1.8: Map showing the distribution of major ethnic/caste groups in Jumla



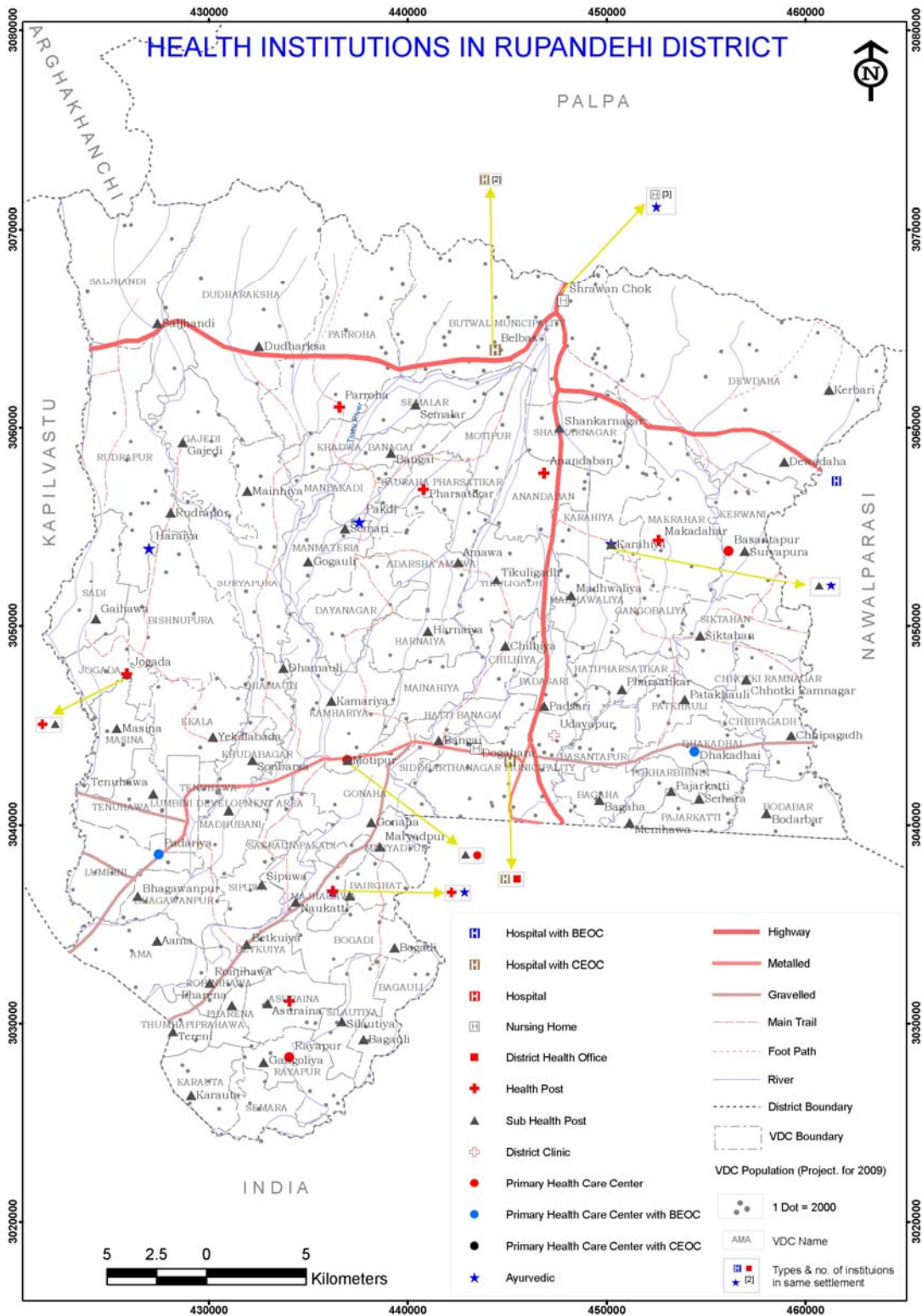
Data Source: Population Census of Nepal, 2001

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

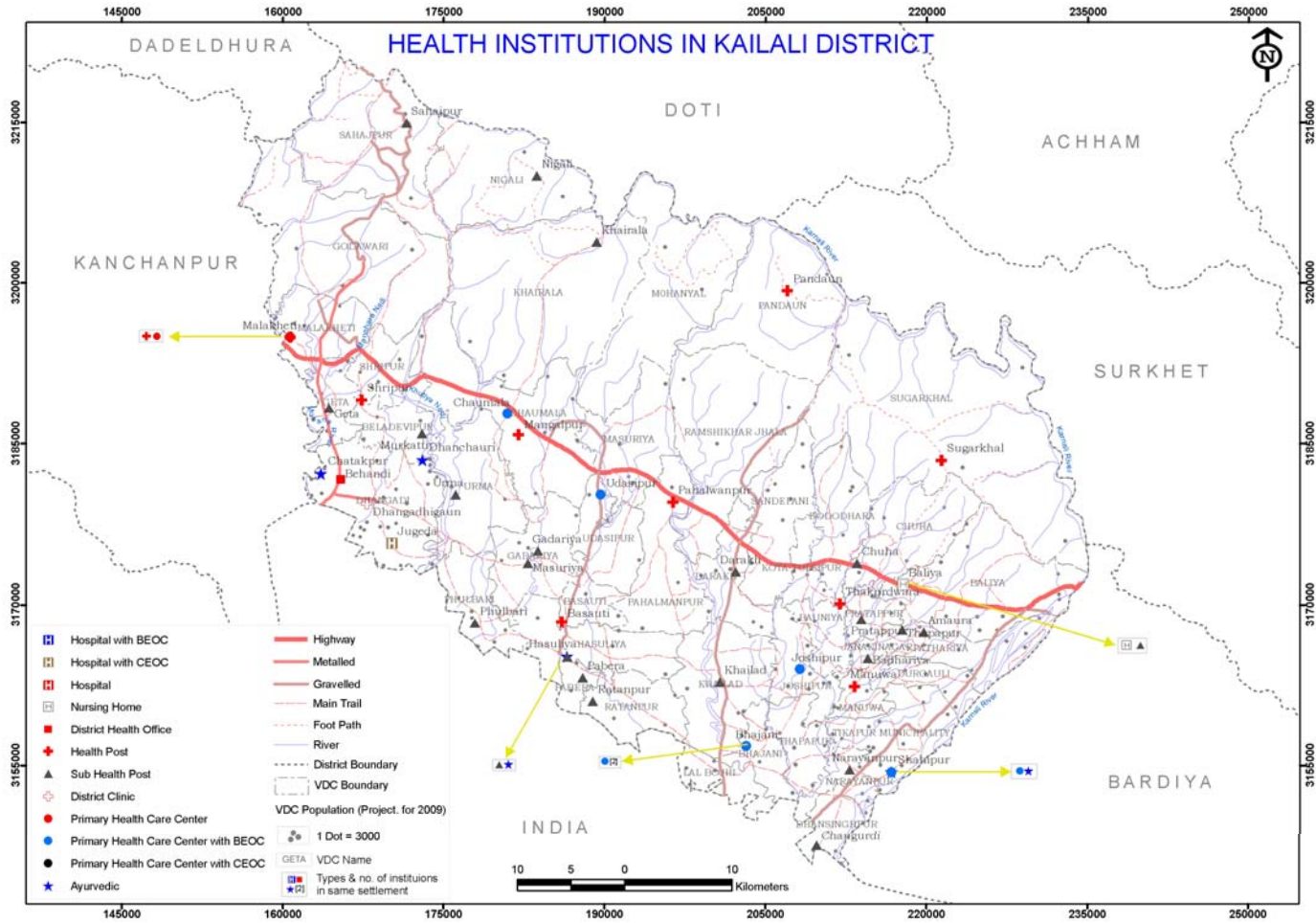
Appendix 1.9: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Sunsari District



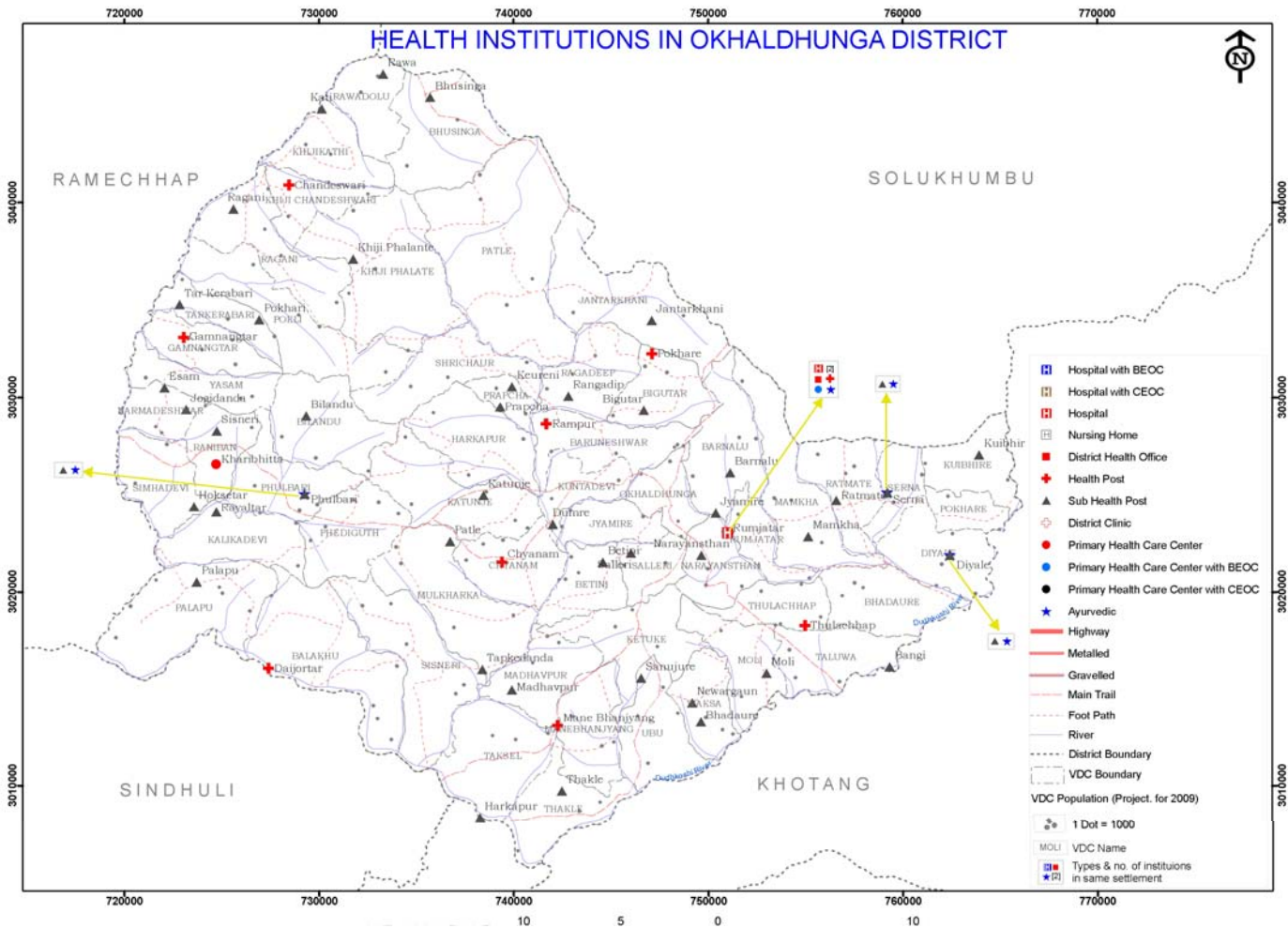
Appendix 1.10: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Rupandehi District



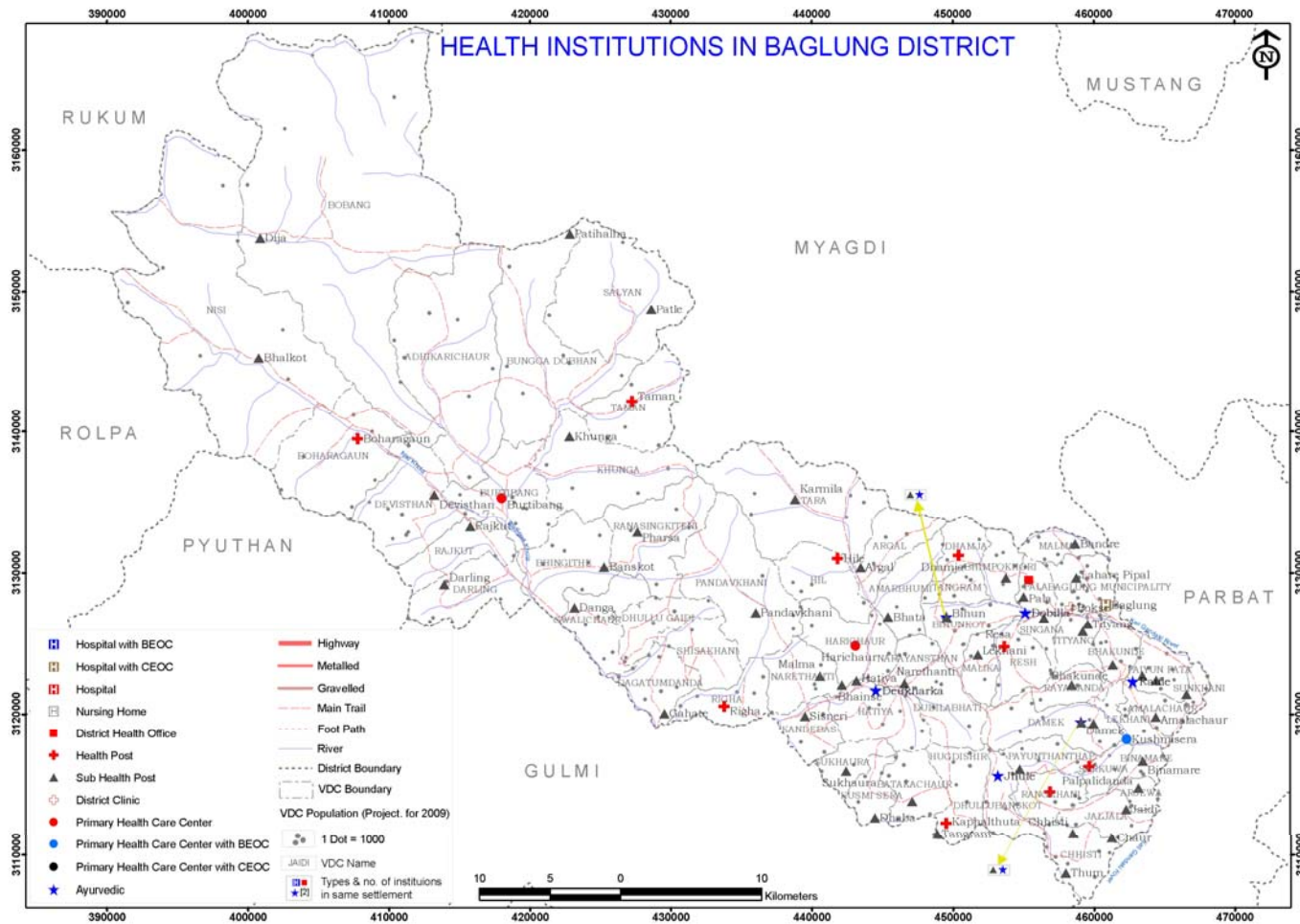
Appendix 1.11: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Kailali District



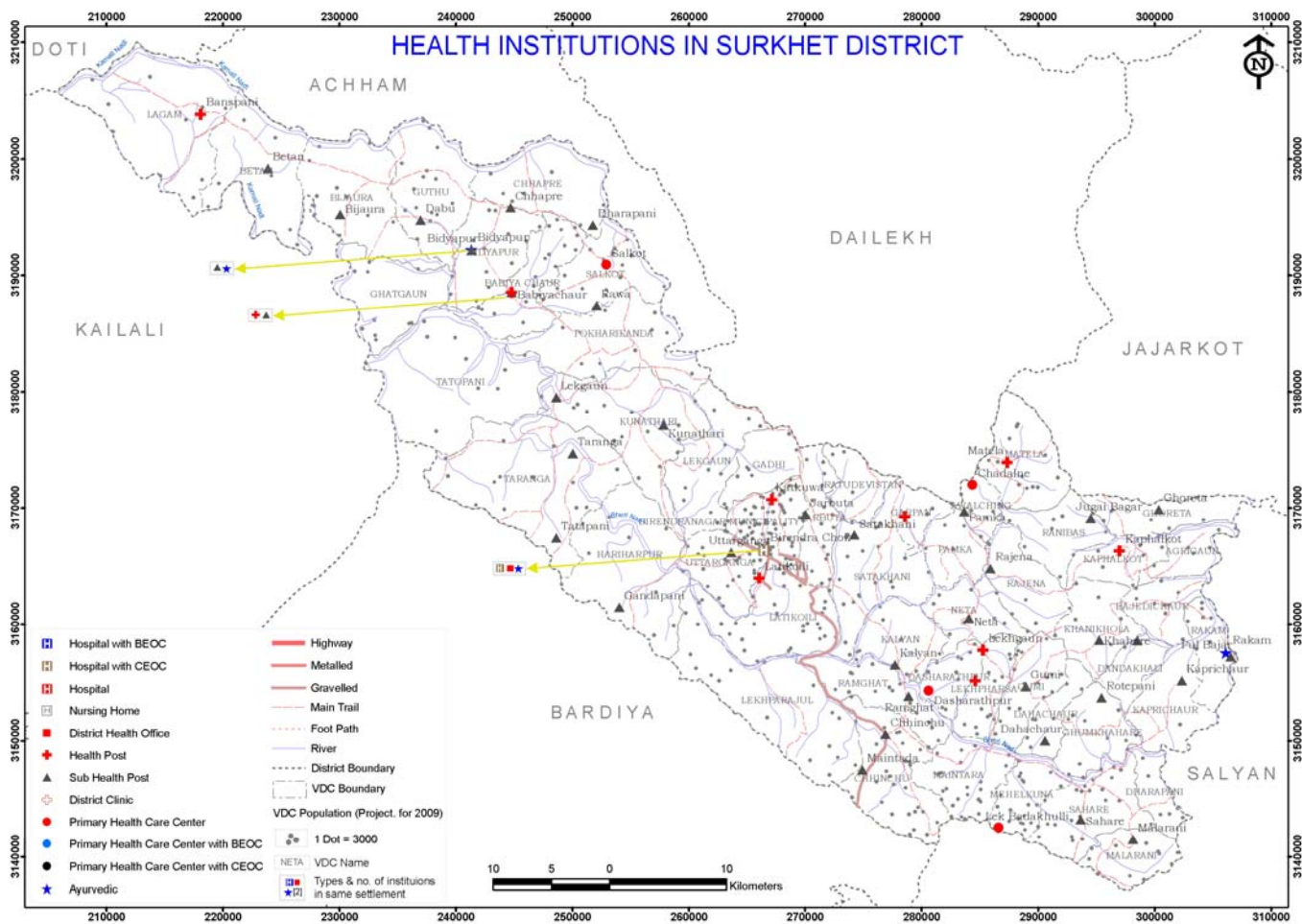
Appendix 1.12: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Okhaldhunga District



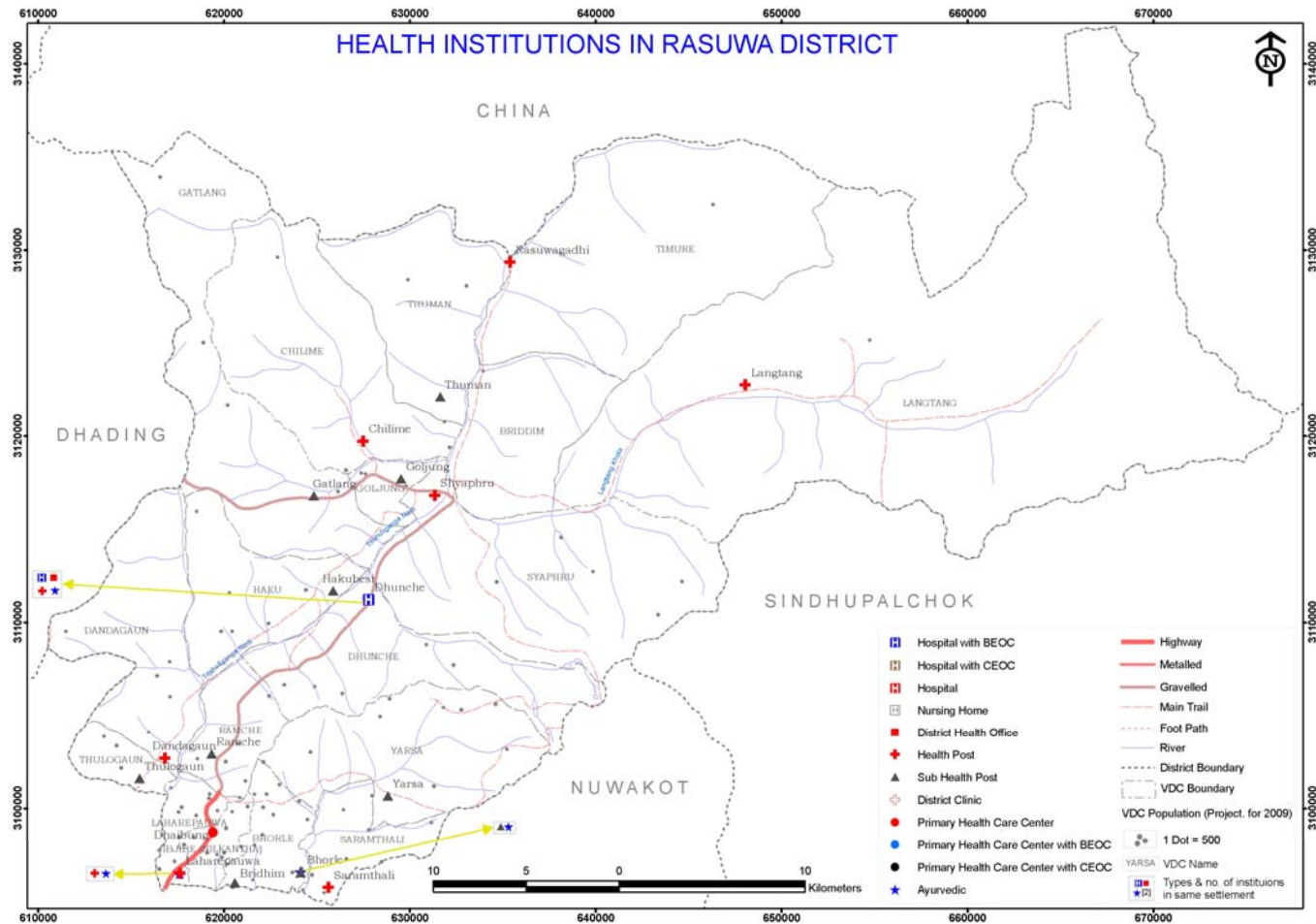
Appendix 1.13: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Baglung District



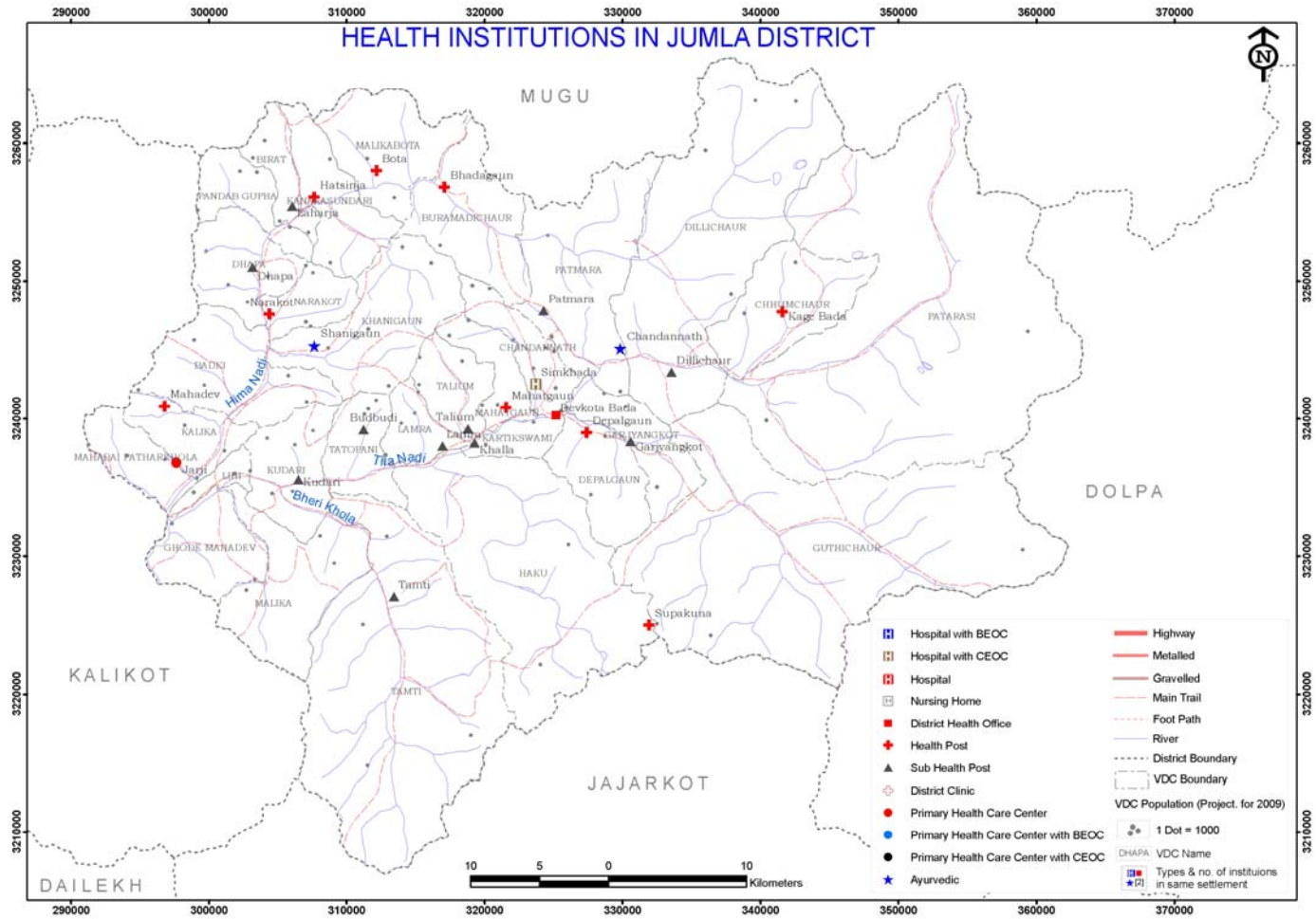
Appendix 1.14: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Surkhet District



Appendix 1.15: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Rasuwa District

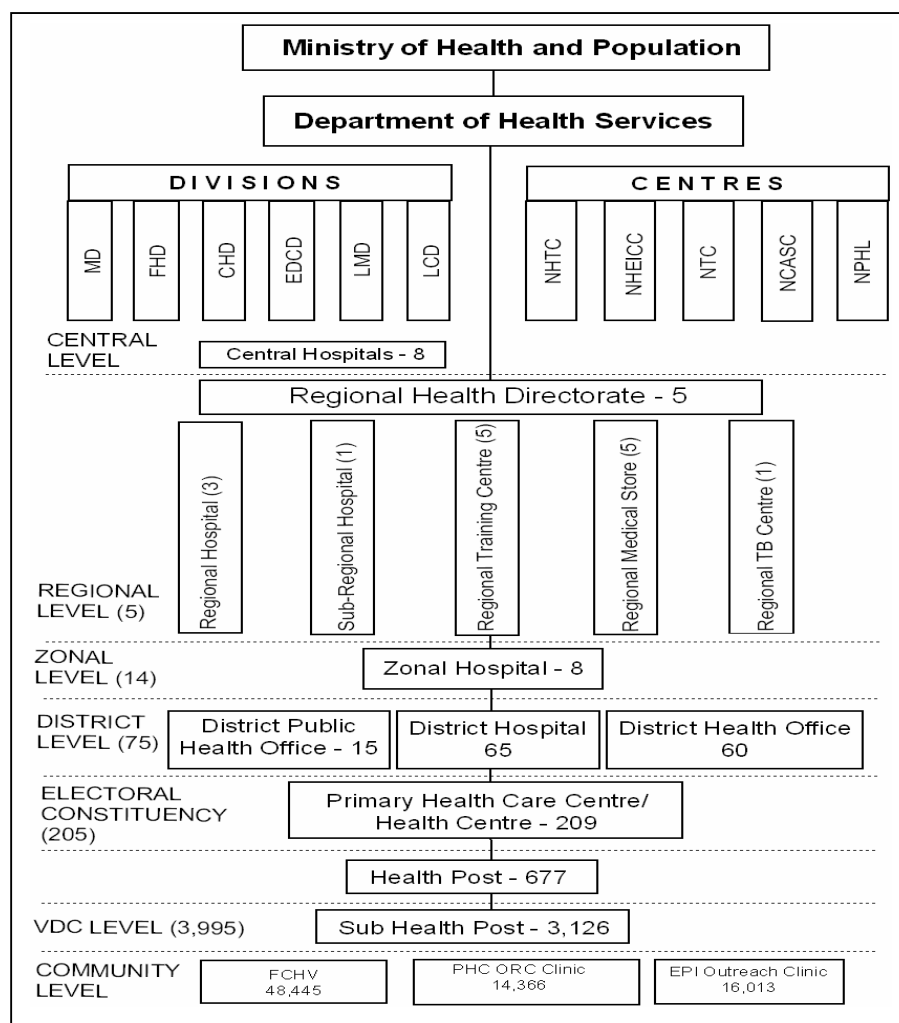


Appendix 1.16: Map showing distribution of health institutions, road network, land cover, settlement and population by VDC in Jumla District



Appendix 1.17: Organisational Structure of the Department of Health Services

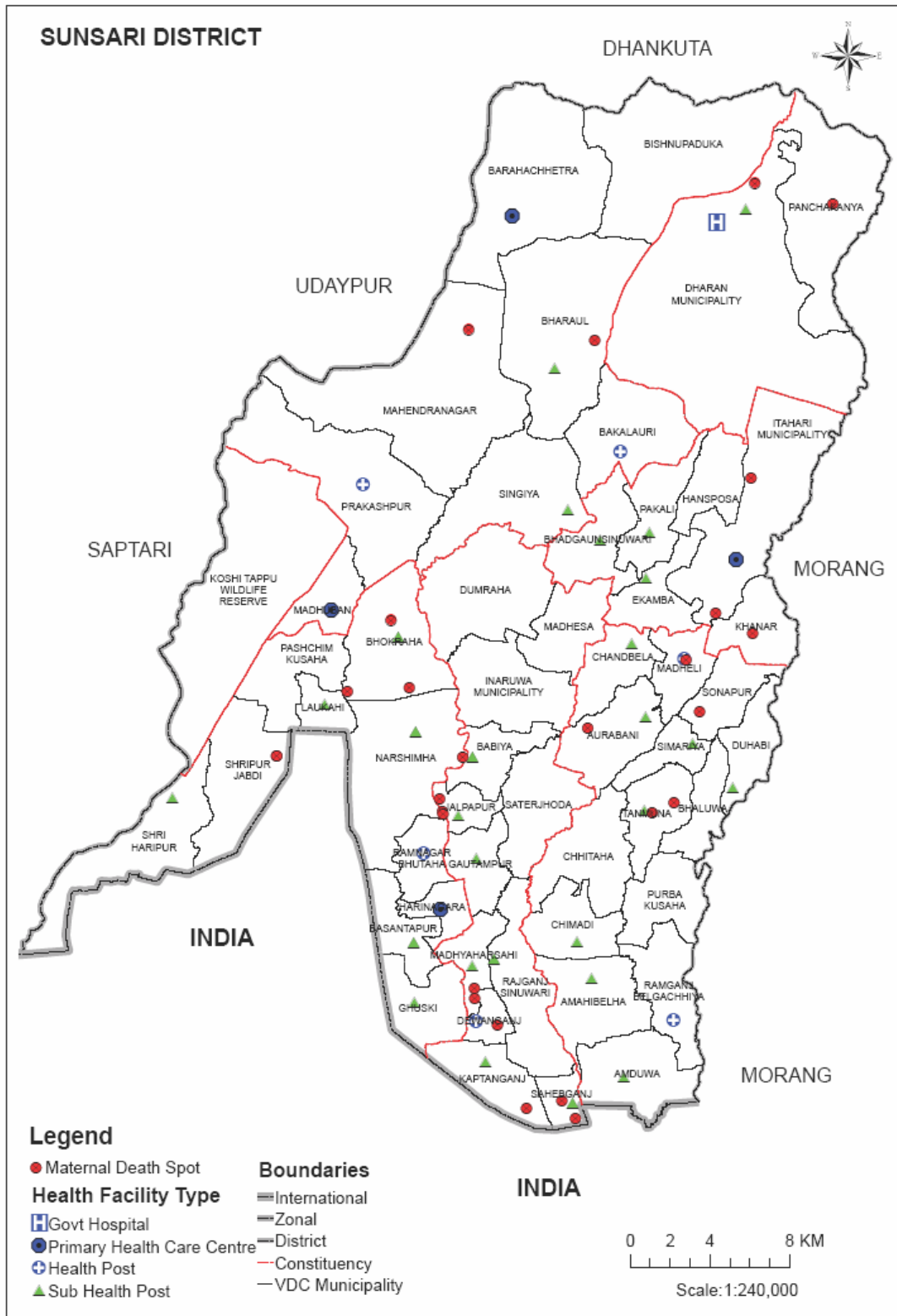
The Department of Health Services in Nepal is one of three departments under the Ministry of Health and Population. The aim of the DoHS is to deliver preventive, promotive and curative health services throughout the country. The figure below outlines how different levels of the health system form a network under the DoHS. According to institutional frameworks, the Sub Health Post (SHP), from an institutional perspective, is the first point of contact for basic health services. However, in reality, this is not always the case, although it may be the preferred referral centre for community providers, such as TBAs and FCHVs, as well as a venue for community-based activities such as PHC outreach clinics and EPI clinics. Each level above the SHP is a referral point in a network from SHP to Health Post (HP) to Primary Health Care Centre (PHCC), and to district, zonal and regional hospitals, and finally to speciality tertiary care centres in Kathmandu.



Source: HMIS/MD, DoHS

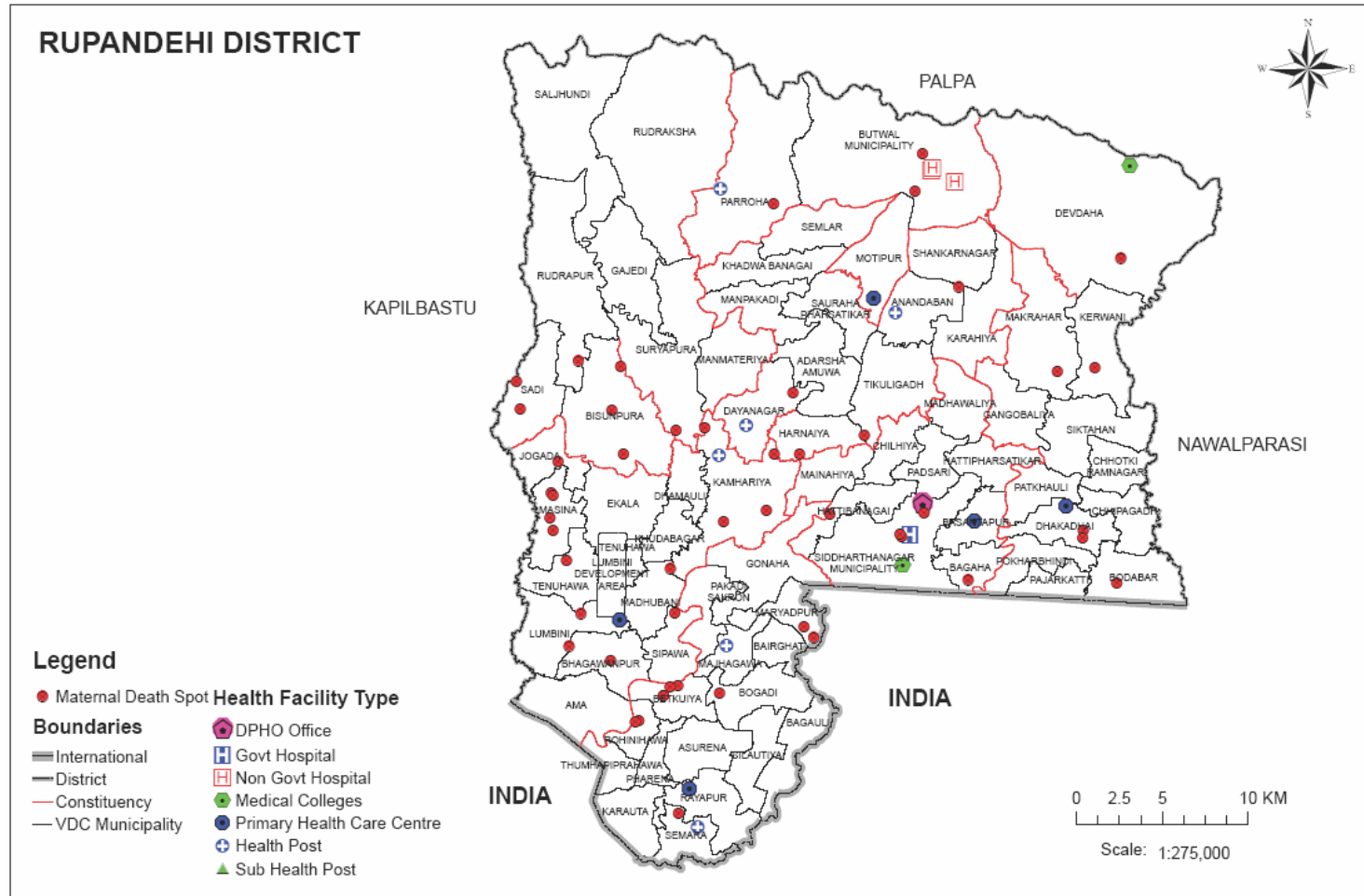
MD	Management Division	NHTC	National Health Training Centre
FHD	Family Health Division	NCASC	National Centre for AIDS and STD Control
CHD	Child Health Division	NPHL	National Public Health Laboratory
EDCD	Epidemiology and Disease Control Division	FCHV	Female Community Health Volunteer
LMD	Logistics Management Division	TBA	Traditional Birth Attendant
LCD	Leprosy Control Division	PHC/ORC	Primary Health Care Outreach Clinic
NHTC	National Health Training Centre	EPI	Expanded Programme on Immunisation
NHEICC	National Health Education, Information and Communication Centre		

Appendix 5.1: Map showing the GPS location of maternal deaths in Sunsari



Maternal Mortality and Morbidity Study 2008/09 Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

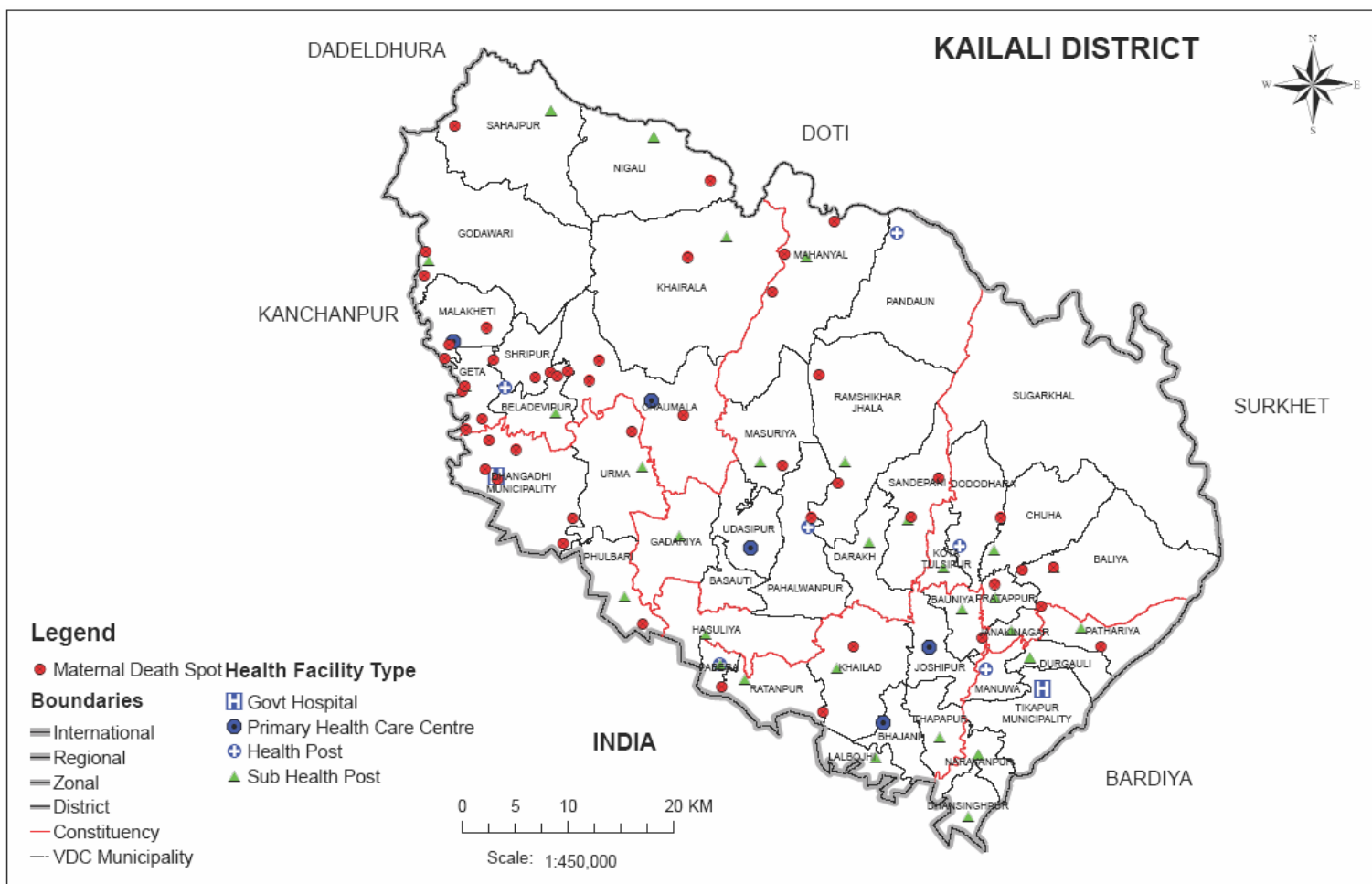
Appendix 5.2: Map showing the GPS location of maternal deaths in Rupandehi



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

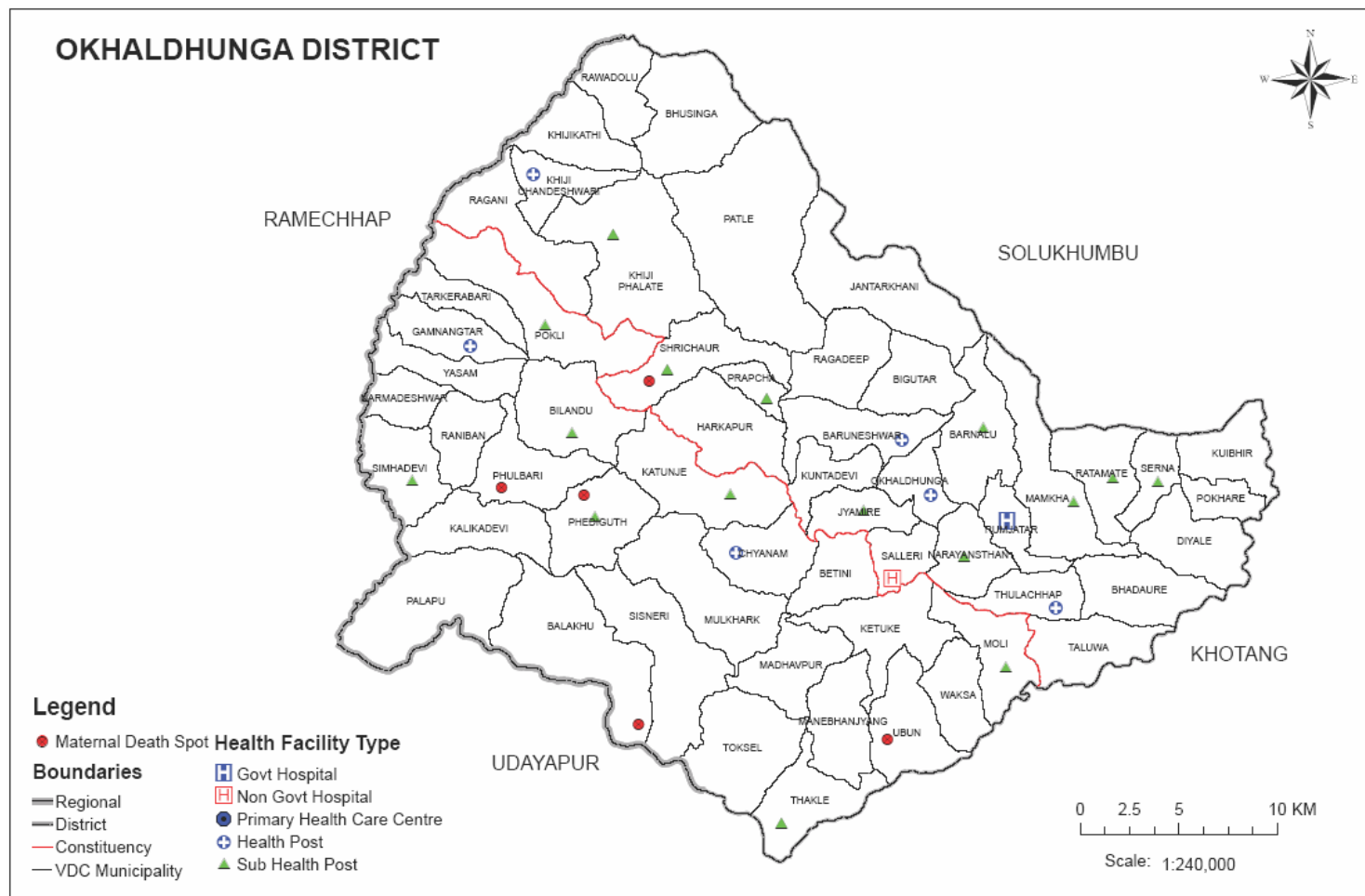
Appendix 5.3: Map showing the GPS location of maternal deaths in Kailali



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

Appendix 5.4: Map showing the GPS location of maternal deaths in Okhaldhunga



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

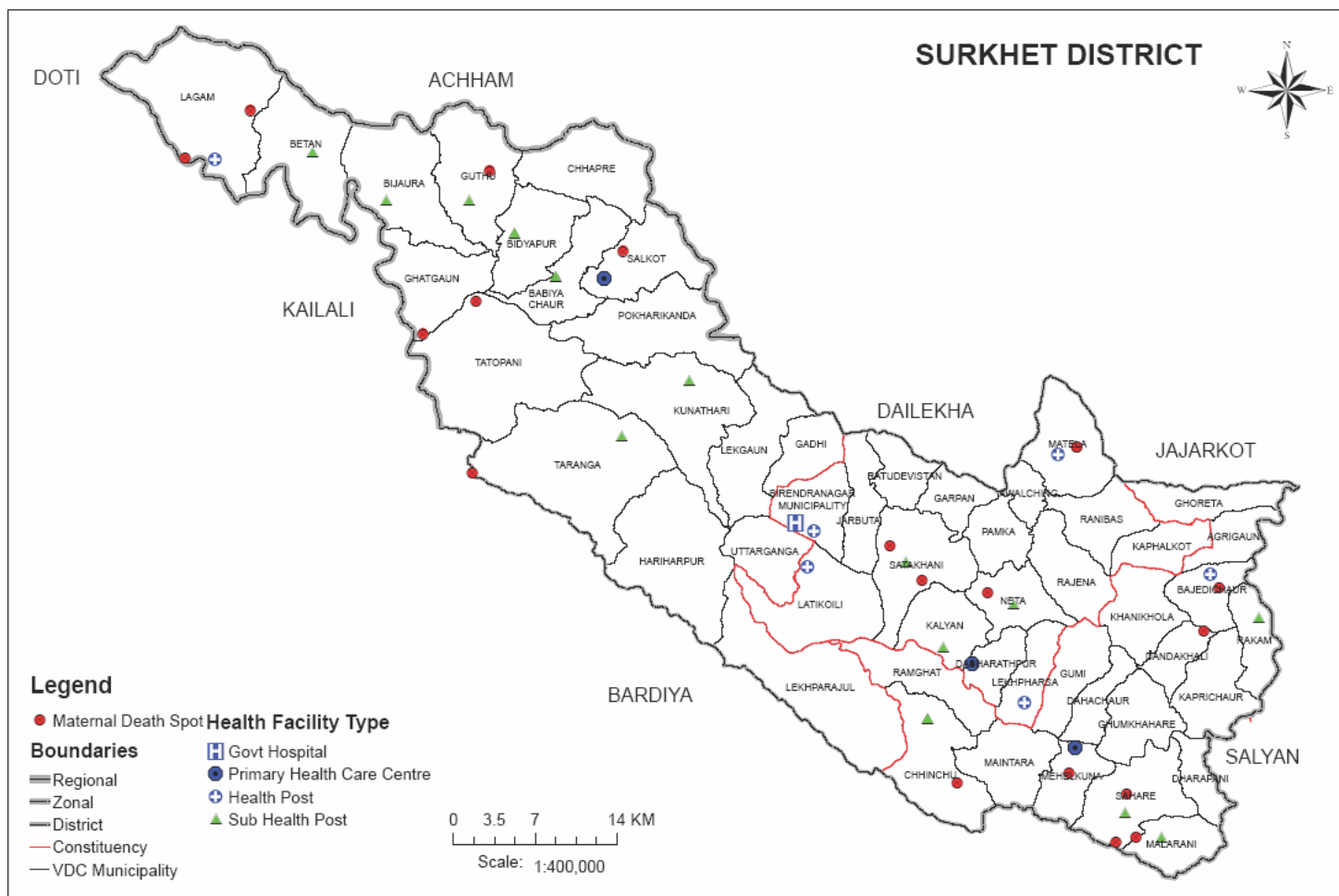
Appendix 5.5: Map showing the GPS location of maternal deaths in Baglung



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

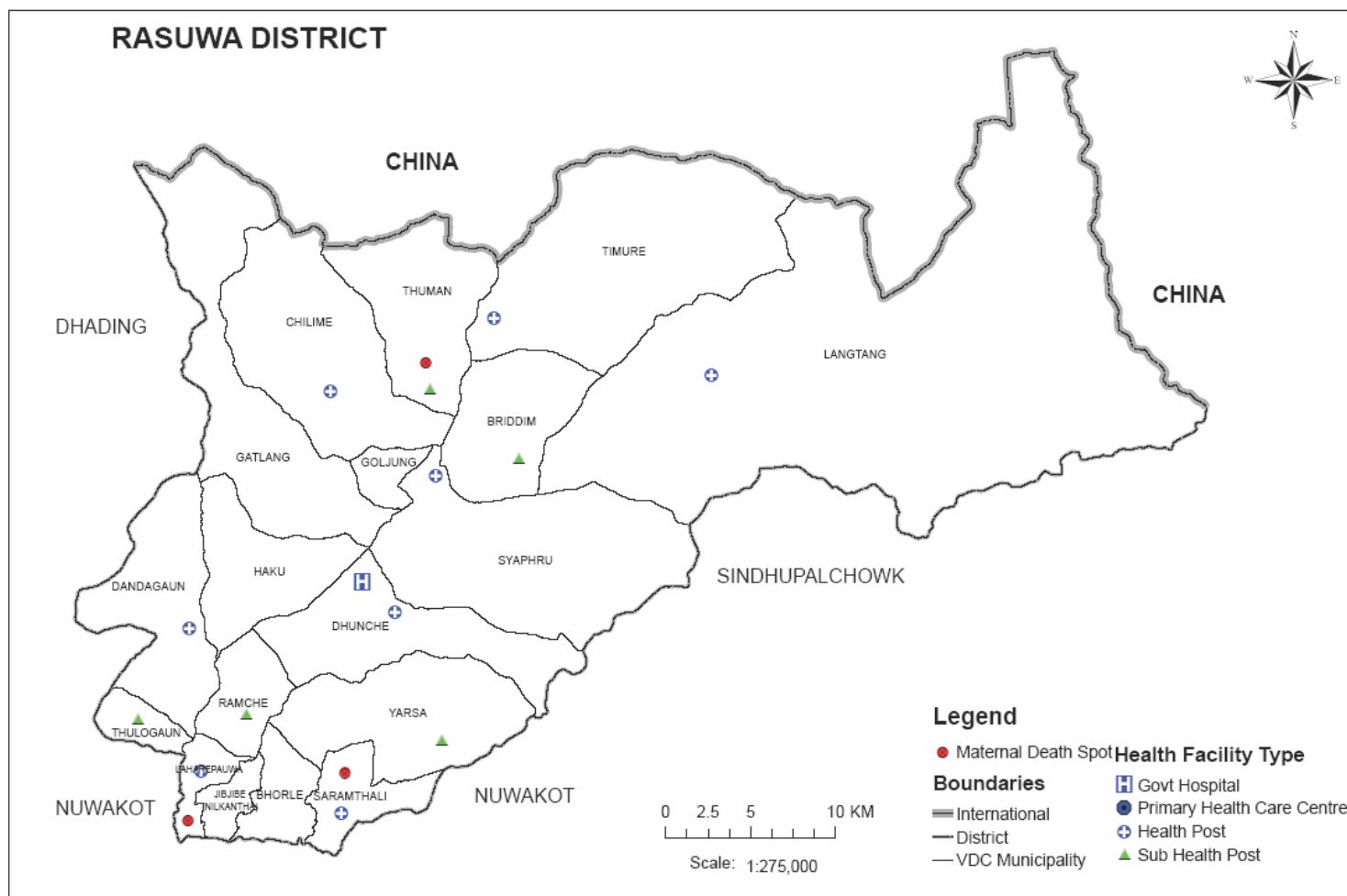
Appendix 5.6: Map showing the GPS location of maternal deaths in Surkhet



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

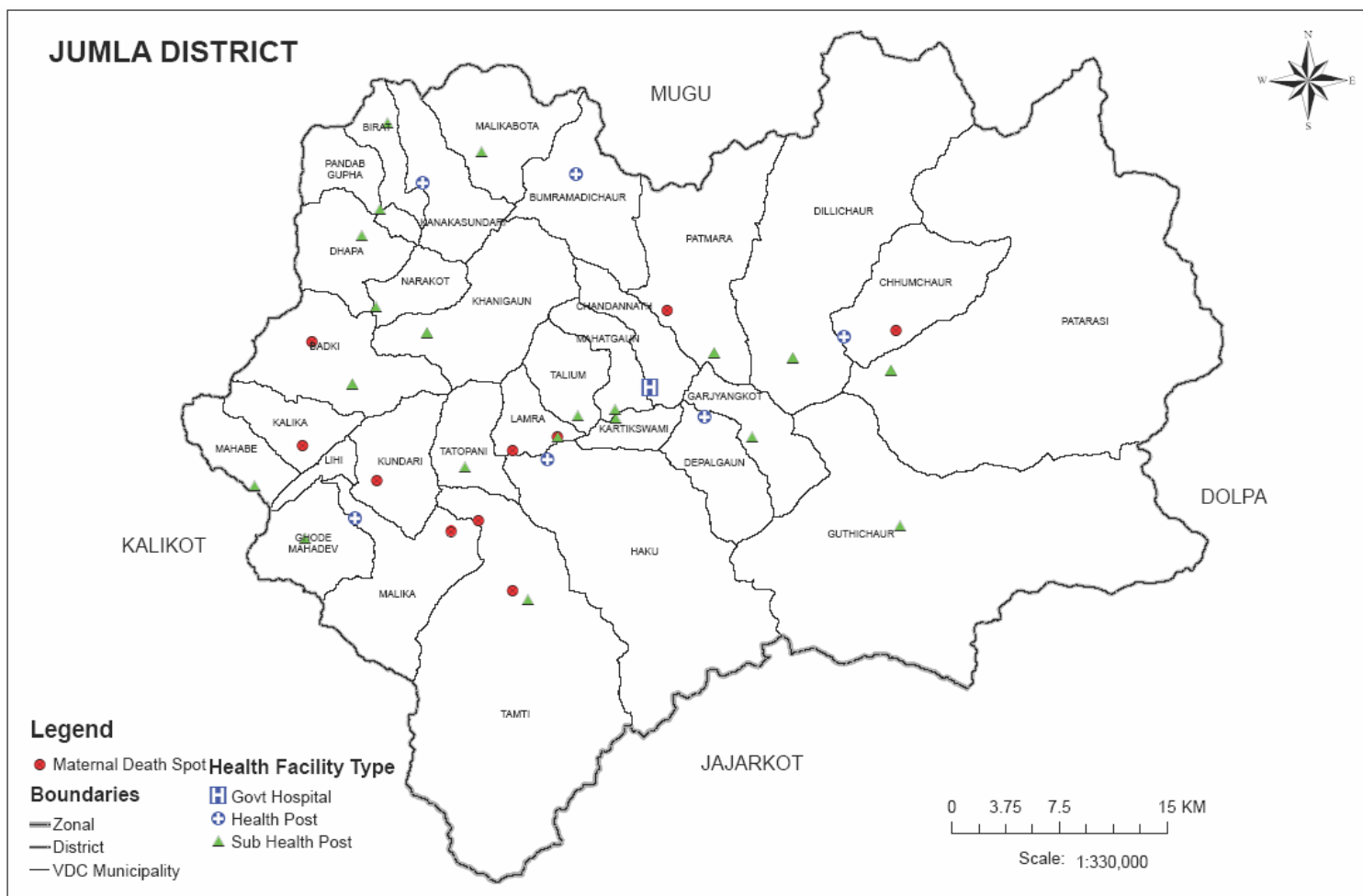
Appendix 5.7: Map showing the GPS location of maternal deaths in Rasuwa



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

Appendix 5.8: Map showing the GPS location of maternal deaths in Jumla



Data Source: Maternal Mortality and Morbidity Study 2008/09

Map Produced by: HMIS Section, Department of Health Services, Teku, Kathmandu

Appendix 5.9: Level of confidence in cause of death assignment

During the cause of death assignment process for pregnancy related deaths the obstetricians noted their level of confidence in the cause they assigned (Table 5.13). Overall, the obstetricians had high confidence in their cause assignment for 74% of all pregnancy related deaths, and due to the high proportion of maternal deaths, this was very similar when just maternal causes were taken into account (73%). The obstetricians had slightly higher confidence in their cause of death assignment for direct than indirect causes, with 76% of direct causes scoring high compared to 66% of indirect causes. For indirect deaths they had problems with heart disease; anaemia; gastroenteritis and septicaemia. For direct causes it was haemorrhage, eclampsia, abortion and obstructed labour. In assigning the cause for non maternal pregnancy related deaths they had a high level of confidence for all but two deaths (with a low level for one homicide and one having insufficient information to assign a cause).

Level of confidence in cause of death assignment by obstetricians

	Level of confidence			Unable to assign cause	Total
	High	Medium	Low		
Direct Causes					
Haemorrhage	34	3	1	0	38
- <i>Postpartum haemorrhage</i>	25	3	0	0	28
- <i>Antepartum Haemorrhage</i>	9	0	1	0	10
Eclampsia	26	7	1	0	34
Abortion	8	2	1	0	11
- <i>Induced</i>	5	0	1	0	6
- <i>Spontaneous</i>	3	2	0	0	5
Obstructed labour	4	4	1	0	9
Puerperial sepsis	7	1	0	0	8
Retained placenta without haemorrhage	2	0	0	0	2
Ruptured Uterus	1	1	0	0	2
Inversion uterus	1	1	0	0	2
Pulmonary Embolism	0	1	1	0	2
Misadventure to patient (primary haemorrhage from C/S)	1	0	0	0	1
Agents primarily affecting blood constituents (Blood transfusion reaction)	0	0	1	0	1
Total	84	20	6	0	110
%	76.4	18.2	5.5	0.0	100
Indirect Causes					
Heart disease	6	2	3	0	11
Anaemia	3	3	1	0	7
Gastroenteritis	5	2	0	0	7
Hepatitis	5	0	0	0	5
Pneumonia	4	0	0	0	4
Septicaemia	2	0	1	0	3
Typhoid	0	2	0	0	2
Epilepsy / Seizures	2	0	0	0	2
Malaria	1	1	0	0	2
Renal failure	1	0	0	0	1
HIV / AIDS	0	0	1	0	1
Tetanus	1	0	0	0	1
Tuberculosis	1	0	0	0	1
Severe dehydration and APD	0	1	0	0	1
Rabies	1	0	0	0	1
Pulmonary Oedema	1	0	0	0	1
Total	33	11	6	0	50
%	66.0	22.0	12.0	0	100

	Level of confidence			Unable to assign cause	Total
	High	Medium	Low		
<u>All maternal</u>					
<i>Total</i>	117	31	12	0	160
%	73.1	19.4	7.5	0	100.0
<u>Accidental / incidental</u>					
Suicide	5	0	0	0	5
Homicide	2	0	1	0	3
Accidental fall	1	0	0	0	1
Contact with venomous snake	1	0	0	0	1
Victim of Lightening	1	0	0	0	1
Unknown	0	0	0	1	1
<i>Total</i>	10	0	1	1	12
%	83.3	0.0	8.3	8.3	100
<i>TOTAL</i>	127	31	13	1	172
%	73.8	18.0	7.6	0.6	100.0

Appendix 6.1: Number of births and obstetric complications at EOC facilities

<i>Number of:</i>	Sunsari	Okhaldhunga	Rasuwa	Baglung	Rupandehi	Jumla	Surkhet	Kailali	Total
Births	8,787	309	37	1,061	10,473	352	2,495	3,743	27,257
<i>Major obstetric complications</i>									
Haemorrhage	261	22	2	30	213	10	65	132	735
<i>Ante Partum Haemorrhage</i>	98	8	1	0	92	4	19	41	263
<i>Postpartum Haemorrhage</i>	163	14	1	30	118	6	46	91	469
Ectopic Pregnancy	62	1	0	0	49	0	7	6	125
Prolonged Labour	169	25	7	19	1,318	13	327	268	2,146
Ruptured Uterus	7	1	0	0	33	0	9	5	55
Pre-Eclampsia	113	2	1	0	68	1	3	3	191
Eclampsia	34	1	1	1	65	0	6	42	150
Retained Placenta	20	7	4	22	147	36	13	105	354
Pueperal Sepsis	19	1	0	0	41	4	17	2	84
Abortion complication	486	38	0	9	513	41	107	321	1,515
Total number of major obstetric complications	1,171	98	15	81	2,444	105	554	884	5,352
Other obstetric complication	500	20	0	21	4,807	8	170	289	5,815

Appendix 6.2: Rate of obstetric complications (per 1000 births) at EOC facilities

<i>Rate per 1,000 births</i>	Sunsari	Okhaldhunga	Rasuwa	Baglung	Rupandehi	Jumla	Surkhet	Kailali	Total
Haemorrhage	29.7	71.2	54.1	28.3	20.3	28.4	26.1	35.3	27.0
Ante Partum Haemorrhage	11.2	25.9	27.0	0.0	8.8	11.4	7.6	11.0	9.6
Postpartum Haemorrhage	18.6	45.3	27.0	28.3	11.3	17.0	18.4	24.3	17.2
Ectopic Pregnancy	7.1	3.2	0.0	0.0	4.7	0.0	2.8	1.6	4.6
Prolonged Labour	19.2	80.9	189.2	17.9	125.8	36.9	131.1	71.6	78.7
Ruptured Uterus	0.8	3.2	0.0	0.0	3.2	0.0	3.6	1.3	2.0
Pre-Eclampsia	12.9	6.5	27.0	0.0	6.5	2.8	1.2	0.8	7.0
Eclampsia	3.9	3.2	27.0	0.9	6.2	0.0	2.4	11.2	5.5
Retained Placenta	2.3	22.7	108.1	20.7	14.0	102.3	5.2	28.1	13.0
Pueperal Sepsis	2.2	3.2	0.0	0.0	3.9	11.4	6.8	0.5	3.1
Abortion complication	55.3	123.0	0.0	8.5	49.0	116.5	42.9	85.8	55.6
Overall rate of major obstetric complications	133.3	317.2	405.4	76.3	233.4	298.3	222.0	236.2	196.4
Other obstetric complication	56.9	64.7	0	19.8	459	22.7	68.1	77.2	213.3

Appendix 8.1: UN Process Indicators

District	Total Population	Expected number of births*	Expected number of complications**	Births in EOC	Number of obstetric complications treated	C/S done	Direct Maternal Death	UN Process Indicators***			
								Proportion of births in B/CEOC	Met need for EOC	C-section rate	Case fatality rate
Sunsari	740,113	19,811	2971.65	8,787	1,171	2,052	18	44.4	39.4	10.4	1.5
Okhaldhunga	177,117	4,211	631.65	309	98	35	2	7.3	15.5	0.8	2.0
Rasuwa	51,553	1,217	183	37	15	0	1	3.0	8.2	0.0	6.7
Baglung	306,110	8,149	1,222	1,061	81	33	0	13.0	6.6	0.4	0.0
Rupandehi	838,916	21,468	3,220	1,0473	2,444	2,356	17	48.8	75.9	11.0	0.7
Jumla	102,295	2,531	380	352	105	2	0	13.9	27.7	0.1	0.0
Surkhet	336,853	9,203	1,380	2,495	554	249	3	27.1	40.1	2.7	0.5
Kailali	745,362	19,564	2,935	3,743	884	274	12	19.1	30.1	1.4	1.4
Total	3,298,319	86,154	12,923	27,257	5,352	5,001	53	31.6	41.4	5.8	1.0

* Expected births obtained using the fast fertility decline variant of Population Projection done by CBS (assumes TFR 3.3 in 2006), ASFR from NDHS 2006, and number of women from fast fertility projection.

** Expected number of complications is based on 15% of all births.

*** UN recommend: a minimum of 15% of births in EOC facilities; 100% met need for EOC; a c/section rate between 5-15%; a maximum case fatality of 1%.

Appendix 8.1: UN Process Indicators Con'td...

	Deliveries in EOC	% deliveries in EOC	Deliveries in BEOC	% deliveries in BEOC	Deliveries in CEOC	% deliveries in CEOC
Sunsari	8,782	44.3	1,517	7.7	7,265	36.7
Okhaldhunga	303	7.2	40	0.9	263	6.2
Rasuwa	40	3.3	40	3.3	0	0.0
Baglung	1048	12.9	113	1.4	935	11.5
Rupandehi	10,395	48.4	1,405	6.5	8,990	41.9
Jumla	350	13.8	0	0.0	350	13.8
Surkhet	2,409	26.2	640	7.0	1,769	19.2
Kailali	3,726	19.0	835	4.3	2,891	14.8
Total	27,053	31.4	4,940	5.3	22,113	26.1

Appendix 8.2: Number of births and obstetric procedures at EOC facilities

<i>Number of:</i>	Sunsari	Okhaldhunga	Rasuwa	Baglung	Rupandehi	Jumla	Surkhet	Kailali	Total
Births	8787	309	37	1061	10473	352	2495	3743	27,257
<i>Obstetric procedures</i>									
Assisted vaginal deliveries (forceps or vacuum)	525	21	1	38	384	0	201	263	1,433
Caesarean sections	2052	35	0	33	2356	2	249	274	5,001
Manual removal of retained placentas (MRP)	29	7	3	17	165	27	7	45	300
Manual vacuum aspiration (MVA)	129	47	1	5	516	43	35	183	959
Dilation and Curettage (D&C)	289	15	0	0	360	4	22	116	806
Other obstetric procedures (hysterectomy, laparotomy etc.)	126	1	0	0	331	25	94	52	629

Appendix 8.3: Rate of major obstetric procedures at EOC facilities

<i>Rate per 100 births</i>	Sunsari	Okhaldhunga	Rasuwa	Baglung	Rupandehi	Jumla	Surkhet	Kailali	Total
Assisted Vaginal Delivery (Forceps or Vacuum)	6.0	6.8	2.7	3.6	3.7	0.0	8.1	7.0	5.3
Caesarean Section	23.4	11.3	0.0	3.1	22.5	0.6	10.0	7.3	18.3
Manual Removal of Retained Placenta (MRP)	0.3	2.3	8.1	1.6	1.6	7.7	0.3	1.2	1.1
MVA	1.5	15.2	2.7	0.5	4.9	12.2	1.4	4.9	3.5
D&C	3.3	4.9	0.0	0.0	3.4	1.1	0.9	3.1	3.0
Others (hysterectomy, laparotomy etc.)	1.4	0.3	0.0	0.0	3.2	7.1	3.8	1.4	2.3

Term	Definition
Abortion	Termination of pregnancy from whatever cause before the foetus is capable of life outside the uterus.
Adult life time risk of maternal death	The probability of dying from a maternal cause during a woman's reproductive lifespan.
Basic EOC facility	A facility that is performing all of the basic EOC services.
Basic EOC services	Parenteral antibiotics; parenteral oxytocic drugs; parenteral anticonvulsants for pre-eclampsia and eclampsia; manual removal of placenta; removal of retained products of conception; and assisted (vaginal) delivery.
Case fatality rate (CFR) - all complications	The proportion of deaths from specific complications in the facility during the time period and complicated obstetric cases in the facility during the specified time period. Here, "specific complications" includes the deaths from the following complications: Haemorrhage (ante-partum & post partum); Prolonged/Obstructed labour; Post-partum sepsis; Complications of abortion; Pre-eclampsia/Eclampsia; Ectopic pregnancy; or Ruptured uterus. Complicated cases include women diagnosed as having one or more of the conditions listed above.
Civil registration system	Routine registration of births and deaths.
Community based verbal autopsy	A method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the death of a person who died out side of a medical facility. The verbal autopsy consists of interviewing people who are knowledgeable about the events leading to the death such as family members, neighbors and traditional birth attendants.
Comprehensive EOC facility	A facility that is performing all of the comprehensive EOC services.
Comprehensive EOC services	All of the functions of BEOC facilities plus obstetric surgery and blood transfusions.
Direct obstetric complications	Haemorrhage (ante-partum & post partum); Prolonged/Obstructed labour; Post-partum sepsis; Complications of abortion; Pre-eclampsia/Eclampsia; Ectopic pregnancy; and Ruptured uterus.
Direct obstetric death	Death resulting from obstetric complications of the pregnant state (pregnancy, labor and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above (WHO ICD 10).
Episiotomy	An incision from the vagina towards the rectum to facilitate vaginal delivery.
Estimated direct obstetric complications	15 percent of all births in the population during the time period.
Facility based maternal death review	A qualitative, in-depth investigation of the causes of and circumstances surrounding maternal deaths which occur in health care facilities (WHO 2004). It is particularly concerned with tracing the path of the women who died, through the health care system and within the facility, to identify any avoidable or remediable factors which could be changed to improve maternal care in the future (WHO 2004).
Gravida	A numerical designation is used following 'gravida' to signify the total number of pregnancies a woman has experienced including the current one, e.g., a woman who has had two prior pregnancies and is presently pregnant is a gravida three.

Term	Definition
Incidental or fortuitous death	Death due to other causes which happen to occur during pregnancy or puerperium but are not associated in any way with them. For example, deaths from snake bites, traffic accident, suicide, homicide, fall, burns, lightning etc. (WHO ICD 10).
Incomplete abortion	Retention of all or some of the products of conception within the uterus or the cervical canal. This is a relatively common and potentially dangerous complication of abortion.
Indirect obstetric death	Death resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy (WHO ICD 10).
Induced abortion	Termination of pregnancy through a deliberate intervention to end pregnancy.
Late maternal death	The death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after termination of pregnancy (WHO ICD 10).
Live birth	A live birth occurs when a foetus, whatever its gestational age, exits the maternal body and subsequently shows any sign of life, such as voluntary movement, heartbeat, or pulsation of the umbilical cord, for however brief a time and regardless of whether the umbilical cord or placenta are intact. Whether the birth is vaginal or by Caesarean section, and whether the neonate is ultimately viable, is not relevant to this statistical definition.
Maternal death	Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO ICD 10).
Maternal death verbal autopsy	A method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the deaths in women who died outside of a medical facility (WHO 2004).
Maternal mortality rate	Number of maternal deaths in a given period per 100,000 women of reproductive age during the same time period.
Maternal mortality ratio	Number of maternal deaths during a given time period per 100,000 live births during the same time period.
Met need for emergency obstetric care	The proportion of women estimated to have direct obstetric complications that are seen in EmOC facilities. A "complicated case" is a woman who is diagnosed as having any one of the following conditions: Haemorrhage (ante-partum & post partum); Prolonged/Obstructed labour; Post-partum sepsis; Complications of abortion; Pre-eclampsia/Eclampsia; Ectopic pregnancy; or Ruptured uterus. If the woman has more than one of these complications, the most immediately life-threatening one is selected. "In EmOC facilities" includes both women admitted with the complication and women who develop the complication in the facility.
Minimum acceptable level of case fatality rate	The case fatality rate among women with obstetric complications in EOC facilities should not exceed 1 percent.
Minimum acceptable level of EOC services	Four Basic and one Comprehensive EOC facilities per 500,000 population.
Minimum acceptable level of met need for EOC	The proportion of all women with obstetric complications who are treated in Basic or Comprehensive EOC facilities is at least 100 percent.
Minimum acceptable level of proportion of all births in Basic and Comprehensive EOC facilities	At least 15 percent of all births in the population take place in either a Basic or a Comprehensive EOC facility.

Term	Definition
Minimum and maximum acceptable levels of caesarean sections as a proportion of all births	As a proportion of all births in the population, caesarean sections should account for not less than 5 nor more than 15 percent.
Percentage of deliveries done by caesarean section	The percent of live births in a defined population that were delivered by caesarean section.
Perinatal death	Death of a foetus of 28 weeks or more of gestation or the death of a live newborn within the first 7 days of life.
Perinatal mortality	Includes stillbirths (death of the foetus between 28 weeks of pregnancy and delivery) and death of the infant in the first week of life (early neonatal death).
Perinatal mortality rate (PMR)	Number of perinatal deaths per 1000 total births. Total births include fetal deaths from 28 weeks gestation plus the number of live births, i.e., all births after 28 weeks of gestation.
Postpartum hemorrhage	Blood loss greater than 500 ml after the delivery of the baby.
Pre-eclampsia	The presence of pregnancy-induced hypertension with proteinuria (loss of protein in the urine), edema (swelling of the extremities) or both after the 20 th week of pregnancy.
Pregnancy-related death	Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death (WHO ICD 10).
Premature rupture of membrane (PROM)	Rupture of the membranes prior to the onset of true labor.
Primigravida	A woman who is pregnant for the first time.
Proportion of maternal death among death of female (PMDf)	The proportion of maternal deaths among deaths of females of reproductive age.
Puerperium	Postpartum period (the six weeks following delivery).
Rate	The term 'Rate' most appropriately applies to the number of demographic events in a period of time divided by the population at risk during that period. Rate is used to study the dynamics of change.
Ratio	A ratio is a single term indicating the relative size of two numbers. If (a) is one number and (b) is another, a ratio between the two is a/b. It is expressed as a ratio of the numerator to the denominator multiplied by k (<i>where k may be 1,000, 10,000 or 100,000, as preferred</i>). It measures the size of the first number in terms of the other.
Retained placenta	Failure of expulsion of the placenta from the uterus after delivery. This carries an increased risk of infection or bleeding.
Spontaneous abortion	A pregnancy that terminates naturally (without deliberate measures). Spontaneous abortions are usually termed miscarriages.
Stillbirth	A stillbirth occurs when a foetus which has died in the uterus or during labour or delivery exits a woman's body. The term is often used in distinction to live birth or miscarriage. Most stillbirths occur in full term pregnancies.
Underlying cause of death	The disease or injury that initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence that produced the fatal injury.
Verbal autopsy	A technique used to determine the cause of death by asking caregivers, friends or family members about signs and symptoms exhibited by the deceased in the period before death.

Technical and Administrative Staff

Mr. Ajit Pradhan, Principal Investigator
Mrs. Shovana Chitrakar Rai, Senior Researcher
Mr. Pradeep Poudel, Researcher

Technical Advisory Group

Dr. Govinda Prasad Ojha, Chairman
Dr. Bal Krishna Suvedi, Member Secretary
Dr. Mahesh Maskey, Member
Dr. Kedar Baral, Member
Dr. Sharad Sharma, Member
Dr. Ganga Shakya, Member
Mr. Ajit Pradhan, Member
Prof. Lynn Sibley, Member
Dr. Louise Hulton, Member
Dr. Sarah Barnett, Member
Dr. Marge Koblinsky, Member
Dr. Harshad Sanghvi, Member

Maternal Death Verbal Autopsy Reviewer

Dr. Meeta Singh
Dr. Bimala Lakhey
Dr. Kusum Thapa

Non-maternal Death Verbal Autopsy Reviewer

Dr. Kedar Baral

Staff Competency Assessment

Dr. Meera Thapa Upadhaya
Dr. Saroja Pandey
Dr. Alka Singh

EOC Monitoring and Maternal Death Review Training

Dr. Kasturi Malla

Facility Assessment

Ms. Jayanti Chantyal
Ms. Sanju Poudel
Ms. Shovan Chitrakar

Data Processing

Dr. Sharad Sharma
Mr. Dhruva Raj Ghimire

Data Entry

Mrs. Sudhira Acharya
Mr. Susheel Lekhak
Mr. Milan Shrestha

Report Layout

Mr. Sanu Raja Shakya, New ERA

District Coordinators

Ms. Sapana Koirala - Sunsari
Mr. Mahendra Dulal - Okhaldhunga
Mr. Puskar Paudel - Rasuwa
Ms. Milima Singh Dangol - Baglung
Mr. Ajay Rajbhandari - Rupandehi
Mr. Ashim Dangi - Surkhet
Mr. Sumit Karn - Jumla
Ms. Hema Bhatt - Kailali

District Assistants

Mr. Santosh Timsina - Sunsari
Mr. Nab Raj Karki - Okhaldhunga
Mr. Mukti Bhandari - Baglung
Ms. Samiksha Sapkota - Rupandehi
Mr. Tika Ram Rawat - Surkhet
Mr. Kamal Singh Kathayat - Jumla
Mr. Madan Bista - Kailali

Core Professional Team for Qualitative Component

Dr. Mahesh Puri - Coordinator
Mr. Prabhat Lamichhane - Field Coordinator
Ms. Bhumika Piya - Research Officer
Ms. Moni Shrestha - Research Officer

Field Supervisors

Ms. Achala Shrestha
Ms. Monika Shrestha
Ms. Sabita Mahaju
Ms. Kamala Shukla

Research Assistant

Ms. Anita Kumbhakar
Ms. Laxmi Pandey
Ms. Swosti Manandhar
Ms. Shanti Dahal

Administrative & Logistic Support, New ERA

Mr. Yogendra Prasai
Mr. Sidhartha Man Tuladhar
Ms. Meena Sitaula
Mr. Navin Kumar Lama
Mr. Min Bahadur K.C.
Ms. Niru Shrestha
Mr. Sujan Bhakta Shrestha
Ms. Geeta Amatya (Shrestha)
Mr. Rajendra Kumar Shrestha

ETHICAL APPROVAL AND CONSIDERATIONS

Ethical approval for the MMM study was received from the Nepal Health Research Council (NHRC) in January 2008. The procedure followed for informed consent is based on the ethical guidelines developed by the World Health Organisation (WHO) for reproductive and sexual health research. All participants in the study were fully informed about the nature of the study and assured of data confidentiality. Participants were informed that they may skip any questions they do not wish to answer and were always given the opportunity to comment or ask questions. Verbal informed consent was obtained from all participants. No names were entered into computerised databases and no personal identification will be used in the analysis or dissemination of results. The study aims to identify programmatically useful information to inform investment and interventions to improve maternal mortality and morbidity, and there is no intention to blame or punish individuals or institutions.

FUNDING

USAID, through MACRO and New ERA provided the funding for most of the study implementation and dissemination costs and all of the full-time employees for the study (Senior Research Fellow, Research Fellow and District Co-ordinators).

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STAFFING

The core in-country team was led by Mr. Ajit Pradhan from SSMP (Principal Investigator), and was supported by Ms. Shovana Rai (Senior Research Officer), Mr. Pradeep Poudel (Research Officer), Dr. Sharad Sharma, Demographer, FHD, Ms. Sudhira Acharya, Computer Officer, FHD. At the district level field activities were coordinated by 8 District Coordinators (Ms. Hema Bhatt, Kailali District, Mr. Asheem Dangi, Surkhet District, Ms. Milima Singh Dangol, Baglung District, Mr. Mahendra Dulal, Okhaldhunga District, Mr. Sumit Karn, Jumla District, Ms. Sapana Koirala, Sunsari District, Mr. Pushkar Poudel, Rasuwa District, Mr. Ajay Kumar Rajbhandari, Rupandehi District,) and the District Coordinators were supported by 7 Assistants (Mr. Santosh Timsina - Sunsari, Mr. Nab Raj Karki - Okhaldhunga, Mr. Mukti Bhandari - Baglung, Ms. Samiksha Sapkota - Rupandehi, Mr. Tika Ram Rawat - Surkhet, Mr. Kamal Singh Kathayat - Jumla and Mr. Madan Bista - Kailali).

TECHNICAL ADVISORY GROUP (TAG)

Chairperson

- Dr. Govinda Prasad Ojha, Director General, Department of Health Services

Member Secretary

- Dr. Bal Krishna Suvedi, Director, Family Health Division, DoHS

Members

- Dr. Kedar Baral, Freelance Consultant, Member, Nepal Health Research Council
- Dr. Sarah Barnett, Maternal and Newborn Health Specialist, Options, UK
- Dr. Louise Hulton, Technical Director, Options, UK
- Dr. Marge Koblinsky, John Snow International, USA
- Dr. Mahesh Maskey, Chairman, Nepal Health Research Council
- Mr. Ajit Pradhan, Monitoring and Evaluation Adviser, SSMP
- Dr. Harshad Sanghvi, Vice-president, Jhpiego, USA
- Dr. Ganga Shakya, Safe Motherhood Adviser, SSMP
- Dr. Sharad Sharma, Demographer, Family Health Division, DoHS
- Prof. Lynn Sibley, Associate Professor, Emory University, USA



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