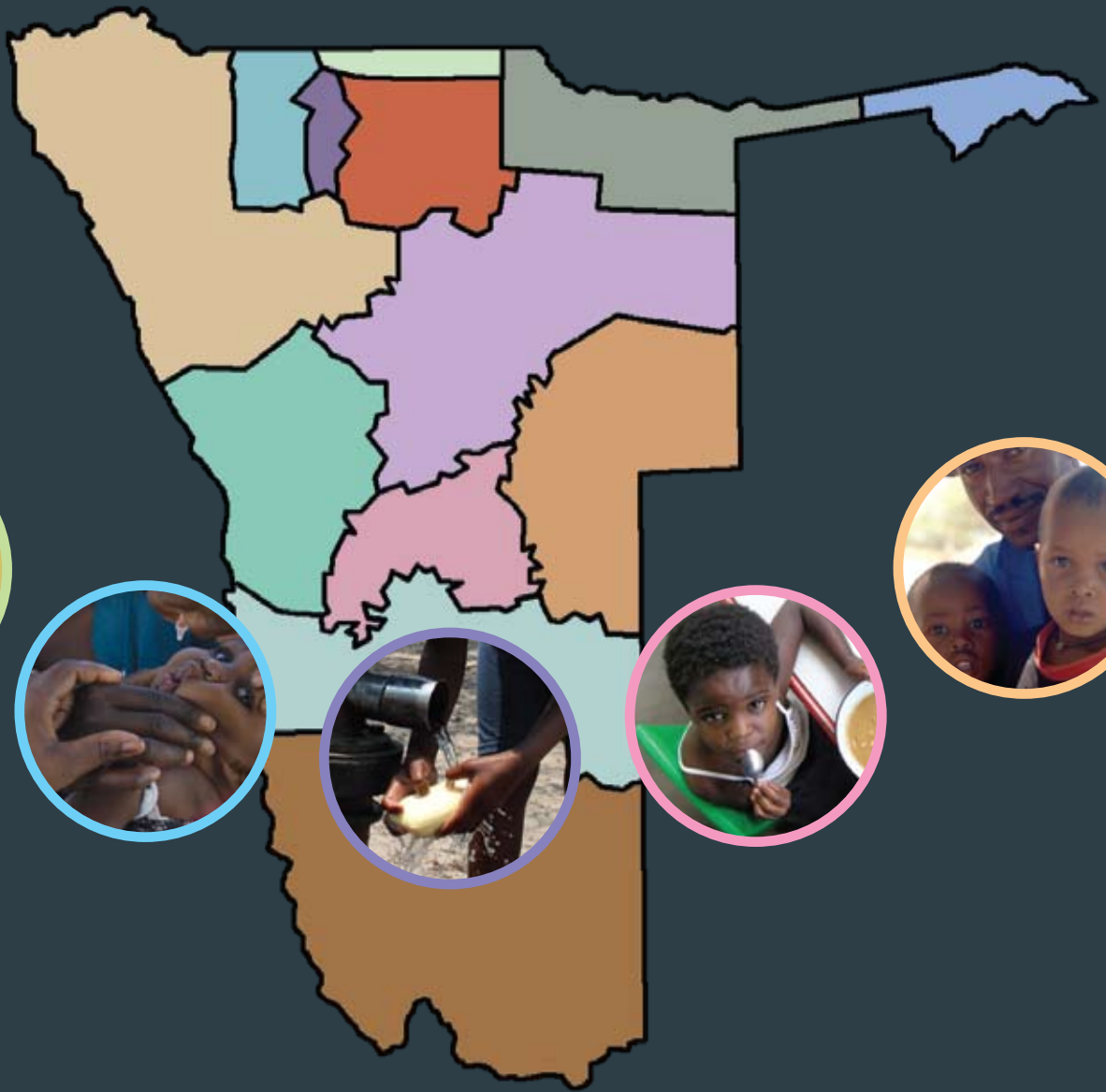


MALNUTRITION IN NAMIBIA



THE TIME TO ACT IS NOW!



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FOREWORD

Children are our first call. Their well-being, their health and their physical and cognitive development should at all times enjoy our undivided attention. Yet, one third of Namibian children, under the age of five, are malnourished. Their weights do not correspond to their ages. Their heights are equally a matter of concern. This means that they are stunted and wasted!

Namibia's per capita income is high. Our country is classified as a middle income nation. However, the distribution of the national income in the population is appallingly unfair. Our Gini-Coefficient is 0.743, meaning that our society is highly unequal in terms of income distribution. Poverty levels are high in the country. This translates into food insecurity, unstable feeding practices at the household-level and inappropriate diets. The situation is further exacerbated by diseases such as HIV/AIDS and TB.

Moreover, there is the phenomenon of invisible hunger. This situation occurs when our staple diets lack micronutrients such as iodine, vitamins and iron. This situation results into Iron Deficiency Disorders among the children. Anaemia, impaired cognitive development and brain metabolism damage our children's normal growth. These children become vulnerable to diseases because of reduced immune-competence.

This situation calls for a concerted action. The establishment of the National Alliance for Improved Nutrition (NAFIN) is a positive response to this urgency. NAFIN is a multi-sectoral and multi-stakeholder association, not for gain. The founding of NAFIN is a call to action towards the situation of nutrition in our country. This report details the nutrition situation in our country. It provides information on what needs to be done!

Nutrition is everyone's business. NAFIN creates a platform for multi-stakeholder engagement. We are all invited to be part of this commitment – the commitment to make malnutrition in Namibia history. This is the only way we can redeem our commitment to our children.



The Right Hon. Nahas Angula,
MP, Prime Minister & NAFIN Convenor



ABBREVIATIONS & ACRONYMS

ART	Anti Retroviral Therapy
ARV	Anti Retroviral
BMI	Body Mass Index
CCT	Conditional Cash Transfer
CSG	Child Support Grant
ECD	Early Childhood Development
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GMP	Growth Monitoring Programme
GRN	Government of the Republic of Namibia
HA	Height-for-Age
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
ILO	International Labour Organization
IMAM	Integrated Management of Acute Malnutrition
IQ	Intelligence Quotient
IU	International Units
IUGR	Intra Uterine Growth Retardation
IYCF	Infant and Young Child Feeding
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MOHSS	Ministry of Health and Social Services
MOLSW	Ministry of Labour and Social Welfare
NAD	Namibian Dollar
NAFIN	National Alliance for Improved Nutrition
NDHS	Namibia Demographic Health Survey
NDP	National Development Plan
NHIES	National Household Income and Expenditure Survey
NPFS	National Programme for Food Security
OECD	Organization for Economic Cooperation and Development
ORS	Oral Rehydration Salts
PLWHA	People Living with HIV/AIDS
PMTCT	Prevention of Mother to Child Transmission
PRSP	Poverty Reduction Strategy Paper
RDA	Recommended Daily Allowance
RUTF	Ready to Use Therapeutic Foods
SAM	Severe Acute Malnutrition
SD	Standard Deviation
TB	Tuberculosis
US\$	United States Dollar
U5	Under-five
UCT	Unconditional Cash Transfer
UNAIDS	The Joint United Nations Programme on HIV/AIDS
UNAM	University of Namibia
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme

UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USI	Universal Salt Iodization
VA	Vitamin A
VAS	Vitamin A Supplementation
VCT	Voluntary Counselling and Testing
VIP	Ventilated Improved Pit-Latrine
WA	Weight-for-Age
WASH	Water Sanitation and Hygiene
WFP	World Food Programme
WH	Weight for Height
WHO	World Health Organization

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THE SITUATION

Since gaining independence in 1990, Namibia has experienced sustained economic growth, which has now put the country into the category of 'upper middle income countries'. However, this economic growth has not benefited all, nor reduced the levels of poverty across the country. Namibia has the highest level of income inequality in the world. Despite the commitment by the government (demonstrated through significant investment in social sectors in the past decade), this has not translated into major improvements in many development outcomes for children, women and families.

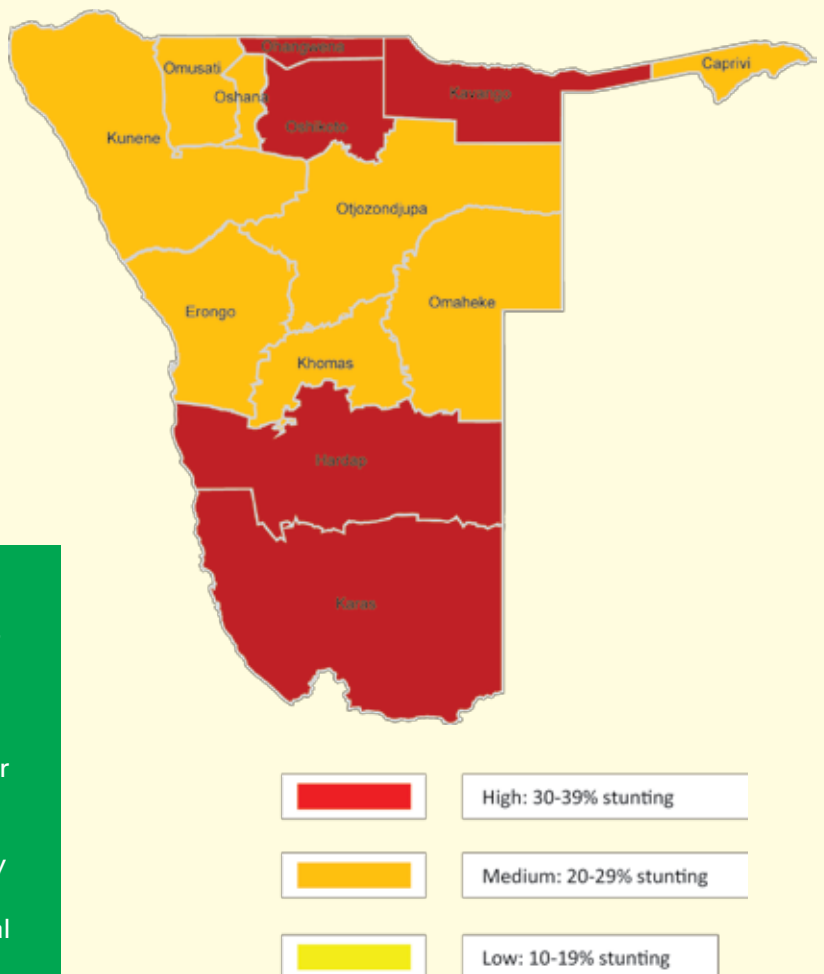
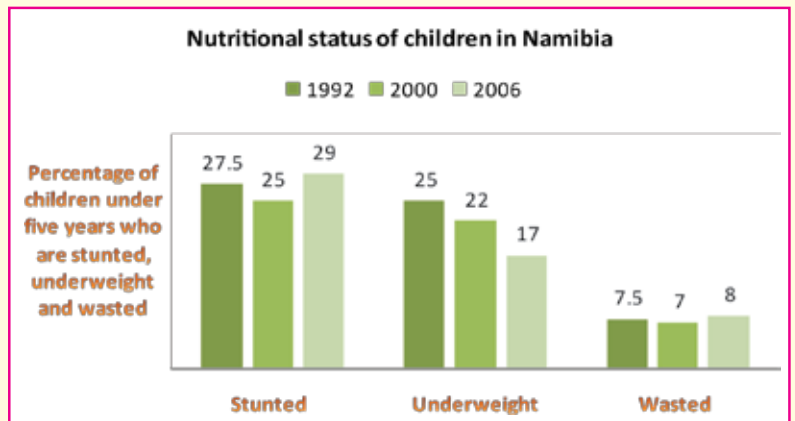
While the percentage of children underweight (too thin for age) has declined in the last two decades, stunting (too short for age) and wasting (too thin for height) have increased. With one out of every three children under 5 years stunted, Namibia has almost twice the percentage of moderately stunted children and three times the percentage of severely stunted children than what is expected for a country with its level of economic development. This national data masks significant regional and language disparities.

Almost one out of every three Namibian children under the age of 5, is malnourished.

The general pattern indicates that regions with high levels of poverty, low literacy rates, high HIV/AIDS prevalence and with predominantly rural populations have the highest levels of stunting: ranging from 39% in Kavango to 22% in Erongo. Children born in the poorest and second poorest wealth quintile households have a threefold risk of being stunted compared to those born in the richest quintile.

- 1 in 3 Namibian children under-five are too short for their age
- 1 in 5 Namibian children are too thin for their age
- 1 in 4 Namibian women weigh too much for their height
- 1 in 20 Namibian children weigh too much for their age
- 1 in 25 Namibian women are at risk of going blind of and have a reduced immune capacity because vitamin A deficiency
- 40% of children are at risk of reduced physical and mental development and 40% of women are at increased risk of miscarriage or giving birth to babies with congenital birth defects

Almost one out of every three Namibian children aged under 5 is malnourished



Over 23% of pre-school children in Namibia have Vitamin A deficiency. Children deficient in vitamin A are 20 times more likely to die from common childhood diseases.



In addition to malnutrition being visible in the form of stunting, underweight and overweight, Namibian children and women also suffer from *Hidden Hunger*: deficiency of important micronutrients including iron, folic acid, iodine and vitamin A. These micronutrients are required only in small quantities, but are essential for the body's daily biochemical functions. *Hidden Hunger* is just as devastating to a child's survival and growth than the more visible underweight and wasting.

Vitamin A is crucial for the body's immune system. Children deficient in vitamin A are 20 times more likely to die from common childhood diseases. Iron deficiency affects 1 in 2 primary school children in some regions of Namibia, with resultant poor growth and cognitive function and affecting school performance.

Iodine is important for physical growth and brain development in-utero and childhood, as well as normal functioning of the thyroid gland. Soon after Independence, a national survey of children aged 8 to 12 years in Namibia identified high levels of iodine deficiency. In response, the government launched

an iodine supplementation campaign and passed legislation on mandatory iodization of household salt. While a follow up survey in 1999 showed complete elimination of goitre (a swelling of the thyroid gland in front of the neck) signifying severe iodine deficiency, the national average of severe iodine deficiency from urinary iodine (which fluctuates more than goitre) remained relatively high, at 14.9% of 8 to 12 year olds (Ministry of Health and Social Services [MOHSS, 2001]). Despite the legislation on salt iodization, close to 40% of households - approximately 800,000 Namibians - are consuming un-iodized salt, according to the 2006/7 Namibia Demographic Health Survey (NDHS).

Children born to mothers with deficiencies' in iodine, iron, folic acid and vitamin A are likely to be small at birth, and at much greater risk of permanent physical or mental disability. Although recent data on micronutrient deficiencies in Namibia is unavailable, it is very likely that without formal micronutrient fortification of grains, cereals and other commonly consumed foods the prevalence of these deficiencies amongst women is probably high. The reported high numbers of still births and spinal neural defects are indicators which point to the likelihood of deficiencies.

THE CAUSES:

Why Are So Many Namibian Children Malnourished?

At the national aggregate level, Namibia is food secure through its own food production, supplemented by imports. As such, food availability is not a significant factor contributing to the widespread malnutrition in Namibia, although it does impact on some communities in the country. The most significant contributors to infant and child malnutrition appear to be inappropriate infant and young child feeding practices especially lack of exclusive breastfeeding, poor hygiene, sanitation and caring practices, along with the health and nutrition status of the mother.

Breastfeeding:

The benefits of exclusive breastfeeding and adequate complementary feeding are not well known to the majority of the Namibian population. Babies that are not breastfed have been shown to be five times more likely to die of infectious disease than breastfed infants in the first 2 months of life; and twice as likely to succumb to infectious disease within the first half year of life.

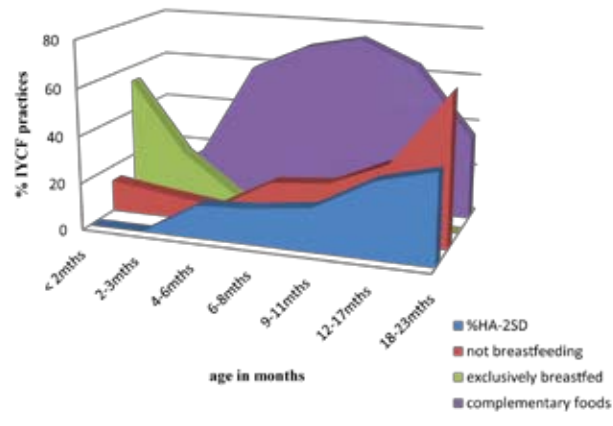
The three most significant contributors to infant and child malnutrition in Namibia are:

- Inappropriate infant and young child feeding practices, especially lack of exclusive breastfeeding
- Poor hygiene, sanitation and caring practices, leading to illness
- Poor nutritional and health status of mothers

Breast milk meets up to 70% of an infants' energy, protein, calcium, vitamin A, vitamin C, iron folate and zinc requirements in the first 6 months of life and up to 50% in the first year of life. Breastfeeding therefore contributes significantly to protecting nutritional and immune status and as such reducing health costs for both families and the health system.

Unfortunately, only half of all Namibian babies are exclusively breastfed within the first two months of life, and less than 25% of infants are exclusively breastfed for 6 months. In addition, immediately following birth, over 14% of Namibian newborn babies receive prelacteal feeds. Bottle feeding, non breastmilk feeds such as juices, plain water and complementary solid foods are introduced within the first 3 months of infants' lives. In Namibia, the

Stunting trends and infant feeding practices.



number of bottle-fed babies exceeds the number of exclusively breastfed babies at three months.

Hygiene, sanitation and care:

Frequent childhood infections, principally due to inappropriate infant feeding practices and compounded by low sanitation coverage and sub-optimal hygiene practices such as infrequent or lack of hand washing with soap at critical moments (e.g. prior to feeding babies and food handling) are important underlying causes of malnutrition. At any given time 5% to 17% of Namibian children under 5 years old have some illness (eg, malaria, pneumonia or diarrhoea) that impacts on their nutrition. Diarrhoea and pneumonia are highly prevalent in regions with low sanitation coverage. Less than 70% of Namibia's population has access to improved sanitation facilities. The nutritional status of children growing up in environments with low sanitation and prevalent unhygienic practices is undermined not only because they lose more nutrients than they can consume, but they have to compete with invading pathogens.

Despite the indisputable evidence on the incredible health and development benefits, only half of Namibian newborns are exclusively breastfed for their first 2 months and under 25% for the recommended 6 months. All a baby needs for the first 6 months of life is breastmilk.

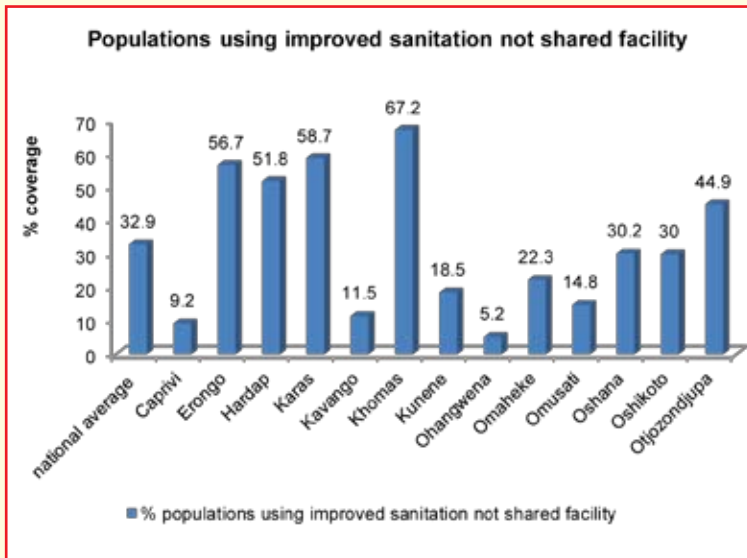
Maternal health and nutrition status:

A third critical factor in infant and childhood malnutrition in Namibia is the mother's nutrition and health status and care during pregnancy. The NDHS 2006/7 showed that children born to underweight mothers were two to three times more likely to be severely stunted compared to

children born to normal or overweight mothers. With 1 in 10 urban and 1 in 5 rural women underweight, the potential for the ongoing cycle of inter-generational stunting to continue is very high.

An estimated 15% of all newborn babies have low birth weight largely due to underlying maternal illness and diseases such as malaria and HIV/AIDS. Prevalence amongst pregnant women is 17.8% (MOHSS 2008b). Malaria and HIV/AIDS in pregnancy is associated with poor birth outcomes such as miscarriage, maternal death and low birth weight. The combination of the two is even more devastating to both the unborn child and the mother.

Namibia has the unique phenomena of high levels of both maternal underweight and overweight. Children born to overweight mothers have a twofold risk of being overweight compared to those born of mothers with normal weight. The prevalence of overweight women in Namibia is high, with 1 in 5 rural and 2 in 5 urban women overweight. The co-existence of high stunting levels in children and overweight and underweight women suggests a nation in a nutrition transition with a double burden of having to deal with diseases of affluence and poverty at the same time.



THE IMPACT OF MALNUTRITION IN NAMIBIA

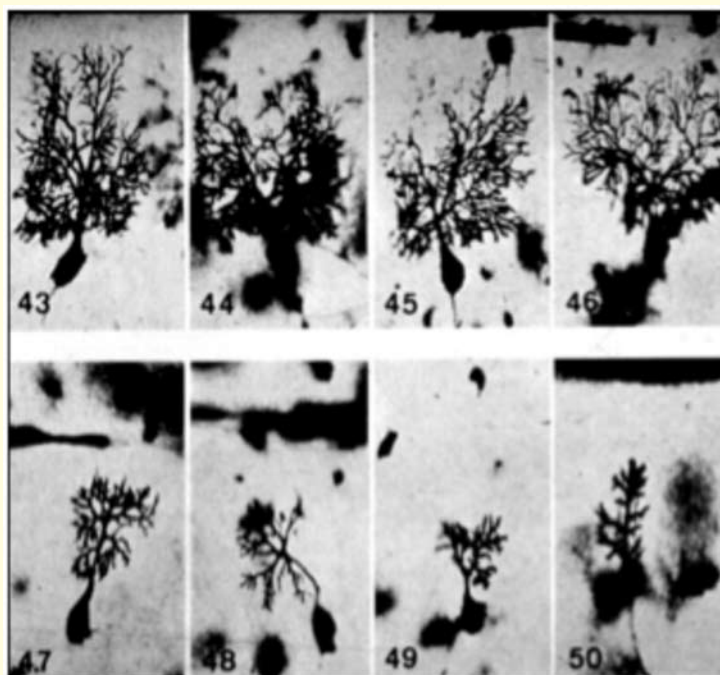
The high levels of infant, child and maternal malnutrition impose a staggering cost to Namibia's human and economic development. Malnutrition is directly implicated in 6,000 Namibian child deaths annually. Tens of thousands more Namibian children start school with diminished capacities to learn due to iron, iodine and other deficiencies and inability to concentrate in school due to hunger and parasitic infestations. The inability to concentrate and learn in school is further compounded by diets deficient in kilojoules and vitamins.

The example of the effects of iodine deficiency at the brain cellular level is perhaps most dramatic. The brain of a child who has iodine deficiency, or which is born to a mother with iodine deficiency, has less 'wiring' or synapses in the brain. Children with iodine deficiency can lose up to 13.5 IQ points, which affects their learning ability, overall school performance, physical growth and ultimately leads to diminished economic productivity.

Tens of thousands more Namibian children face an adult life with increased incidences of diabetes and heart disease. Scientists have long postulated the link between malnutrition in childhood and chronic debilitating diseases of adulthood. Diseases of adulthood such as diabetes, chronic heart disease and hypertension are strongly linked to malnutrition and care during fetal life and the first 3 years. Data from the MoHSS Health Information System indicate hypertension and diabetes as the first and second causes of disability among adults respectively. Heart attack, hypertension, and stroke collectively were responsible for 5% of all health facility deaths in 2005. The proportion of deaths from these causes increased from 6% in 2006 to 8% in 2007. (MoHSS, 2008a)

Children who are malnourished enter adult life with constrained physical and cognitive developmental outcomes, reduced life expectancy, declines in reproductive performance and diminished capacities for economic productivity. In economic terms, malnutrition can result in up to 3% losses in Gross Domestic Product (GDP) from restricted workers'

One out of 4 Namibian children has reduced capacity to learn as a result of iodine deficiency. This has significant negative implications for the future of Namibia's workforce.



Human brain iodine sufficient

Human brain iodine deficient

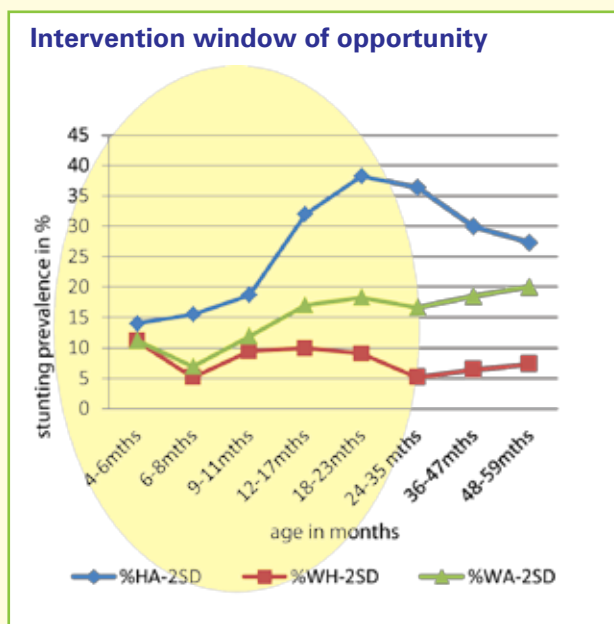
productivity amongst severely stunted manual workers; reduced potential earnings of children stunted in childhood; and absenteeism and death from malnutrition related causes (Hunt, 2001). The World Bank indicates that it would be difficult for a country to industrialize with levels of stunting above 30% (World Bank 2008).

As Namibia grapples with under-nutrition, the rapidly growing challenges of overweight and obesity amongst both adults and children must also be addressed.

WHAT NEEDS TO BE DONE

The window of opportunity for improving nutrition and a young child's prospects for survival, growth and development is very narrow: from pregnancy through to 24 months of age is just 1,000 days.

The global body of experience indicates that through a simple set of low cost, high impact interventions, a country is able to significantly



improve its maternal, infant and child nutrition situation, simultaneously investing in longer term household nutrition and food security approaches. These priority intervention strategies include:

Maternal and Infant and Young Child Feeding interventions:

- Exclusive breastfeeding up to 6 months, followed by complementary feeding
- Improved nutrition and health care for pregnant women
- Greater access to low cost fortified complementary foods for young children (6 to 24months)
- Twice yearly Vitamin A supplementation for all children under-five

- Availability of ready to use fortified therapeutic food for moderate and severely malnourished children.
- Community-based growth monitoring systems that are linked to services such as health facilities and social workers.

Food Fortification:

- For the general population fortification of maize, wheat flour and other centrally processed staple foods with iron, folic acid, vitamin A and zinc and use of market based delivery systems
- Social mobilization on importance of consuming fortified foods
- Regulation and policy change

Hygiene Promotion and deworming:

- Nationwide hygiene promotion campaigns
- Increased access to, and use of improved latrine facilities
- Deworming for all children aged one year and above, twice yearly

Household food diversification and targeted food distribution programmes:

- Community awareness campaigns on nutrition and household food security programmes
- Vegetable garden establishment
- Targeted food distribution to highly vulnerable households, households with chronically ill patients and schools in food insecure areas

This report outlines the situation in much more detail and offers suggestions on how Namibia can approach nutrition improvement as a national development priority.

An estimated additional N\$35,000,000.00 a year is required from public and private resources to successfully mount an attack against malnutrition. This is an investment that must be made and which will yield dramatic dividends through thriving children, healthy families and a productive workforce as the country strives for Vision 2030.

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1. INTRODUCTION



1.1 BACKGROUND AND EXTENT OF THE PROBLEM

1.1.1. Beyond Namibia

Globally, one in three children under the age of five is affected by stunting. In Africa, one in three children under the age of five is affected by stunting. Only 9 countries in Africa are on track to meet Millenium Development Goal 1C which aims to halve the proportion of children affected by underweight. Micronutrient deficiency is a challenge around the world as well as in Africa. The deficiency of micronutrients is known as *Hidden Hunger*. The most common forms of *Hidden Hunger* are deficiencies of iron, iodine and vitamin A. Globally, *Hidden Hunger* affects almost 2 billion people. Of these, 190 million children and 19 million pregnant women are affected by vitamin A deficiency; 293 million preschool children, 56.4 million pregnant women and 468 million non-pregnant women are affected by anaemia due to iron deficiency and inadequate iodine intake places 1.9 billion people at risk of iodine deficiency, of whom 285 million are school age children. Most of the children and women affected by *Hidden Hunger* live in Sub Saharan Africa and the Asian subcontinent.

This report is based on the nutrition conceptual framework of malnutrition in its presentation and the analysis of the state of nutrition in Namibia and its determinant factors, with a particular focus on the nutritional status of children under-five years old (U5). Based on the analysis, possible areas for immediate attention and action to improve the nutrition status of Namibians and especially the plight of mothers and children in Namibia are highlighted. Data from the 2006/7 NDHS provides the main source of data.

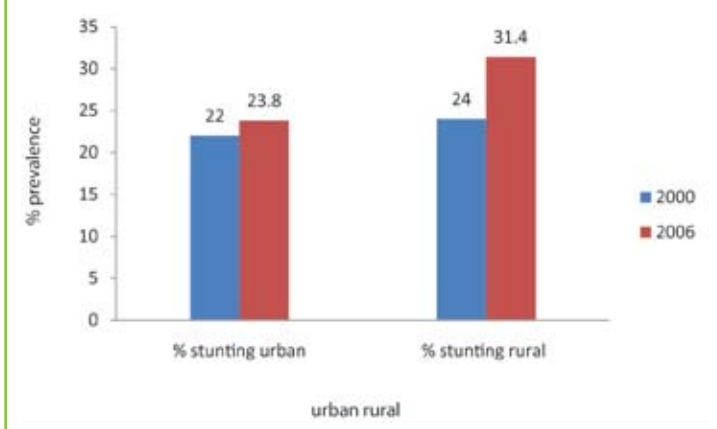
1.1.2. Namibia

In Namibia, findings from the 2000 NDHS indicated that stunting prevalence among U5 was 23.6% (MOHSS, 2003). When compared to the stunting prevalence reported in the 2006/7 NDHS (29.1%), the nutritional status of children in the under-five age group has increased (MOHSS, 2008). The prevalence of wasting, defined as a low weight-for-height decreased between 2000 and 2006 (9.1% versus 7.5%). A similar decrease was seen for the prevalence of underweight defined as a low weight-for-age between 2000 and 2006, where prevalence in 2000 was 24% and 2006 estimates are 16.6%. This is indicated in Figure 1.

The differences in anthropometric patterns suggest that children in Namibia have had decreased access to foods of sufficient quality to increase their growth in height but they have had access to foods that contribute to weight gain. Additionally the fact that stunting has increased in the intervening time period suggests that the majority of challenges to childhood nutritional security are experienced before the child's third

passed on to the next generation, as small women are shown to give birth to small babies. This is the intergenerational cycle of malnutrition, which can be broken only by prevention of stunting. The prevalence of stunting in a population is defined as high when between 30 and 39% of children under the age of five are found to be stunted. It is of medium severity when stunting prevalence among children under-five years of age is between 20 and 29%. Assessing the current national prevalence of stunting in Namibia and if current trends continue, the country is on the verge of having a high burden of stunting among children under-five years of age. Urgent interventions are required to reverse this trend.

Figure 1: Changes in malnutrition trends 2000 - 2006



birthday and is associated with shortcomings in the mother's nutritional status. Challenges include increased disease burden to young children or increases in the prevalence of maternal underweight between 2000 and 2006.

Although there are three different indicators for undernutrition in children under the age of five, stunting has been chosen as the primary nutritional indicator to interpret nutritional status. Stunting which reflects long term limited dietary intake will be used as the primary indicator of nutritional status in this report. Stunting is defined as a low height-for-age of less than two standard deviations from the reference World Health Organization (WHO) growth charts (HA-2SD). Wasting is defined as a low weight-for-age of less than two standard deviations from the reference WHO growth charts (WH-2SD). WA-2SD, is an indicator of low weight gain relative to the child's age. Of the three indicators, stunting is the most informative as stunting reflects hindrances in a child's growth processes limiting the child's full potential to grow taller. Within the first two years of life, stunting is largely reversible but after this period, stunting is not reversible and in girls will be

Reinforcing the message that the nutrition situation in Namibia has deteriorated is shown in Figure 2, which indicates the changes in stunting prevalence across wealth quintiles. We see that the prevalence of stunting increased across 4 of the 5 wealth quintiles and only decreased in the fifth wealth quintile. This suggest that 80% of the households in Namibia experienced factors that undermined their capacity to maintain the nutritional status of children under-five years of age and most likely the family unit as whole.

The deterioration in the prevalence of stunting is evident across both urban and rural areas. In the rural areas the increase in the rate of stunting increased by 7 percentage points (see Figure 3).

Figure 2: Changes in stunting prevalence between the years 2000 and 2006 across the wealth quintiles

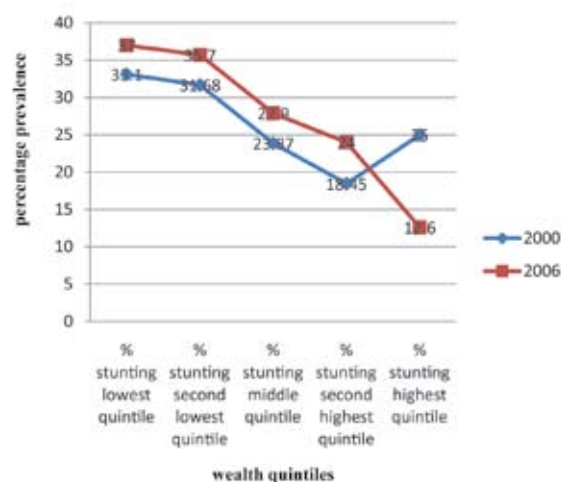
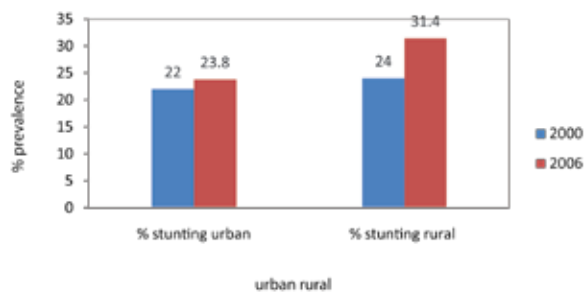


Figure 3: Changes in stunting prevalence across the urban rural areas of Namibia

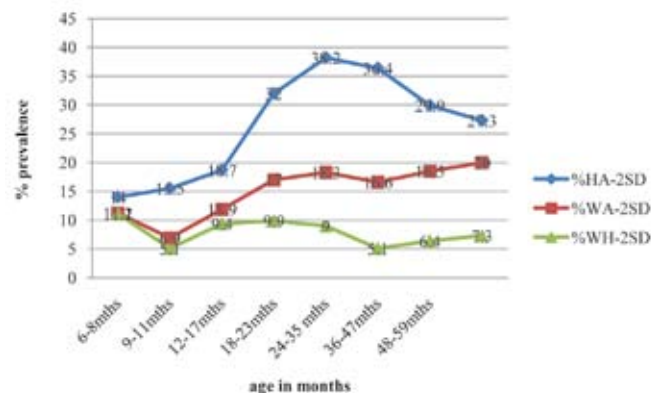


Illustrated in figure 4 at right, are results from the 2006/7 NDHS showing the national prevalence in stunting, wasting and underweight among Namibian children between the ages of 6 months and 59 months. From the chart we see that the prevalence of stunting is the most significant nutrition problem among Namibian children. The severity of the problem varies with age and peaks during the second year of life at 38.2%. Stunting prevalence begins to rise between 6 and 8 months, while the largest change occurs between 9 and 11 months of age, peaking at 18-23 months. Underweight (WA-2SD) peaks at 5 years of age. The prevalence of wasting, an indicator of acute malnutrition (WH-2SD), is highest in the youngest age group and is lowest in the highest age group. Stunting was more prevalent among boys at 31.5% compared to 26.4% in girls. Rates of wasting and underweight were similar between boys and girls.

The discrepancies between these anthropometric markers suggest that children are receiving enough calories in their diet to achieve weight gain, but not sufficient calories and micronutrients to keep them growing taller. Alternatively, children may receive sufficient calories, but due to conditions where sanitation coverage is limited and unhygienic practices prevalent, diarrhoeal diseases may result, predisposing the children to malabsorption syndrome and excessive nutrient losses caused by inflammation and physical damage to the intestine from invading gut pathogens.

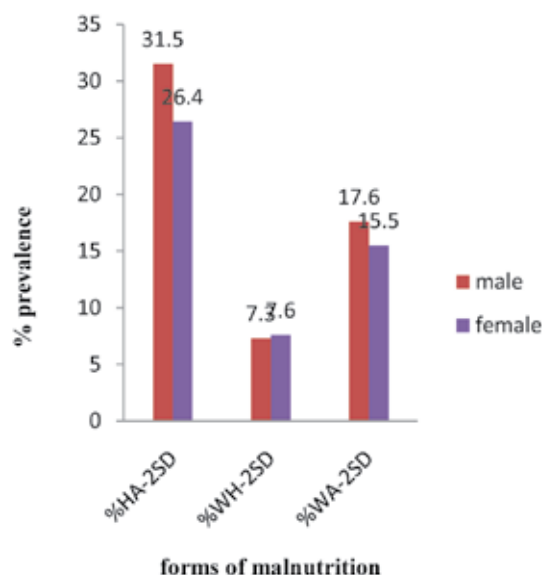
Figures 4 and 5 highlight the importance of the stratification of stunting burden, in this case by age group and gender so as to understand the full extent of the stunting burden affecting children under the age of five in Namibia. Here we see that the stunting burden among boys is of high public health significance as is stunting prevalence between 1 and 4 years of age. Thinness is of public health significance in both boys and girls.

Figure 4: Stunting, wasting and underweight prevalence between 6 months and 5 years of age



Stratification across urban rural differences showed that all forms of malnutrition were higher among children in the under-five age group, living in the rural areas than among children living in the urban areas as is illustrated in Figure 6. In the rural areas, stunting burden is of high public health significance and needs to be urgently addressed.

Figure 5: Gender differences under-five malnutrition



Source: Ministry of Health and Social Services, 2008

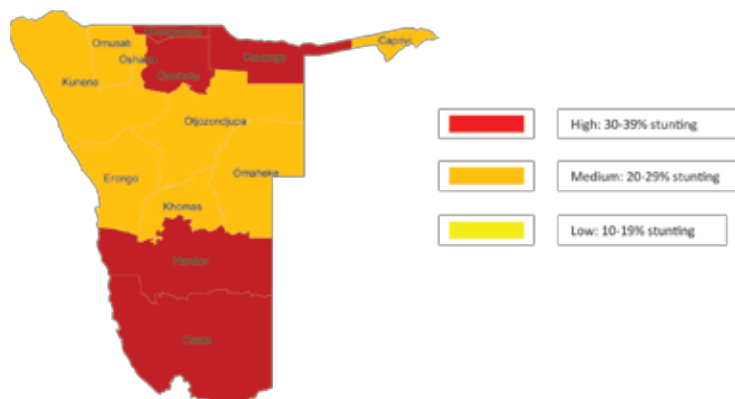
In addition to malnutrition having wide rural - urban disparities it also shows worrying regional disparities as is illustrated in Figure 7.

Stunting burden in the Kavango region is the highest (38.8%) in the country. According to World Health

Organization classifications the prevalence stunting in this region is very high (WHO, 1995). Regions where stunting is of high public health significance are Hardap (30%), Karas (30.2%), Kunene (34%) and Oshikoto (32.5%). See the figure below. Erongo region had the lowest burden of stunting (21.5%) in the country, nevertheless the prevalence remains of medium public health significance. Additionally in the Erongo region, wasting is of medium public health significance affecting 11.3% of children under the age of five. Malnutrition is a very significant public health problem in almost half of all the regions in Namibia.

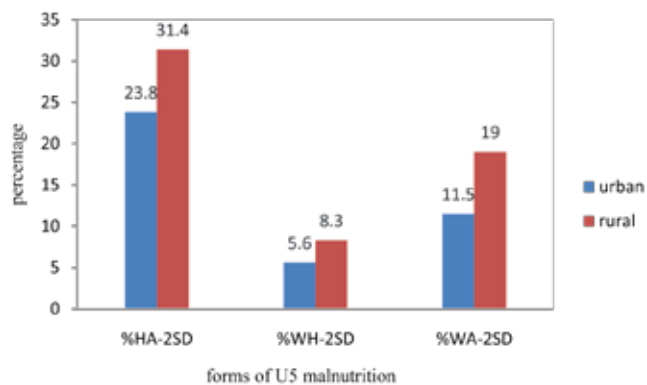
A growing body of evidence indicates that babies born to undernourished mothers, who experience growth faltering within the first two years of life

Figure 7: Regional malnutrition rates in Namibia



part of the strategy to prevent chronic disease in later life (Barker, 2004). Although the maternal-fetal nutrition link has primarily been used in strategies to prevent chronic non-communicable disease of hypertension and diabetes in later life (World Health Organization, 2003), the evidence is persuasive to promote and ensure adequate nutrition in-utero and in the first 2 years of life so as to protect the health of the child in later life.

Figure 6: All forms of undernutrition in Namibia, urban rural differences



Source: Ministry of Health and Social Services, 2008

are at increased risk of developing chronic disease later in life. Children who are stunted at the age of two, and who subsequently rapidly gain weight, are at an increased risk of obesity-related illnesses such as coronary heart disease, hypertension and type 2 diabetes. This phenomenon is known as the *Double Burden of Malnutrition*. These findings point to the importance of (1) protecting the nutrition and health of young women before and during pregnancy, (2) protecting the growth of infants, (3) avoiding rapid increase in obesity after the age of two years, especially in children who were thin at around two years of age, as

Although the maternal-fetal nutrition link has primarily been used in strategies to prevent chronic non-communicable disease of hypertension and diabetes in later life (World Health Organization, 2003), the evidence is persuasive to promote and ensure adequate nutrition in-utero and in the first 2 years of life to prevent stunting so as to protect the long term health of children and the adults they develop into.

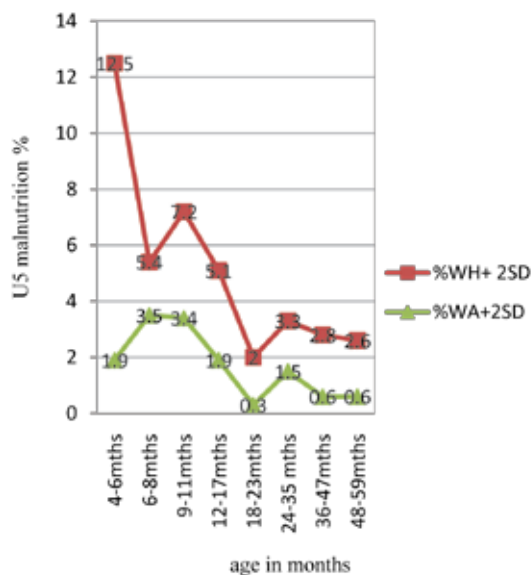
1.1.3. Overweight in Namibia

As an economy in transition, 4.3% of Namibian children are classified as overweight (WH+2SD) and 28% of women are overweight, with a BMI of greater than 25kg/m² and critically 11.7% of women are severely obese with a BMI greater than 30 kg/m² (MOHSS, 2008).

Observation of overweight according to age showed that the highest prevalence of overweight babies was between the 4-6 month age group and decreased with increasing age after the first year of life (Figure 8). The prevalence of overweight (WH+2SD) among children in the urban areas under the age of five was twice as high as overweight prevalence among rural children (Figure 9).

The evidence is persuasive to promote and ensure adequate nutrition in-utero and in the first 2 years of life to prevent stunting so as to protect the long term health of children and the adults they develop into.

Figure 8: Overweight prevalence:- 6 months to 6 years

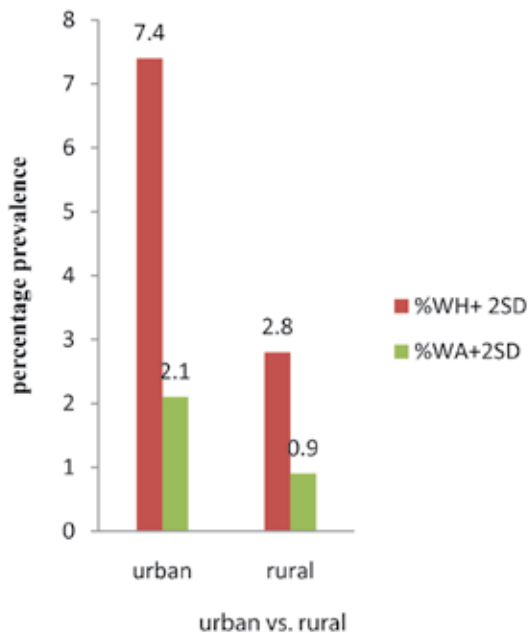


A child's size at birth was also found to contribute to increased risk of overweight. Five percent of children classified as average or large at birth were found to be overweight, compared to 2% and 2.9% of children who had been very small or small at birth as is illustrated in Figure 10.

An analysis across wealth status showed that children born into the highest wealth quintiles were at the highest risk of overweight. In the highest wealth quintile 8.8% were overweight (see figure 11 on page 14). Urgent measures therefore are needed targeting urban children in promoting lifestyles and dietary patterns that improve height gain but prevent obesity.

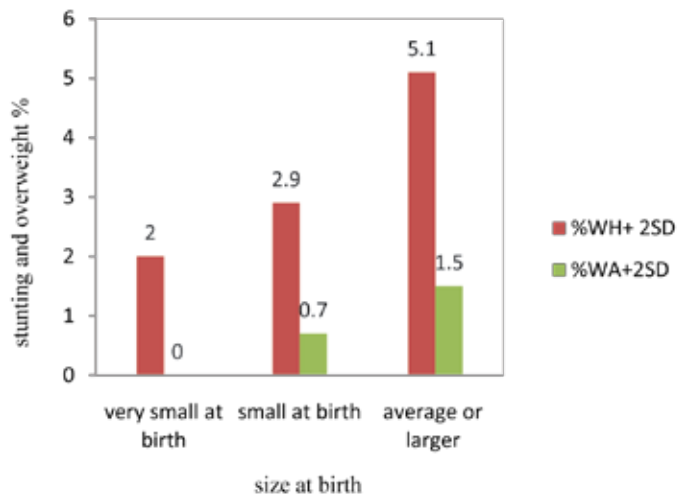
Namibia has yet to accumulate sufficient clinical evidence of the debilitating effects of the double burden of malnutrition. Overweight and obesity are emerging as serious problems in developing and middle income countries. This is as a result of

Figure 9: Urban rural differences in stunting and overweight prevalence



Source: Ministry of Health and Social Services, 2008

Figure 10: Child overweight determined by size at birth



Source: Ministry of Health and Social Services, 2008

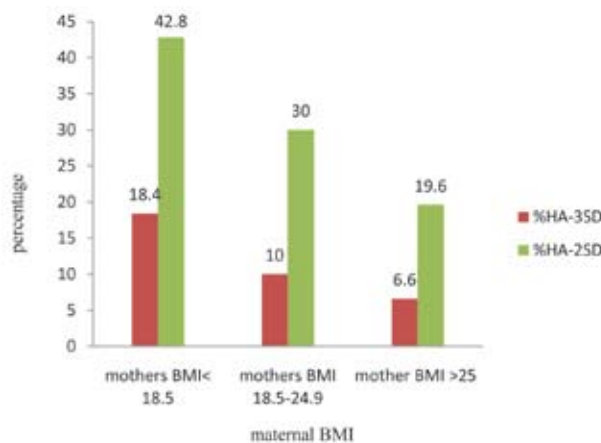
rapid changes in lifestyle patterns encompassing dietary intake comprising energy dense diets and accompanied by sedentary lifestyles (Doak & Popkin, 2008). Namibia has not escaped these changes. Therefore it is important to draw important lessons from countries facing similar economic and nutritional

Figure 11: Under-five overweight across wealth quintiles



Source: Ministry of Health and Social Services, 2008

Figure 12: Maternal undernutrition as a determinant of U5 stunting



Source: Ministry of Health and Social Services, 2008

transitions and the consequences thereof. In a six country case study analysis undertaken by the FAO, three typologies of countries with respect to the double burden of malnutrition were identified. The first typology describes countries in early transition with persistent undernutrition and micronutrient deficiencies in both children and adults; India and the Philippines were found to fit this typology. In the second, child stunting and micronutrient malnutrition are still widespread, but overweight/obesity is more of a problem than undernutrition in adults; South Africa was the country identified fitting this typology. Namibia falls within these two typologies and therefore can draw valuable lessons from the South African experience. Namibia is in the early stages of transition where childhood underweight is more prevalent than overweight in adults. Namibia is at an opportune stage to act before the effects of transition leading to debilitating complications arising from non-communicable diseases such as diabetes mellitus, hypertension, cardiovascular disease and stroke are manifest. This is important when we consider the Barker theory associating increased risk of coronary heart disease, hypertension and type 2 diabetes among stunted children who rapidly became overweight after the age of two (Barker, 2004).

1.1.4. WOMEN'S NUTRITIONAL STATUS IN NAMIBIA

A. MATERNAL UNDERWEIGHT

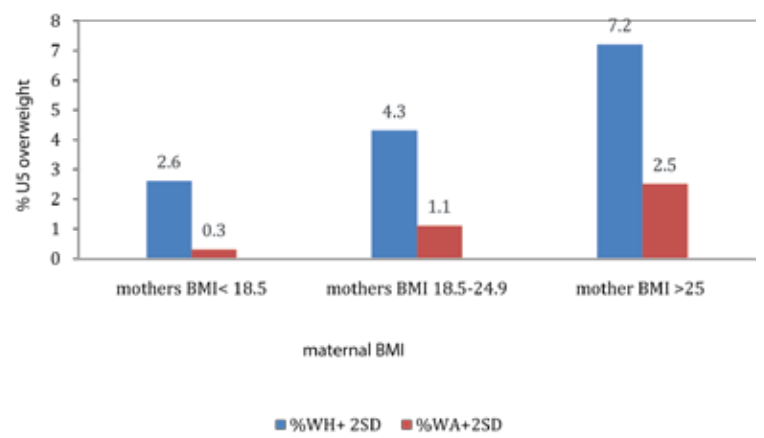
As discussed earlier, maternal nutritional status plays a significant role in infant and child nutrition, from conception through to at least six months of age. Results from the 2006/7 NDHS indicate that maternal underweight is a significant risk factor for U5 stunting. Stunting prevalence in children born to underweight mothers is of alarming proportions and falls within the very high burden category according to WHO guidelines (WHO, 1995). Stunting risk was medium in mothers of normal weight and was absent among overweight mothers. Significantly, children born to mothers who are underweight are three times more likely to suffer from severe forms of stunting than children born to normal or overweight women (see Figure 12). These findings are significant when we take into consideration that 15% of mothers are estimated to be underweight, with the prevalence higher in the rural areas compared to the urban areas (Figure 13). Just under 60% of mothers are normal weight. At the opposite end of the spectrum just



Just under 30% of women nationwide were found to be overweight, with the prevalence in the urban areas as high as 37% and 19% in the rural areas

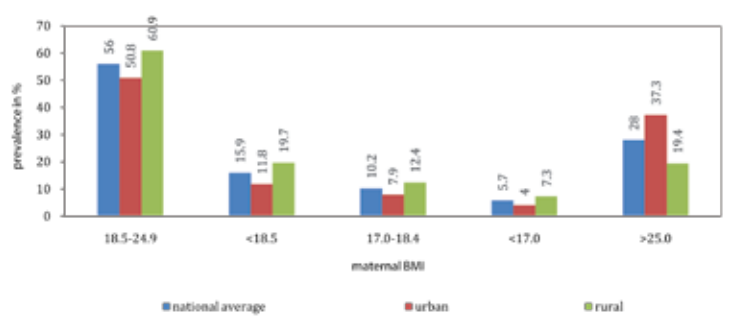
under 30% of women nationwide were found to be overweight, with the prevalence in the urban areas as high as 37% and 19% in the rural areas (figure 13). The urban rural divide for maternal overweight reflects child overweight stratification and indicates the need for urgent action to address the prevalence of overweight among women and children in urban areas of Namibia.

Figure 14: Relationship between maternal BMI and child overweight



Source: Ministry of Health and Social Services, 2001

Figure 13: Urban rural differences in maternal underweight and comparison with the national average



Source: Ministry of Health and Social Services, 2008

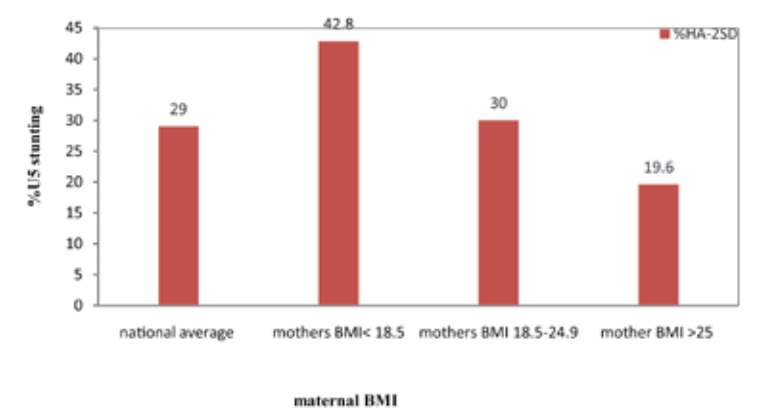


B. MATERNAL OVERWEIGHT AND CHILD OVERWEIGHT

The relationship between maternal overweight and the prevalence of overweight in children under-five was looked into and is illustrated in figures 14 and 15. Figure 14 illustrates the relationship between maternal overweight and under-five overweight prevalence. Here we see a positive correlation between increases in maternal weight categories with overweight in children under the age of five.

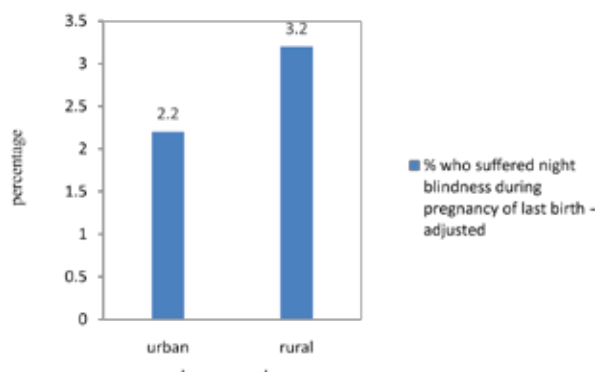
Figure 15 illustrates the relationship between maternal overweight and under-five stunting. Figure 15 illustrates a negative relationship between increasing maternal weight and under-five stunting prevalence. These findings appear to confirm the existing evidence that undernourished mothers are more likely to give birth to undernourished offspring with the opposite applying as well.

Figure 15: Relationship between maternal BMI and child stunting



Source: Ministry of Health and Social Services, 2001

Figure 16: Prevalence of mothers who suffered nightblindness during their last pregnancy



Source: Ministry of Health and Social Services, 2001

C. MATERNAL CLINICAL VITAMIN A DEFICIENCY

In Figure 16, the prevalence of reported maternal night blindness suffered in the previous pregnancy was higher in rural areas than in urban areas. The highest regional prevalence of maternal nightblindness was found in Oshikoto region at 4.9%. Although, the prevalence of nightblindness does not exceed 5% of the survey population and therefore is not classified as of public health significance, the fact remains that antenatal maternal nightblindness reportedly exists in Namibia. This is significant because this is indicative of severe vitamin A deficiency in the women affected. Severe maternal vitamin A deficiency during pregnancy increases the risk of poor birth outcomes such as low birth weight. If a mother's dietary intake of vitamin A is not urgently increased through supplementation or dietary diversity the unborn infant is at risk of stunting and worse still,

blindness or death. Vitamin A deficiency related blindness is the leading cause of childhood blindness in the under-five age group (Sight and Life, n.d.). This risk arises because the infant will be born with very low vitamin A stores, and breastmilk vitamin A will be insufficient to meet the infant's needs, because the mother has negligible stores herself. This places the infant at additional risk of disease because vitamin A is a nutrient that is essential not only in supporting normal growth and development but is central to maintaining normal immune function (Sommer & West, 1996). The presence of clinical maternal vitamin A deficiency was determined using the prevalence of maternal nightblindness reports.

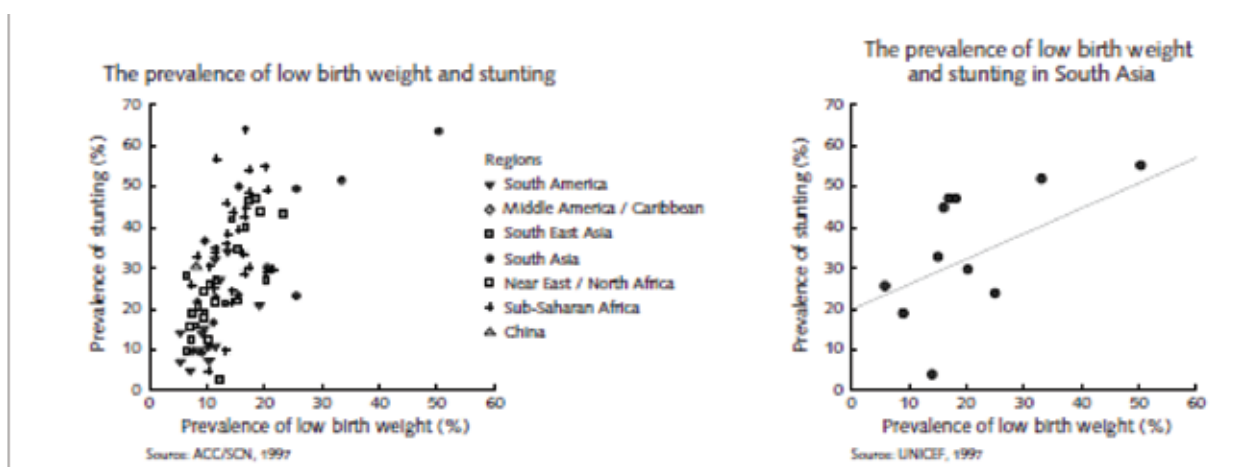
1.1.5. LOW BIRTH WEIGHT

The significance of the focus on low birth weight is that it has been consistently shown that small babies grow up to be small children and return to be small adults and is illustrated in Figure 17. (WHO, 2003; Semba and Victora, 2008).

In Namibia, low birth weight prevalence has increased between 2000 and 2006 as is shown in Figure 18. This reflects the worsening stunting prevalence among under-fives in the past six years suggesting a deterioration in maternal factors in the past 6 years.

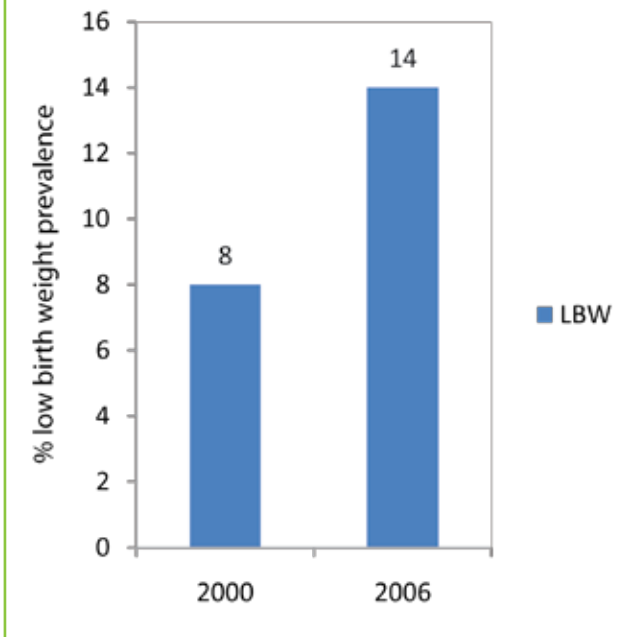
Infant birthweight and the risk of stunting was examined. In figure 19 we see that children born with a very low birth weight (<1500g) or a low birthweight (<2500g) were 1 to 1 1/2 times more likely to be

Figure 17: The link between low birthweight and stunting



Source: Commission on the Nutrition Challenges of the 21st century, 2000

Figure 18 Change in low birthweight prevalence between 2000 and 2006



stunted than children born of an average birth weight (>2500g).

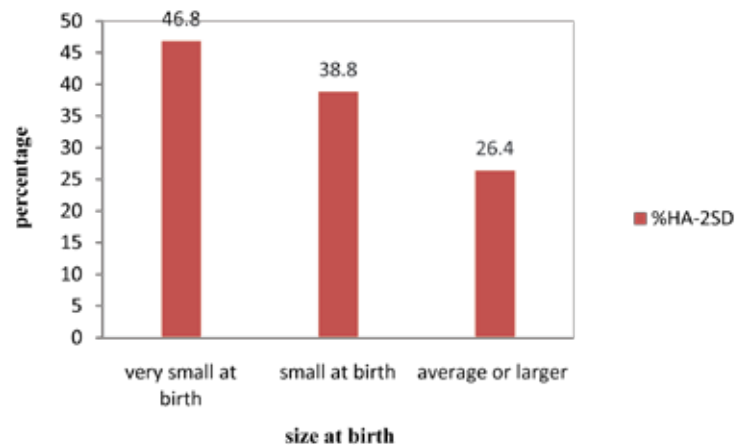
Factors contributing to low birthweight were examined. Maternal fertility was a contributory factor to low birthweight risk. First-born children had the lowest risk of low birth weight. Babies with the highest risk of low birth weight were found to be to be sixth borns (20%). Additionally, babies born to women older than 35 years of age were more likely to be low birth weight babies. Wealth status was also found to be a determinant of low birthweight. Fifteen percent of babies born to women in the lowest wealth quintile were low birthweight babies. Additionally small babies are more susceptible to the effects of disease and are more at risk of complications during recovery. To protect the next generation of Namibia's future, factors that contribute to low birthweight as identified above need to be addressed so as to prevent low birthweight and the future risk of stunting.

1.1.6. HIDDEN HUNGER

The deficiency of micronutrients is known as *Hidden Hunger* and has long lasting consequences. The most common forms of *Hidden Hunger* are deficiencies of iron, iodine and vitamin A. The forms of micronutrients best available for use by the body are found in animal source foods. Unfortunately diets in developing countries are usually plant based with minimal intake



Figure 19: Birth weight as a determinant of stunting



Source: Ministry of Health and Social Services, 2008

of animal source foods, which limits their availability for use in the body. Although only required in small amounts, micronutrients are essential for significant physiological processes such as growth, development (physical and mental), which are not always easily measured. *Hidden Hunger* therefore is insidious in its manifestation, because when clinically evident, indicates universal disturbances in growth, physical and intellectual development, immunological function and reproductive capacity and ability to maintain a healthy pregnancy or the capacity for the baby to grow in the womb.

A. VITAMIN A DEFICIENCY

The last available data showing the prevalence of vitamin A deficiency among preschool children indicated that 23.5% of children had plasma levels of vitamin A of less than 0.70 $\mu\text{mol/l}$. This is the cutoff point indicating that an individual has low vitamin A levels in their blood. According to this prevalence, vitamin A deficiency is of public health significance in Namibia. The defining limit for vitamin A deficiency as a public health problem using plasma retinol levels less than 0.70 $\mu\text{mol/l}$, is 20% among school children (MOHSS, 1992). The data however, was collected over fifteen years ago and may not reflect the current micronutrient deficiency profile affecting the country today. If vitamin A trends are in line with changes in stunting trends, the assumption is that vitamin A deficiency prevalence is higher in the present day than during the survey period. This paucity of data highlights the urgent need for a micronutrient survey that will inform on the current status of micronutrient adequacy or inadequacy in the country. Although supplementation coverage and intake data are useful in estimating the extent of the problem, a micronutrient survey is the most reliable method. Vitamin A is essential to vision, immune function, health skin and mucosal epithelia, reproduction and growth. Children with vitamin A deficiency are found to have an increased risk of illness and death from infectious diseases and vitamin A supplementation has been shown to significantly decrease the prevalence and severity of a number of illnesses in children.

B. IRON DEFICIENCY

Last available data indicated that 1437 children less than five years of age had anaemia, and 2419 children older than five years were anaemic. The highest prevalence of under-five anaemia was in the northwest with a prevalence of 55%, and in children older than five years, 59%. Thirty three percent of girls were found to be anaemic and 43,9% of boys in primary schools in the Eastern Caprivi region (Chotard, et al., 2006). Antenatal records of anaemia using haemoglobin measurements and a cut off of 10g/dl to define the presence of anaemia, showed that 21% of pregnant women in Kavango were anemic, 16% in Caprivi, 13% in the Khomas region and 11% in the Hardap region. Antenatal iron supplementation is

important for both the health of the mother and her unborn child. Iron is essential to the production of haemoglobin in the blood for the transportation of oxygen to the tissues and in energy metabolism. Iron is also involved in immune function. Iron deficiency is associated with poor cognitive function in children affecting school performance. In pregnancy, iron deficiency is associated with increased risk of low birth weight and prematurity. Iron deficiency is associated with reduced work performance and productivity in adults.

C. IODINE DEFICIENCY

Iodine concentrations as indicators of iodine status in school children, were found to be 216.3 $\mu\text{g/L}$ (MOHSS, 2001). This suggests that iodine intake is more than adequate and places susceptible groups at risk of hyperthyroidism. This value contrasts with the indications that 37% of households were not reached by adequately iodized salt. Final inference can only be made once an assessment of the prevalence of urinary iodine concentrations less than 100 $\mu\text{g/l}$ is made, if this exceeds 50%, iodine deficiency is still of public health significance in the county (WHO, 2004). National prevalence was found to be 28.7% of the surveyed population with urinary iodine of less than 100 $\mu\text{g/L}$, and the highest prevalence in the country was reported in Kavango at 70% of the surveyed population with urinary iodine less than 100 $\mu\text{g/L}$ (WHO, 2004). Using urinary iodine excretion cut off of less than 20 $\mu\text{g/L}$, 14.9% of children were found to have severe iodine deficiency. Therefore nationally, iodine deficiency does not appear to be of public health significance but there are regional pockets that suggest a very high risk of severe impact of iodine deficiency disorders. This is critical as iodine deficiency can lead to a wide spectrum of disorders ranging from poor growth, poor cognitive function and mental retardation, to the risk of still birth in pregnant women.

1.1.6.1. LINKS BETWEEN HIDDEN HUNGER AND STUNTING

Hidden Hunger contributes to stunting. Energy and protein provide the fuel and structural foundation to maintain growth processes, however vital micronutrients such as vitamin A, iron, and iodine are crucial in directing, controlling and sustaining growth and development.

Vitamin A is vital to normal cell differentiation and development of all organs and systems in the body including the bones, therefore in the womb, vitamin A deficient can limit the baby's growth in length. Vitamin A deficiency postpartum will also result in restricted height gain i.e. stunting. Vitamin A is also known as the anti-infective vitamin. Vitamin A is vital to immune function, therefore vitamin A deficient mothers and infants are more susceptible to infections which reduce nutrient availability while increasing nutritional needs. If this situation is a chronic one, the danger exists of exacerbating the negative nutrition infection cycle and further curtailing growth. Iron deficiency is associated with increased risk of low birthweight and prematurity of infants born to anaemic pregnant women. Therefore iron deficiency indirectly contributes to stunting prevalence, as small babies

have been shown to be at increased risk of developing into small adults. Iodine is vital to normal thyroid hormone function. The thyroid hormones primarily control metabolism of the body and therefore control metabolism of the proteins, carbohydrates and fats and regulate basal metabolic rate. Growth hormones are partly regulated by the thyroid hormones. The thyroid hormones are also involved in maintaining normal bone cell growth and development. Therefore an inadequate supply of iodine in the diet adversely affects thyroid hormone production, consequently limiting intrauterine growth and increasing the risk of childhood stunting postpartum. Micronutrients work in synergy in maintaining normal growth and function and a deficiency in one or more of these micronutrients can result in growth retardation in-utero and postpartum.



2. IMMEDIATE CAUSES

2.1. THE CONCEPTUAL FRAMEWORK

Malnutrition in women and children results from a series of interlinked adverse factors. The nutrition framework below (Figure 20) illustrates the most significant factors and categorises them defining them as manifestations of the consequences of malnutrition, immediate causes or basic causes. The manifestations of malnutrition are the prevalence of the problem of malnutrition (undernutrition and overnutrition) and its effects, whether these be disability, death, lowered productivity, or diseases arising out of the presence of malnutrition e.g. cardiovascular disease and stroke. The immediate causes are factors that directly contribute or exacerbate the presence of malnutrition. These are the presence of infectious disease agents and their source and most importantly, inadequate dietary intake. Underlying factors encompass access to food and its utilisation, care practices at an individual level as well as the capability of the existing infrastructure such as the health services that provides the means

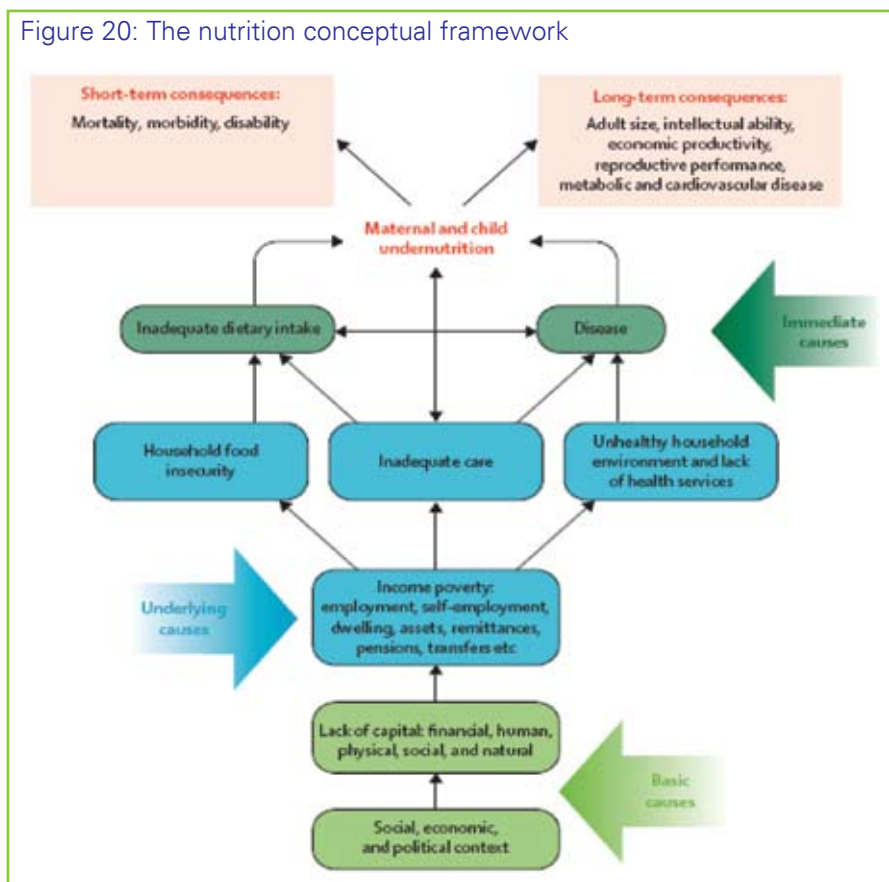
to prevent malnutrition e.g. vitamin A supplements and prophylactic deworming, to name a few. Finally basic factors are the resources and access to resources that facilitate the utilisation of food and the mechanisms to protect the individual's right to access that food. Here resources refer to capital, financial and human resources. Therefore economic disparity and the capacity in a country as well as legislative mechanisms may facilitate or hinder access to resources that protect nutritional security of women and children.

2.2. ACCESS TO MICRONUTRIENT RICH FOODS

2.2.1. Reported intake of vitamin A and iron rich foods

A diet derived from a wide variety of food groups is more likely to provide an adequate intake of macronutrients and micronutrients. Studies have shown that an intake of a minimum of five food groups was associated with a minimum probability of adequacy of meeting micronutrients requirements for young children (Kennedy, 2009).

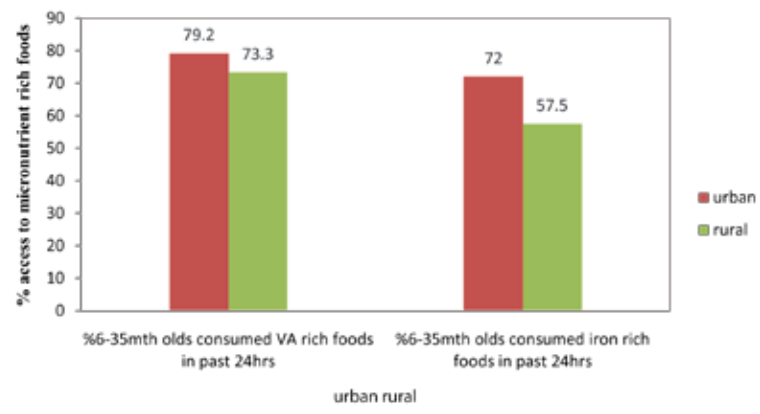
Figure 20: The nutrition conceptual framework



Stratification for rural and urban differences showed lower access to micronutrient rich foods as illustrated in Figure 21. Factors contributing to the differences in access to micronutrient foods between the urban and rural areas need to be understood, especially as food is grown in the rural areas but does not appear to reach the children living there. It appears that there is an urgent need for community health promotion within communities about the importance of young child nutrition. More than half of all the children across all wealth quintiles had access to micronutrient rich foods (Figure 22). The question remains whether the diets are primarily plant based or animal based diets. Results from the 2006/7 NDHS indicated that mothers had consumed foods from at least five food groups in the 24 hours of the survey.

Results from the 2006/7 NDHS showed that the consumption of micronutrient rich foods by infants increased across wealth quintiles (intake of iron rich foods 40% in

Figure 21: Reported intake of micronutrient foods among under-fives in urban and rural areas



education have a greater understanding of the importance of childhood nutrition and therefore provide more micronutrient rich foods to their children. Additionally, women with a better education may have better jobs which provide them with sufficient disposable income to have a greater variety of foods and food groups in the home. However there is need for a larger and more systematic study of dietary habits of the Namibian population to better interpret the significance of food consumption pattern influences on micronutrient intake and adequacy.

wealth quintile 1 to 80% in wealth quintile 5 (Figure 22). Stunting prevalence decreased across the wealth quintiles. Additionally, an inverse association was observed between U5 stunting prevalence and micronutrient intake in infants and young children. There was no stunting information available for children born to mothers who had completed secondary and tertiary education. Infants and young children in the two highest education brackets nevertheless had the highest micronutrient intake. The findings suggest that increasing wealth status allowed for improved dietary quality through increased dietary diversity leading to improvements in nutritional status. Additionally, stratification by educational qualification, suggests that women who had attained a higher

2.3. DISEASE PREVALENCE

2.3.1. HIV AND AIDS PREVALENCE AND ANTIRETROVIRAL THERAPY ACCESS

With the fifth highest adult HIV prevalence in the world, estimated to be 15.3%, the burden of HIV in Namibia is significant (MOHSS, 2009). Figure 23 illustrates the prevalence of HIV across the country.

Alarming, 68 percent of the new infections in the 15 to 24 age group in 2008, were estimated to be among young women. In 2008/09, among the 174,000 people living with HIV, 7 percent (12,700) were under 15 years of age and 55 percent (95,000) of those

Figure 22: Reported infant intake of micronutrient rich foods



Source: Ministry of Health and Social Services, 2008

following a two year course of antiretroviral therapy (Weigel et al, 2010). HIV predisposes infected individuals to frequent bouts of diarrhoea and is associated with painful mouth sores. This restricts food consumption and further undermines the nutritional status of people living with HIV and AIDS who frequently experience episodes of little or no appetite as a result of infection induced anorexia. As such, PLWHA (children and adults) are susceptible to acute weight loss and wasting. In eastern and southern Africa there are increased efforts to link HIV screening and testing with nutrition programmes especially for those children with moderately severe malnutrition since 50% of the children presenting with severe acute malnutrition are HIV positive.

In relation to treatment of HIV, in the short term, individuals on ART are also at risk of rapid weight loss and in children wasting as side effects of ART include vomiting, nausea and frequent diarrhoeal episodes. In the long term, PLWHA on ART experience dyslipidaemias and lipodystrophy which are distortions in lipid metabolism usually leading to very high lipid profiles circulating in the blood. In addition, PLWHA can experience a concentration of fat around the trunk which increases the risk of diabetes mellitus, stroke and hypertension.

Owing to the high burden of HIV in Namibia and the commendably high access to ART treatment programmes for adults and children, Namibia needs to set in place a number of approaches. As system is needed that will not only monitor HIV where severe acute malnutrition prevalence is high and link programmes to address SAM, but also set in place measures to deal with the expected wave of non-communicable diseases associated with ART among PLWHA who are living longer as a result of access to the life-saving drugs.

In addition to the health implications of HIV the high prevalence of HIV/AIDS among adults and women especially, leads to reduced productivity and a decrease in household income, which exacerbates existing food insecurity at household and individual levels. Families may be further impoverished by drawing from existing resources such as savings and sale of household material possessions and goods to settle existing and new health bills. Of the 155,000 orphans in Namibia, 69,000 have been orphaned as a result of losing their parents to HIV/AIDS (MOHSS, 2009). This erosion in capacities across society weakens human, financial and institutional safety nets and leaves the country less able to respond to natural disasters and to manage the development process.



3. UNDERLYING CAUSES

3.1. WATER, SANITATION AND HYGIENE (WASH)

Access to water, sanitation and hygiene is also inequitably distributed. Twenty eight percent (28%) of households are classified as poor and 4% of households are classified as severely poor. In the rural areas only 13.3% have access to improved sanitation facilities and 79.3% to improved drinking water sources compared to urban populations where 97.3% have access to improved water sources and 61.4% have access to improved sanitation facilities (MOHSS, 2008).

It appears that access to improved non-shared sanitation facilities remains a challenge among both urban and rural populations. However, the greatest cause of diarrhoea in Namibia's children is the inadequate access to improved sanitation facilities especially in the rural areas, as is indicated in Figure 24. It was found that populations in the rural areas had less access to improved sanitation facilities (urban 61.4% vs. rural 13.3%) and were more likely to use non-improved sanitation facilities (urban 38.7% vs. rural 86.8%) and were more likely to use non-improved sanitation facilities (urban 38.7% vs. rural 86.8%).

child feeding practices towards the reduction and prevention of diarrhoeal disease in children under the age of five. Maternal care practices need to be reviewed and appropriate education messages developed so as to ensure that there is continued rehydration not only with Oral Rehydration Salts (ORS), but continued breastfeeding during diarrhoea as well as continued feeding as is age appropriate.

Figure 25 shows differences in parents' health seeking behaviours according to the child's age. Significantly, 1 in 5 children suffering from diarrhoea at 6 months or younger did not receive treatment for diarrhea. This prevalence dropped to 1 in 10 children at 2 years of age. By the age of five, the prevalence of untreated children increased to approximately 4 in 10. These are too many children left at risk of dehydration and its consequences, as a result of diarrhoeal disease, especially in the pre-existing conditions of poor sanitation, limited access to water sources and the resultant poor environmental hygienic conditions. Figure 25 appears to reflect the impact of decreasing treatment for diarrhoea as an increase in the prevalence of stunting.

Figure 24: Links between stunting and diarrhoea treatment and access to WASH

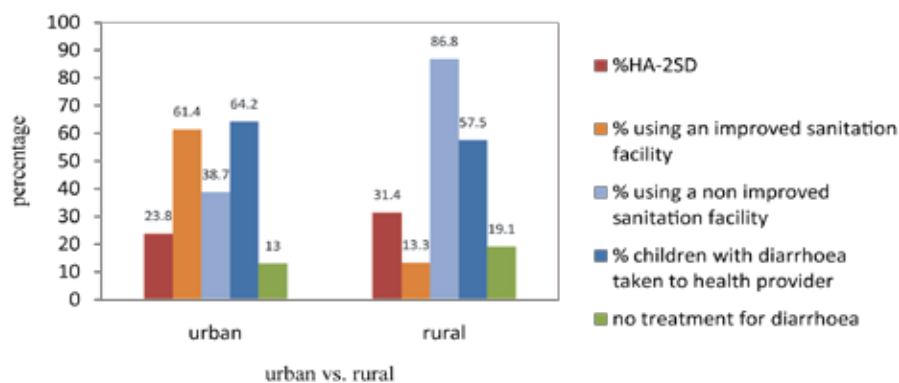
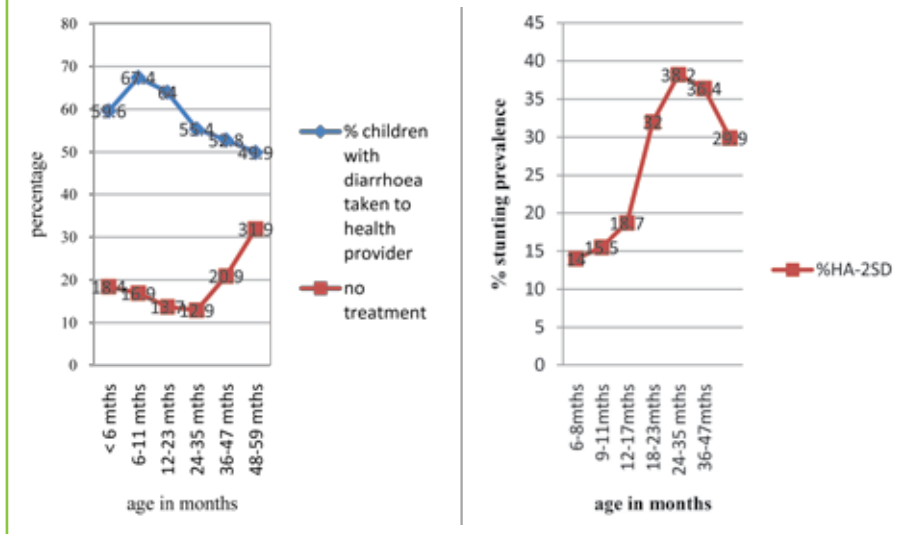


Figure 24 highlights the trends in the risk of diarrhoeal disease and poor sanitation access. These conditions lead to a poor hygienic environment which increases the risk of gastrointestinal disease. The trends seen here illustrate that strategies addressing nutrition need to be broader than a health issue and encompassing water, sanitation and hygiene factors as well. Additionally, there is a need to strengthen existing exclusive breastfeeding practices and to improve current infant and young

Awareness about the use of ORS was high among mothers (NDHS 2006/7). Provision of fluids accompanied by ORS was the preferred method of diarrhoea management across the board, whether stratifying for rural urban differences, wealth status and education status. Stratification along urban and rural divides showed that 23% of mothers in the rural areas were likely to reduce the child's fluid intake during a bout of diarrhoea as opposed to 20% of mother in the urban areas. Additionally, 5% of rural mothers withheld liquids in comparison to 2.5% of urban mothers. Provision of much less fluids during bouts of diarrhoea was most

widely practiced among mothers who had received no formal education (30%), mothers with a complete primary education (25%) and mothers who had completed secondary education (25%). The provision of more fluids during diarrhoea was practiced by fewer than 20% of mothers. With regards to feeding practices, just under 50% of mothers maintained the same feeding habits during diarrhoea bouts. In the rural areas 5% of mothers reportedly withheld food during a child's diarrhoea episode in comparison to

Figure 25: Diarrhoea treatment or absence of between 6 and 59 months of age and stunting prevalence by age



Nutritional requirements increase in HIV+ individuals. Figure 26 illustrates the effects of progression from HIV to AIDS on nutritional status and requirements. In terms of nutrient requirement changes, in the asymptomatic phase of HIV and AIDS it is estimated that energy requirements increase by 10% so as to maintain normal body weight, physical activity and growth in asymptomatic HIV+ children. Energy requirements can increase between 20-30% in the symptomatic phase. In children experiencing weight loss, energy intakes need to increase by 50-100% so as to

allow for weight gain and growth. Provision of dietary protein (12-15% of total energy intake) and micronutrient requirements (1RDA) do not change. Postpartum vitamin A supplementation is recommended. (WHO, 2003)

1% of mothers in the urban areas. More mothers with no formal schooling and mothers who had completed a secondary education were shown to provide more food during bouts of diarrhoea, at a disappointing 10% prevalence. Urgent action needs to be undertaken to address the awareness of the 90% who are withholding food from their children during bouts of diarrhoea.

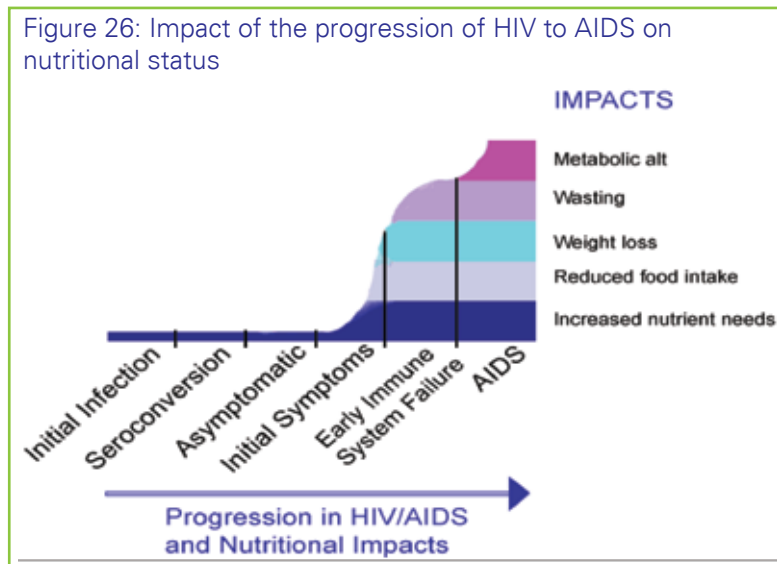
The reasons why these practices exist need to be understood and health promotion and awareness activities undertaken to stress the importance of rehydration, preferably with ORS and maintaining continued feeding in protecting infant and young child survival, especially in an environment of constant challenge from infectious diarrhoeal disease.

Energy requirements for people with HIV and AIDS increase by between 10% - 100%, depending on the phase of the disease.

A. NUTRITION AND INFECTION

The presence of infection exacerbates the risk or actual presence of malnutrition in children and adults alike. This is because infection induces anorexia which results in suppressed appetite thereby restricting food intake. The existing inadequate food intake is further diminished as a result of a decreased appetite. In HIV infection, the presence of oro-pharyngeal sores limits food intake because of the discomfort experienced by the affected individuals thereby further undermining nutritional status.

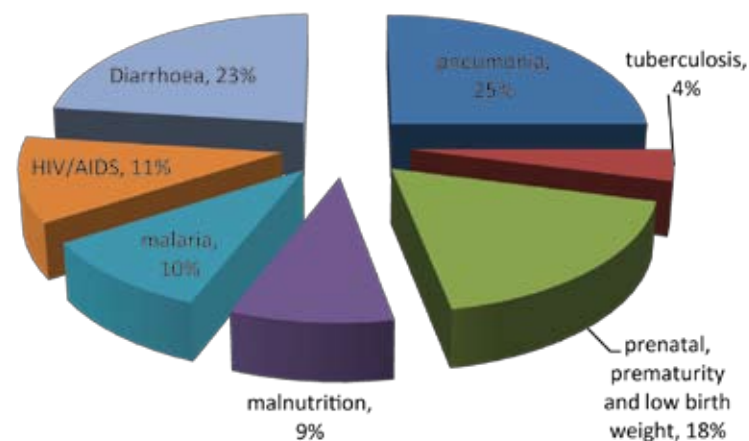
Figure 26: Impact of the progression of HIV to AIDS on nutritional status



In general infection is also associated with increased loss of nutrients in both urine and faeces. In Namibia the main diseases that are responsible for under-five deaths are outlined in Figure 27.

Findings from the 2006/7 NDHS reported that within the two weeks prior to the survey, 5% of children suffered from acute respiratory infections

Figure 27: Causes of under-five deaths in Namibia



Source: MOHSS, 2005

(pneumonias); diarrhoeal episodes (12.2%) and malaria associated fevers (17%) (MOHSS, 2008). As such the burden of infection in the under-five age group in Namibia is a significant contributor to child malnutrition. Infection causes inflammation. Inflammation is associated with increased permeability of the epithelia in the body resulting in leakage of nutrients e.g. vitamin A in the urine. Growth faltering in children is exacerbated as a result of diarrhoeal faecal losses that result from malabsorption caused by enteric pathogens. Persistent intestinal infections occur in instances when a child is unable to eliminate the enteropathogens either as a result of the type of pathogen, or possibly due to the malnourished child's reduced immune integrity; the end result being persistent diarrhoea. Persistent diarrhoea is a particular danger to children as they are unable to replenish their nutritional stores at the rate that they lose their nutrients. Persistent diarrhoea frequently affects PLWHA and children with severe micronutrient deficiencies and is compounded by poor sanitary conditions. Faced with the danger of the consequences of frequent

diarrhoeal episodes, methods that rapidly alleviate diarrhoeal disease should be used. In 2004, UNICEF and WHO adopted a joint recommendation for the clinical management of diarrhoea with zinc and ORS for routine use at facility and community level. Doses of 20mg zinc supplements would be concurrently administered with ORS to children suffering from diarrhoeal for a period of 10-14 days for children older than 6 months and 10mg zinc supplements for infants younger than 6 months. This was based on evidence that zinc supplementation lowered the incidence of diarrhoea in the following 2-3 months (UNICEF, WHO, 2004). The recommendations are yet to be adopted into routine clinical management of diarrhea in Namibia. The adoption of these recommendations will serve a two fold purpose: (1) rapidly improve diarrhoea management and (2) contribute to improving children's zinc nutritional status.

3.2. INSUFFICIENT ACCESS TO FOOD

At a national level, Namibia is food secure, however, regionally, at household and individual levels, food security is of concern. Agriculture contributes 5% to the national GDP, while 70% of the country's population directly obtain their livelihoods from agriculture. Forty three percent of the country's population occupy 7% of the land area of the country in the heavily populated northern regions of Ohangwena, Omusati, Oshana and Oshikoto. In a FAO/WFP report in 2009, overall crop production was estimated to be 139,000 tonnes. While this is 25% more than the previous year, Namibia still needs to import 150,000 metric tonnes of grain to meet market demands for the 2009-2010 marketing year. The most vulnerable regions of the country are in the north and north eastern regions of Namibia.

Food security assessments carried out by WFP and the government of Namibia in 2008 revealed high levels of food insecurity in the flooded areas of Caprivi, Ohangwena, Omusati, Oshana and Oshikoto. Food insecure households reportedly consumed a grain based diet with little contribution from animal source foods or vegetables. Food insecure households were found to be primarily female headed households (67%), widowed (40%), low education level and with no access to improved drinking water sources and with no formal sources of income (FAO/WFP, 2009).

3.3. INADEQUATE MATERNAL AND CHILDCARE PRACTICES

A. INFANT FEEDING

The first two years of a child's life are periods of numerous and rapid transition, not only in growth but also in dietary intake and sources. These dietary sources play a significant role in maintaining a child's growth and development and if not optimal, place the child at risk of malnutrition and especially stunting. In the first six months of life a baby should ideally receive breastmilk exclusively from its mother, however this is not always the case and children are fed other types of milk or liquids or plain water. Figure 28 illustrates infant feeding practices in the first two years of life.

Just over half of all Namibian babies are exclusively

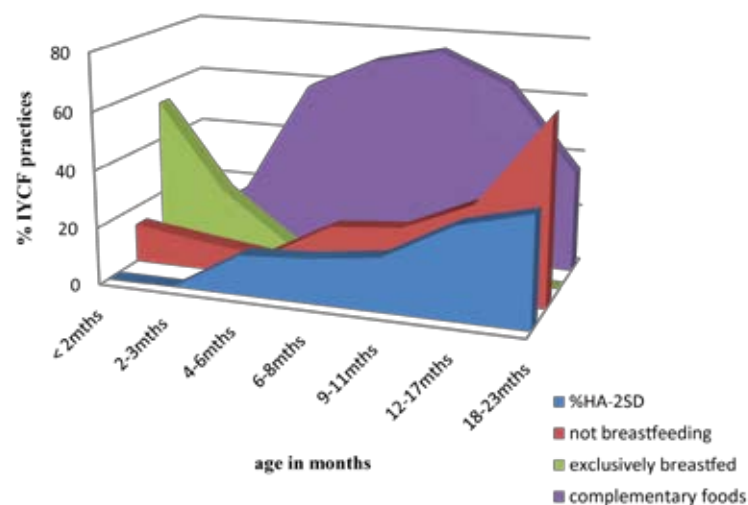
the mother are that breastfeeding may help a mother lose her pregnancy weight, can give a degree of contraceptive cover through lactational amenorrhea and most of all solidifies the nurturing bond between the mother and her infant (Savage-King, 1992).

Mirroring the decline in exclusive breastfeeding prevalence is the rise in the use of complementary foods within the first 6 months. This is also mirrored by the rise in stunting prevalence across these age groups.

This period of rapid increase in stunting prevalence, corresponds to the complementary feeding period and introduction to the family diet. A number of factors have been shown to increase the risk of stunting. Reduced intake of breastmilk, the nutritional quality of the diet and the quantities of food consumed are the primary

causes. Secondary factors are food safety and food handling which can exacerbate the risk of diarrhoeal disease. Diarrhoeal disease occurs as a result of infection of the infant's gut mucosa, which leads to physical damage from the infectious agents as well as increased permeability as a result of the inflammation response (Gracey, 1997). The result is that infants lose nutrients they have consumed faster than they can be replenished. These are the nutrients that would be used for growth and weight gain, without which the risk of stunting increases. There is need to better understand the types of complementary foods given to children and how these can be improved upon. Additionally, any unfavourable feeding practices that may contribute to the increased risk of stunting between 6-24 months need to be understood and addressed.

Figure 28: Stunting trends and infant feeding practices.

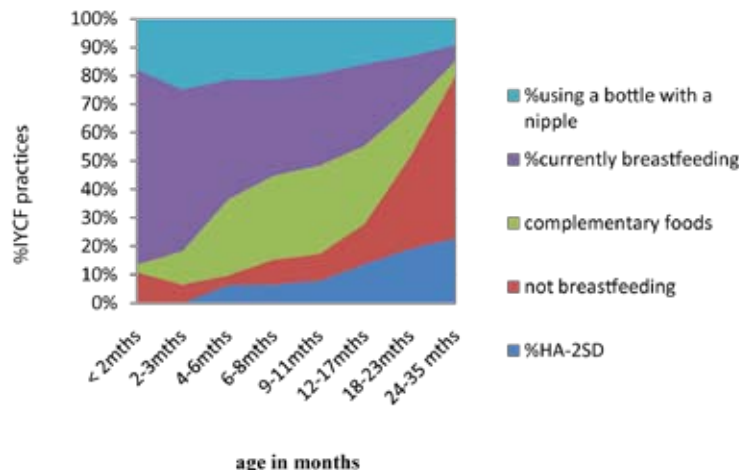


Source: Ministry of Health and Social Services, 2008

breastfed. The decline in exclusive breastfeeding is rapid and alarming, decreasing to 23% between 2 and 3 months of life, then to 5.7% by 4-6 months. This means that half of Namibian babies do not receive the full benefit of exclusive breastfeeding at 2 months of life and by six months, 94% of babies are not getting the benefits of exclusive breastfeeding. Breastmilk in adequately nourished mothers is the most complete source of nutrition that a baby can receive in the first six months of life. The benefits to the growing infant extend beyond nutritional as breastfeeding also confers immunological cover, is the right temperature and is sterile. The benefits to

Further analysis of the feeding practices reveals that in the first two months, only 1 in 2 children are exclusively breastfed. It is necessary to ensure that all babies breastfeed exclusively. The proportion of exclusively breastfed infants halves by the third month to 23% and to an alarming 6% by 4-6 months. Bottle feeding is introduced within the first two months of life and up to 50% of babies are bottle fed by 6 months. Some form of breastfeeding is sustained through to 8 months. The prevalence of babies not breastfed at eight months is four times as high as those not breastfed at two months (see Figure 29).

Figure 29: Comparison of breastfeeding and bottle feeding trends in the first two years of life



Source: Ministry of Health and Social Services, 2008

Figure 29 is an examination of breastfeeding versus bottlefeeding practices. This analysis showed that in the first 3 months of life, breastfeeding was twice as common in comparison to bottlefeeding. Bottlefeeding peaked at 50% at 6 to 8 months and decreased to its lowest level (less than 20%) between 24 and 35 months when the prevalence was similar to breastfeeding practices. Breastfeeding peaked at 4 to 6 months (90% prevalence) and was lowest between 24 and 35 months. Stunting started to rise corresponding to the decrease in breastmilk or milk feeding and peaked at the second lowest prevalence of breastfeeding and bottlefeeding. These practices are contradictory to promoting or protecting breastfeeding and especially exclusive breastfeeding, further illustrating the urgent need to institute legislation in Namibia to for The Code to Monitor the Marketing of Breastmilk Substitutes with sufficient powers to ensure accountability by the private sector and the authority to mete out appropriate penalties when Code violations are found. Additionally there is a need to enact legislation for maternity leave so as to support breastfeeding women who are working mothers. Early introduction of bottle feeds is hazardous to child health due

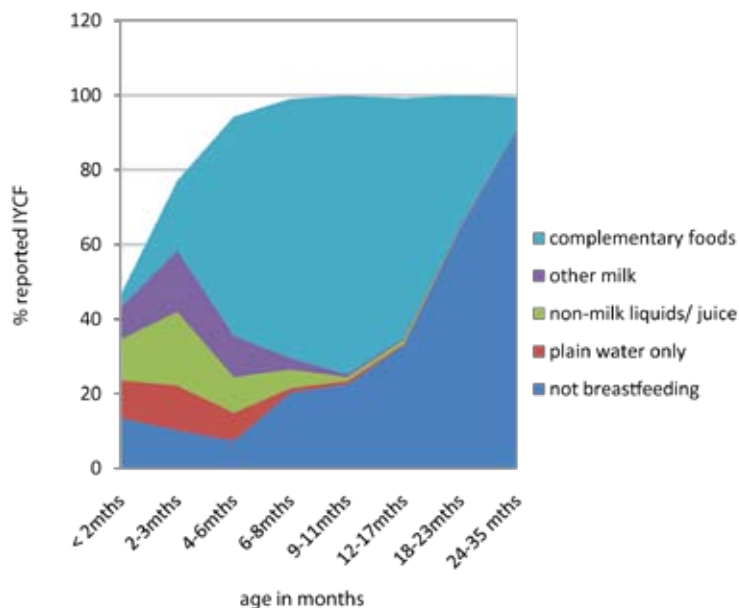
to the risk of contamination from unsafe water sources and, as has been repeatedly emphasized, access to improved drinking water sources in Namibia, though in excess of 95% in the urban areas, is only 79.3% in the rural areas. Access to improved sanitation facilities is 13.3% in the rural areas and 61.4% in the urban areas.

An analysis of the introduction of alternative milks and liquids showed that by the third month of age, 20% of infants are fed juices. Complementary foods are fed to 19% and other milks are fed to 17% of infants. By the 6 month of life, over 60% of children are receiving complementary foods. By 8 months, 20% of infants are receiving no breast milk at all and 7 in 10 are being fed complementary foods.

By the first year of life, 33% of infants are not breastfeeding. This increases to 91% by the second year of life. Additionally the contribution of other milks and liquids to the dietary intake after the first years of life is almost nil (see Figure 30.)

The analysis of breastfeeding and infant feeding practices highlights a number of crucial issues. These are: What can be done to improve the prevalence of exclusive breastfeeding and extend its duration so that it covers the first six months of life? What are the constraints that lead to 1 in 10 mothers failing to initiate breastfeeding? Why are alternative feeds

Figure 30: Infant and Young Child Feeding Patterns



Source: Ministry of Health and Social Services, 2008

introduced at such an early age? Additional issues on pre-lacteal feeding showed that 20% of mothers with tertiary education and 20% in the wealthiest quintile were more likely to provide their infants with pre-lacteal feeds.

3.4. CARE AND SUPPORT FOR MOTHERS

A. UNDERAGE PREGNANCY AND SMALL STATURE

For girls and women, low height-for-age has implications on birth outcomes when they become mothers. Results from a WHO collaborative study showed that babies born to women of short stature (less than 150cm in height) or who were less than 47 kg in weight prior to their pregnancy were at risk of low birth weight (LBW) as a result of intra-uterine growth retardation (IUGR) (WHO, 2002). LBW is defined as a birth weight of less than 2500g. IUGR describes inadequate length gain of the baby during pregnancy in relation to other babies of the same gestational age. Teenage girls are the most likely to be of short stature and have a low body mass index and are therefore at increased risk of delivering low birth weight babies. Therefore girls becoming pregnant during their teens jeopardizes their own health and development and places them at risk of having a low birth weight baby since their own bodies are still growing and developing and will compete with their fetus for available food, energy and nutrients. In Namibia, 15.4% of girls have their babies before their 20th birthday. In rural areas, this is as high as 17.9% and in the urban areas, 11.8% of teenage girls fall pregnant. Kavango has the highest prevalence of teen pregnancies at 34% (WHO, 2009). Notably, Kavango also accounts for the highest stunting prevalence among children under the age of five (see Figure 7), further illustrating how early age pregnancies significantly contribute to the inter-generational cycle of under-nutrition.

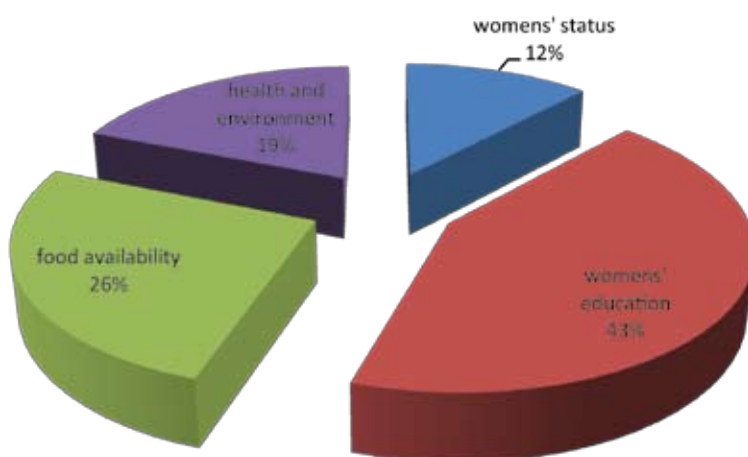
Birth spacing was an additional maternal factor found to contribute to stunting. Children born within four years of their older sibling were more likely to be stunted. Birth spacing is important because it allows a mother to rebuild her nutritional stores depleted from the previous pregnancy and the period of lactation. The benefits of adequate birth spacing and smaller families on maternal nutrition need to be promoted at community and facility level. A starting point is to strengthen the position

of women in decision making in Namibia which requires awareness, cooperation and collaboration of male leaders at all levels of society. Results from the 2006/7 NDHS indicate that just under 1 in 2 women across the board participate in all the major household decision making processes. In the lowest educational and wealth groups as few as 1 in 3 women participated in all the major household decision making processes. The urban rural divide was greater, as only 1 in 3 women had a say in all household decisions in the rural areas and 1 in 2 in the urban areas. Over 80% of the women however, had a say on the number of children they wanted to have.

The factors presented here demonstrate how prevailing conditions, even prior to an infant's birth and into its first six months of life, contribute to or prevent stunting later in a child's life.

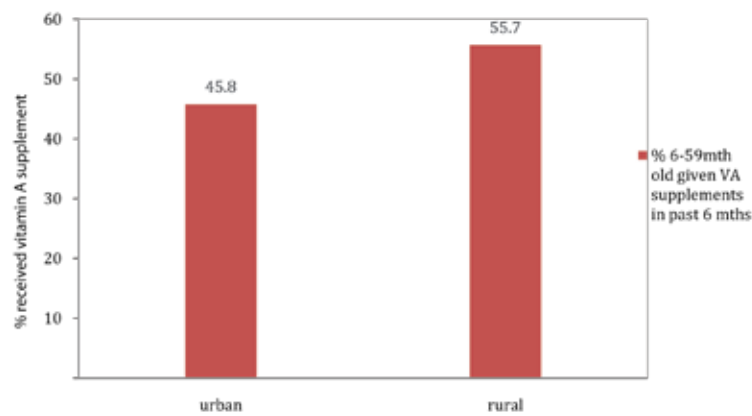
Figure 31 illustrates results from a cross-country regression analysis of 63 countries which reinforces the importance of empowering women's status in society and improving their educational status. Women's education has shown to contribute up to 43% in the reduction of underweight in young children and women's status contributes upto 12%. Combined, empowering women in society can contribute up to 55% reduction in childhood undernutrition, which outweighs food availability and health and environmental factors.

Figure 31: The percentage contribution by underlying determinants to the reduction of childhood underweight in developing countries



Source: ACC/SCN, 2000

Figure 32: Urban rural differences in U5 micronutrient supplementation



Source: Ministry of Health and Social Services, 2008

3.5. HEALTH SYSTEM DELIVERY VITAMIN A, IRON AND FOLATE SUPPLEMENT COVERAGE

A. VITAMIN A SUPPLEMENTATION

According to the 2006/7 NDHS only 1 in 2 children had received vitamin A supplements in the previous 6 months. Reach was slightly higher in the rural areas than in the urban areas, as is illustrated in Figure 32. It is encouraging that vitamin A coverage is higher in the rural areas because these children tend to be more nutritionally disadvantaged than children in urban areas. However, coverage still needs to increase by 30% to reach the targeted 80%. It is important that measures to improve access to supplementation are found, in light of the importance of vitamin A to normal growth, health and development of Namibian children. In a study of the flood affected regions in the north of Namibia carried out in 2009 (MOHSS & UNICEF, 2009), vitamin A supplementation coverage within the previous six months was reportedly 95%. This is encouraging as it suggests almost universal reach of vitamin A supplements to children in the under-five age group.

Some of the factors affecting vitamin A supplementation coverage included wealth status, education level and maternal age. Results from the 2006 NDHS showed that under-five vitamin A supplementation coverage was highest in those children with mothers with a tertiary education (57.2%) and was lowest among children whose mothers had had no formal education (43%). Interestingly, vitamin A supplementation contacts were highest in the lowest wealth quintiles (55%) and lowest in the highest wealth quintiles (43%). Children born to older mothers were more likely

to take their children for vitamin A supplementation. Only 50% of mothers in the youngest age group took their children for the biannual vitamin A supplementation, while more than 60% of mothers in the oldest age group took their children for vitamin A supplementation.

These patterns in vitamin A supplementation uptake also indicate different levels of awareness influenced by socioeconomic status, knowledge, ability and willingness to act upon it determined usually by educational attainment and age of a mother.

B. ANTENATAL IRON AND FOLATE SUPPLEMENTATION

Antenatal iron supplementation is important for both the health of the mother and her unborn child. Iron is essential to the production of haemoglobin in the blood for the transportation of oxygen to the tissues and in energy metabolism. Iron is also involved in immune function. Iron deficiency is associated with poor cognitive function in children affecting school performance. In pregnancy, iron deficiency is associated with increased risk of low birth weight and prematurity. In adults, iron deficiency is associated with reduced work performance and productivity.

The 2006 NDHS survey results indicate that compliance to antenatal iron supplementation was higher in the urban areas than in the rural areas. Urban mothers' higher compliance to antenatal iron supplementation regimens may be a contributory factor to the lower levels of stunting seen in the urban areas (Figure 33). Iron deficiency is exacerbated by the prevalence of intestinal parasitic infections and malaria infections. Therefore treatment of helminthic infections and malaria prophylaxis and prevention activities are important components of preventing iron deficiency anaemia in women and children. Antenatal folate supplementation coverage was reported to be 31%. This is far from the ideal coverage of 80%. Folate coverage needs to be increased because folate has been associated with a protective effect against congenital birth defects and specifically neural tube defects for the unborn child (Semba & Victora, 2008). In later life, folate has also been shown to confer a protective effect against the development of coronary heart disease. This becomes significant in light of the prevailing stunting prevalence in the under-five age group, when the implication of the theory proposed by Barker et al (2004) are considered.

4. BASIC CAUSES

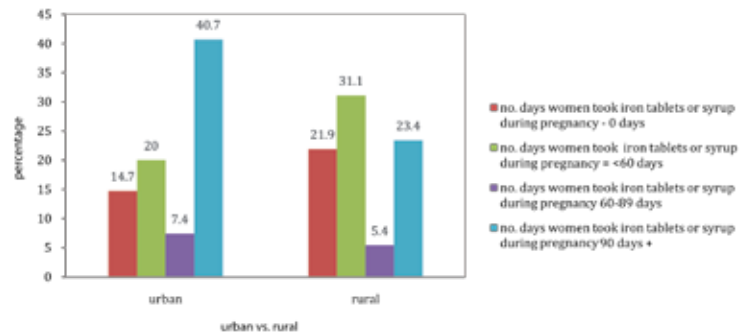
4.1. SOCIOECONOMIC AND REGIONAL DISPARITY

In the twenty years since independence, Namibia has enjoyed significant economic growth. As of September 2010, the World Bank classified Namibia as an upper middle income country, with an average GDP per capita of US\$4290 (World Bank, 2010). This apparent affluence disguises an unemployment rate of 51.2% (MOLSW, 2008), with 49.1% of the population living under the International Poverty Line. Namibia however, is the most disparate country in the world with a GINI index of 0.734 (UNDP, 2009). The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of zero represents perfect equality and 100, perfect inequality (OECD, 2006). Figure 34 below illustrates the level of disparity in Namibia. In the figure we see that 4% of the national household income is held by the poorest 40% of the population and the wealthiest 40% have possession of 78%.

In Namibia 921,000 of the estimated population of 2.1 million people in the country are under 18 years of age. Within this age group, 31% are under the age of five. In Namibia, 24% of households are defined as poor and 4% as severely poor. Forty three percent of all children in Namibia live in poverty. Poor Namibians are concentrated in Kavango (42%), Caprivi (36%), Omusati (45%) and Oshikoto (41%) regions. Rural areas (36%) have higher proportions of poor compared to urban areas (6%) (Central Bureau of Statistics, 2006).

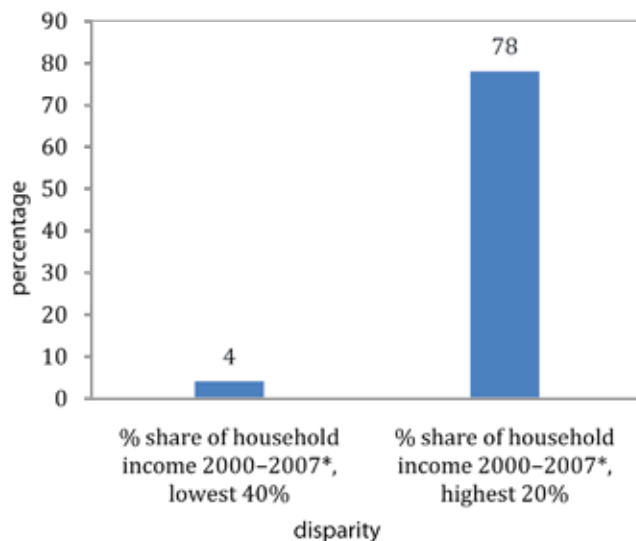
The relationship between stunting, wealth status and education strata was examined and is illustrated in Figures 35 and 36. The results from the DHS report indicated that stunting decreased with increasing wealth. The highest prevalence of stunting was found among children in the lowest two wealth quintiles (37% and 35.7% respectively). The prevalence not only exceeded the national average of 29% but was classified as being of high public health significance (Figure 35). When education was examined as a determinant of stunting, increasing literacy was associated with a decrease in stunting prevalence. An examination of education as a determinant of stunting showed that children born to mothers who had received no formal schooling or had less than a

Figure 33: Urban rural differences in antenatal iron supplementation coverage



Source: Ministry of Health and Social Services, 2008

Figure 34: Income distribution in Namibia among the lowest 40% and highest 40% of wealth strata

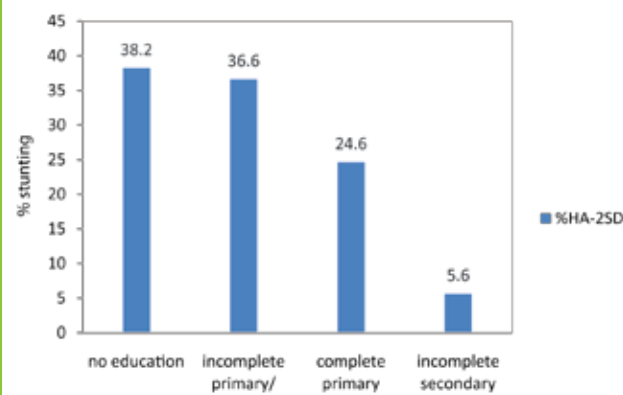


Source: UNICEF, 2009

Figure 35: Socioeconomic status as a determinant of stunting



Figure 36: Education as a determinant of stunting

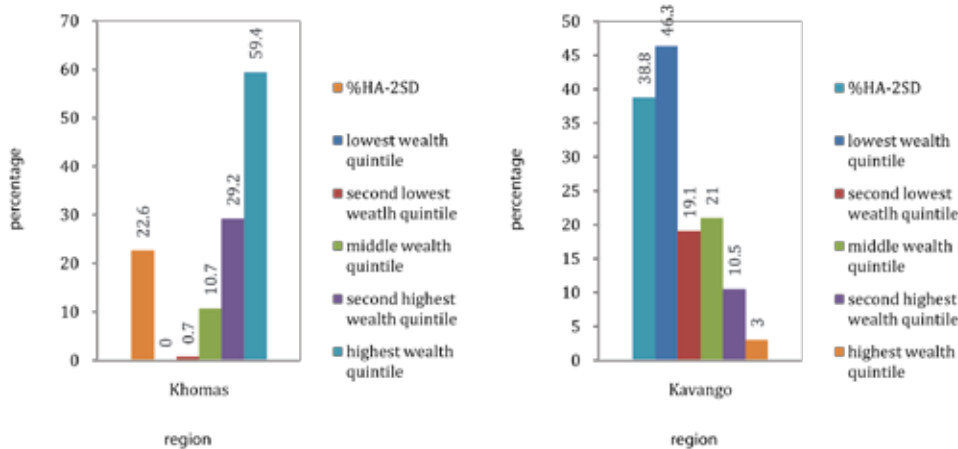


Source: Ministry of Health and Social Services, 2008

primary education were at the highest risk of stunting (38% and 36% respectively). The prevalence of stunting in these two education strata approached the WHO classification of very high burden of stunting (Figure 36).

The analysis above indicates that national estimates of stunting prevalence obscure the severity of the burden of stunting affecting Namibian children under the age of five. Here we have seen that where a child lives, how much their parents earn, the level of their mother’s schooling, the child’s age and whether the child is boy or girl all influence the risk of a child being stunted or not.

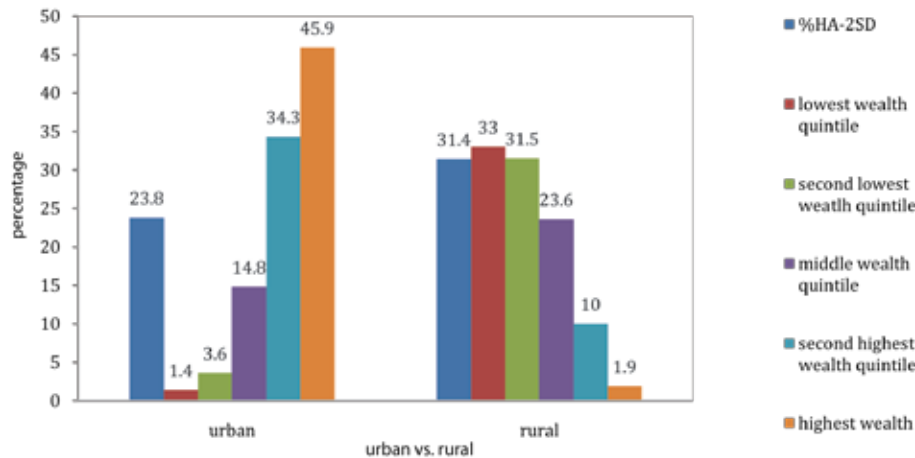
Figure 37: Examples of the inverse relationship between stunting and wealth status illustrated by the richest and poorest regions in Namibia. (Khomas and Kavango)



Source: Ministry of Health and Social Services, 2008

The impact of wealth disparity is clearly illustrated in Figure 37, where stunting prevalence in the rural areas and in the poorest region of the country, Kavango, (38.8%) exceeds the prevalence in the urban areas and Khomas region which is the wealthiest region (22.6%). In the Kavango region, more than 60% of the population lived below the middle quintile while in the Khomas region, none of the surveyed population fell into the lowest wealth quintile and 59.4% of the population were in the highest wealth quintile.

Figure 38: Urban Rural differences :The link between wealth status and stunting an inverse relationship



The differences across wealth lines are also distinct between urban and rural populations. Figure 38 shows that less than 20% of the population living in the urban areas fell within the three lowest wealth quintiles. By contrast, in the rural areas, 88% of the population fell within the three lowest wealth quintiles.

These disparities need to be urgently addressed as reductions in economic inequalities have been identified as one of the most effective ways to address the dual burden of malnutrition (Subramanian, Kawachi & Smith, 2007). It has been found that income inequality can compound the occurrence of overweight and

underweight in a country concurrently. In India it was shown that for one standard deviation increase in income inequality measured by the Gini coefficient, the odds ratio of being underweight increased by 19% while the odds ratio of being obese increased by 21% (Subramanian, Kawachi & Smith, 2007). Across socioeconomic quintiles, at an individual level, women in the lowest socioeconomic quintile are at an increased risk of underweight with any change in the Gini index and women in the highest socioeconomic quintile are at greatest risk of increased overweight and obesity. For Namibia this would mean that maternal underweight could rise to 18.9% and the prevalence of obesity in Namibia could increase to 14.7%, if the Gini coefficient was to increase by one standard deviation.

4.2. POLICY AND NUTRITION GOVERNANCE

To place nutrition squarely at the centre of her development agenda, strategies and goals reflecting commitment of nutrition strategies need to be included in Namibia's poverty reduction strategy (PRSP) which is encompassed in the country's National Development Plan (NDP3) (National Planning Commission, 2008) and thus reflecting the Government's commitment to nutrition. To reflect the United Nations agencies' commitment to nutrition in their development assistance agenda, nutrition needs to be one of the three key areas identified in the Joint UN United Nations Development Assistance Framework (UNDAF) (Joint UN Team and Programme on HIV/AIDS, 2010).

In NDP3 the government acknowledges challenges in addressing childhood malnutrition in its section on socioeconomic targets. Target setting for nutrition falls under Key result area 8 "Quality of Life" within NDP3. The goal of which informs the Vision 2030 objective that aims for a "healthy and food secure nation in which all preventable, infectious and parasitological diseases are under secure control and in which people enjoy a high standard of living with access to quality education, health and other vital services in an atmosphere of sustainable population growth and development." This section also acknowledges the need to urgently address malnutrition among children under the age of five. However, how this is to be done is not specifically explained and any focus on nutrition subsequent to this reference is non-existent. As such, nutrition

actions within NDP3 are not explicitly specified and therefore are unlikely to be undertaken.

The UNDAF 2006-2010 has a primary focus on HIV. Reference to nutrition within this framework is in the context of nutritional support for people living with HIV/AIDS. Nutrition support in HIV is critical and important. However, in light of the current burden of child stunting there is an urgent action to address maternal and child nutrition in the next cycle UNDAF is need to set in place integrated inter-agencies' strategies to address malnutrition among Namibia's women and children.

Namibia has embarked on various efforts aimed at placing nutrition at the centre of Namibia's development agenda. These include:

In 1992:

1. Namibia committed to the Global Declaration and Plan of Action for Nutrition at the International Conference on Nutrition.
2. 1993 - 2002 was declared the Namibian Food and Nutrition Decade by then Right Honourable Prime Minister Hage Geingob. This action was a bid to commit the full government mechanisms to improving the nutritional situation of the most disadvantaged and vulnerable Namibians.
3. Legislation passed on iodised salt. All salt in Namibia for both human and animal consumption must be iodised.
4. Establishment of a National Food Security and Nutrition Council. This multi-sectoral organ plays a significant role in the reduction of malnutrition in the country through concerted, collaborative and co-ordinated efforts.

In 1995:

1. the Food and Nutrition Policy of Namibia was released under the auspices of the National Food Security and Nutrition Council
2. Development of a National Food and Nutrition Policy in 1995.
3. National Declaration on Food and Nutrition compiled by the National Food Security and Nutrition Council.

Other achievements during the Namibian Food and Nutrition decade 1993-2002:

1. Vitamin A and iron supplements administered at antenatal clinics and other health centres in the country.
2. Introduction of baby-mother-friendly health facilities, leading to extensive promotion of breast-feeding countrywide.
3. Administering of iodine oil to school children in the Caprivi Region who had goitre. This measure has been a tremendous success in reducing the incidence of goitre.

Following the end of the Food and Nutrition decade, in 2007:

- The Namibia National Programme for Food Security was launched. The National Programme for Food Security (NPFS) has been designed to support Namibia's National Food and Nutrition Policy (NPFS, 2007).
- The primary purpose of the programme is to be the action plan to support the execution of the existing National Food and Nutrition Policy and the National Food Security and Nutrition Action Plan through a comprehensive set of strategies and measures to be implemented in order to improve food security for all people in Namibia.

Now in 2010:

- A Strategic Plan for Nutrition in Namibia is being developed through multisectoral collaboration of government, development partners, non governmentals and the private sector and industry with the objective of reintroducing a National Nutrition Strategy for Namibia. The collaboration is called the National Alliance for Improved Nutrition (NAFIN). Set up in recognition of the continuing high burden of malnutrition in the country. These renewed energies are being harnessed to re-engage the full Government mechanism towards improving the nutritional status of women and children in Namibia.

Additional policies that impact nutrition are in place in Namibia. These are listed below :

1. An agricultural Policy which aims to:
 - a. Ensure food security and improve nutritional status
 - b. Create and sustain viable livelihood and employment opportunities in rural areas
 - c. Improve the living standards of farmers

and their families as well as farm workers

2. A Fisheries White Paper which contains details of the importance of developing marine fisheries sustainably as a source of protein and micronutrients for the local population
3. A Social Welfare policy which pledges that all people over sixty years of age in Namibia are eligible to receive an old age pension, thereby putting into place an important source of income for many families.
4. A Health Policy which pledges achieving health for all Namibians by the year 2000
5. An Education Policy aimed at improving access to education and improving education quality
6. A Water supply and Sanitation Policy which pledges to ensure availability of essential water supply and sanitation service to all Namibians at a cost which is affordable to the country as a whole
7. An Environmental Policy which seeks sustainable policies to achieve food security and good nutritional status through environmental protection and appropriate management of water resources, wetland conservation, the use of wildlife and the exploitation of indigenous plant life which endeavour to establish sustainable systems for the benefit of both local communities and the country as a whole.

Source: Government of the Republic of Namibia - National Food Security and Nutrition Technical Committee, 2008.

4.2.1. LEGISLATION STILL TO BE ENACTED

Namibia has a partial policy on the integrated management of acute malnutrition.

- Namibia does not as yet have a policy on the management of child diarrhoea providing 20mg of zinc plus ORS for 10-14 days. This action needs to be considered during the current strategy development. Especially in light of some of the unfavourable practices found during the 2006/7 NDHS.
- To further consolidate support for breastfeeding promotion and protection, Namibia has drafted a measure for Legislation of the Code for the Marketing of Breastmilk Substitutes however it is still awaiting approval. Action towards finalising these legislations needs to be urgently undertaken.

5. NEED FOR URGENT ACTION

5.1. EXPLOITING THE WINDOW OF OPPORTUNITY: Prenatal to 3 years of age

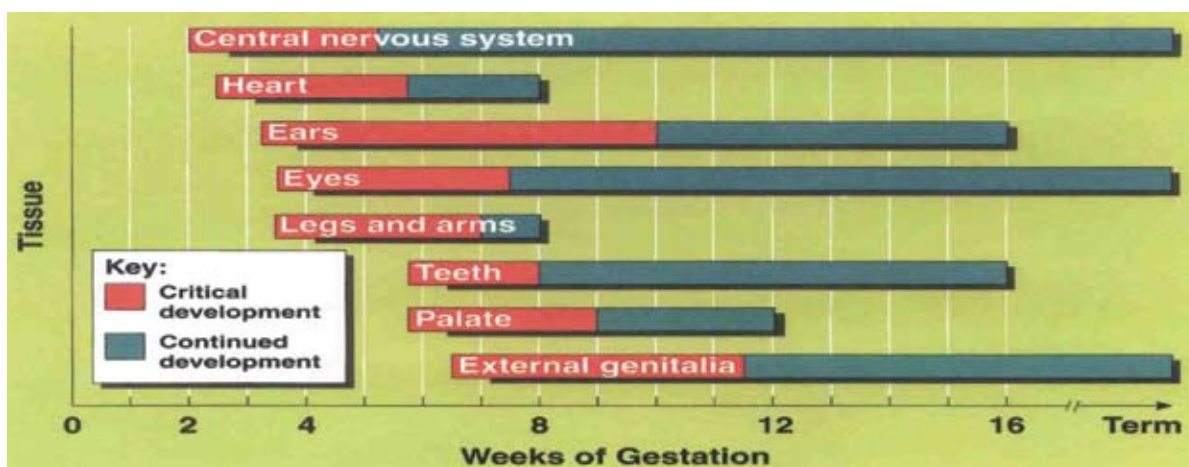
The most critical stage of the development of the central nervous system is within the first 3 weeks of pregnancy when many women are unaware that they are pregnant. Figure 39 illustrates organ development in-utero. This shows the vital importance of a healthy adequately nourished mother who can support the optimal growth of all these organs and systems for the baby in her womb.

The time available to effect a lasting difference is confined to the first three years of life. This is because the most critical period of brain growth in the development of a child occurs in the first three years of life and adequate nutrition is a crucial factor in brain development. The elasticity of the human brain and the plasticity of the human personality are unmatched during the first three years of life.

Figure 40 illustrates how difficult it is to regain ground lost to malnutrition and stunting in particular after the first two years of life. Underweight (WA-2SD) and wasting (WH-2SD) are acute indicators of inadequate dietary intake to support weight gain and can be reversed if addressed in time. The first figure uses metaanalysis data and the second uses the current under-five malnutrition profile in Namibia to show where the intervention window of opportunity lies. Therefore from a perspective of implementation of interventions, the period from conception to the period between two and three years of age provides



Figure 39: Organ development in-utero



Source: Wasserman, 2009



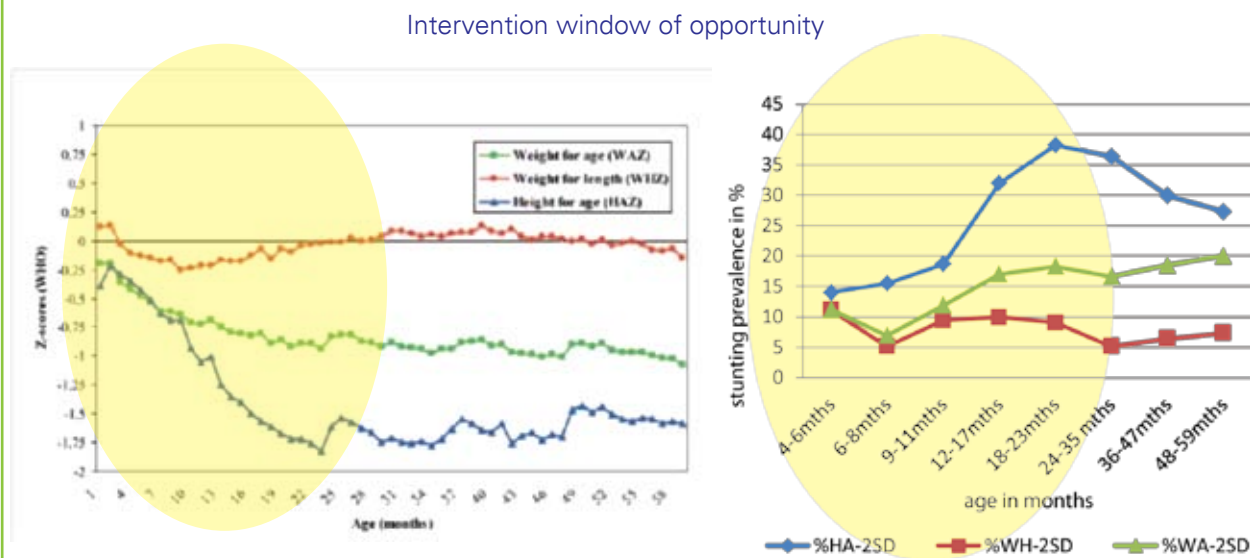
a valuable opportunity to prevent or reverse the impact of stunting. In this “window of opportunity” interventions to improve maternal and child health and nutrition can have a positive and lasting impact on a young child’s prospects for survival, growth and development.

Past the age of two years, low height-for-age reflects failure to have reached the child’s potential height and is rarely reversible. The impact of stunting affects children long after their second birthday and

has implications on future generations. This is known as the intergenerational cycle of malnutrition.

At a population level, high levels of stunting suggest unfavourable socioeconomic conditions which predispose to limited dietary intake; and an increased risk of frequent and early exposure to adverse conditions such as frequent and severe illness and poor feeding practices. In children at 2 years, low height-for-age reflects continuing growth failure.

Figure 40: The window of opportunity



Source: Victora et al, 2010

Source: Ministry of Health and Social Services, 2008

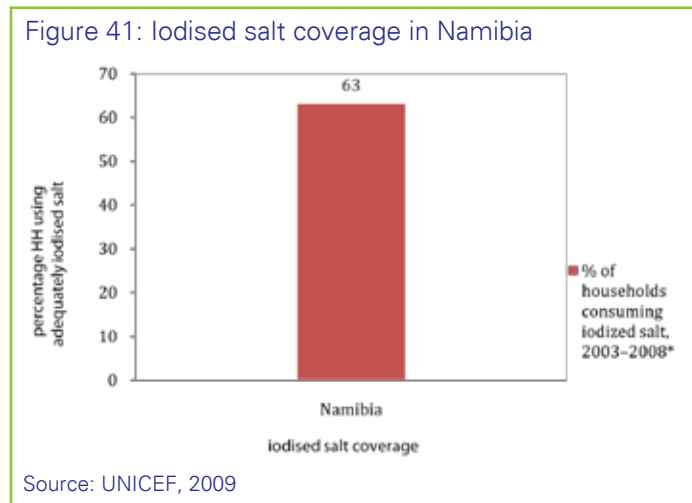
6. PROGRAMMES IN PLACE

6.1. FOOD FORTIFICATION

A. SALT IODISATION COVERAGE

Universal Salt Iodisation is said to be reached when 90% of households have access to iodised salt.

Estimates from the nationwide follow up survey on iodine deficiency disorders in Namibia undertaken in 1998 indicate that salt iodization coverage was



63% (MOHSS, 2001) (Figure 41). More recently a study undertaken in the flood affected regions of the north of Namibia found that 60% of households had access to adequately iodised salt (MOHSS & UNICEF, 2009). Efforts therefore need to be made to reach the 90% goal of Universal Salt Iodization. The weaknesses inherent in this indicator is that it does not measure individual household member consumption of iodized salt. Nevertheless this low level of coverage is critical because iodine deficiency is the leading cause of preventable mental retardation in the world (Semba & Victora, 2008). Children with iodine deficiency are more likely to have poor psychomotor development, lower school performance and growth retardation. In women, iodine deficiency, is associated with infertility and impaired fetal development. This implies that children in the houses not reached by adequately iodized salt, are at increased risk of the disorders mentioned above and women are at risk of poor birth outcomes including low birth weight (Semba & Delange, 2008). Low dietary intake of iodine may partially contribute to the stunting prevalence found among Namibian children under

the age of five. This has ramifications for the future development and potential of Namibia's children.

Whether the discrepancy between coverage of adequately iodised salt and the amount of iodine consumed in the diet arises as a result of excessive salt intake or as a result of quality control at point of fortification needs to be urgently understood. In so doing, if the high urinary iodine concentrations arise as a result of excessive salt intake then steps need to be taken to reduce sodium intake and reduce the risk of future hypertensive disease. If the differences are as a result of quality control then more stringent fortification monitoring systems need to be set in place. However, the results are in urgent need of review and repeating.

B. FLOUR STAPLES

In situations where the risk or actual presence of nutrient deficiencies persist despite supplementation interventions and efforts to increase dietary diversity, there is need to fortify a staple with a wide consumption base by the target population. Namibia finds herself in this position.

Food fortification can take several forms. It is possible to fortify foods that are widely consumed by the general population (mass fortification), to fortify foods designed for specific population subgroups, such as complementary foods for young children or rations for displaced populations (targeted fortification) and/or to allow food manufacturers to voluntarily fortify foods available in the market place (market-driven fortification) (WHO and FAO, 2006).

At present no legislation exists for the fortification of wheat and maize flour in Namibia. However the two largest millers in the country have ongoing fortification activities of wheat and maize flour. Unfortunately the absence of national standards or legislation means that the millers are currently using South African guidelines. There is a move towards legislation of flour fortification that has been advocated through the planned National Nutrition Strategy for Namibia. However, prior to this, a food consumption survey is planned to identify the most viable vehicle for fortification for the Namibian population considering that the northern population's diet is primarily based upon millet and the central southern populations have maize as a staple.

7. THE COST OF ACTION

7.1. ECONOMIC COST OF INACTION

A. STUNTING

Children who are stunted past the age of two have been shown to experience learning difficulties at school and have lower school performance; and in adulthood, small body size can contribute to reduced work capacity. In economic terms malnutrition can result in up to 3 percent losses to the GDP of the country, in severely stunted adult manual workers productivity could be restricted by as much as 9% (Hunt, 2001). Extrapolating this to the Namibian situation with an annual GDP of US\$ 9.3 billion (NAD 67 billion), malnutrition could be costing Namibia between NAD 2-6 billion per year. Additionally in Zimbabwe it was shown that undernutrition could contribute to the reduction in an individual's lifetime earnings by 12%. In Namibia, where GDP per capita is an estimated US\$4290, malnutrition could be contributing to losses of up to US\$ 514.00 per person.

B. COSTING BOTTLE FEEDING VERSUS BREASTFEEDING

These questions are extremely pertinent when the cost ineffectiveness of bottle feeding (which is assumed here to be commercially produced formula feeds), is considered in comparison to the cost of breastfeeding. A study in South Africa showed that combining exclusive breastfeeding support at facility level and home visits yielded cost effectiveness increases of R769 to the ongoing interventions for every month of supported exclusive breastfeeding among the study participants (Desmond et al, 2008). Table 1 illustrates the incongruity of the situation especially when almost 50% of the country's population live under the International Poverty Line and could use these resources for other beneficial resources to the households e.g. the provision of animal source foods to young children.

The tables below illustrate the cost of bottle feeding.

Table 1: Cost of Bottle feeding

Baby's age	Total milk or formula per day	Number of feeds per day	Amount of milk or formula per feed
Birth – 1 month	480 ml	8	60 ml
1 – 2 months	630 ml	7	90 ml
2-4 months	720 ml	6	120 ml
4-6 months	900 ml	6	150 ml

Table 2: Number of feeds in the first six months of life

Month	Number of 500g tins needed/month	Number of 400 g tins needed/month
First month	4	5
Second month	6	8
Third month	7	9
Fourth month	7	9
Fifth month	8	10
Sixth month	8	10
Total for 6 months (approximate)	40 X 500g (20kg)	51 X 400g (20kg)

Table 3: Number of tins required to meet feeding requirements in the first six months of life

Formula cost	Monthly cost 1 month old baby	Monthly cost 6 month old baby	Cost of 12 months formula 40 kg per year	Cost %of minimum urban wage (excluding cost of fuel, transport, water and health care)
US \$ 6/ 500 g NAD 42.00	US\$ 24.00 NAD 168	US\$ 48.00 NAD 336	US\$ 240 NAD 1680	8.4% of monthly wage of NAD 2000

Source: WHO, UNICEF, 2006 with adaptations

Namibia does not have a basic minimum wage. Therefore this analysis is based upon the wages for an urban domestic worker/ nanny. We see that 8% of wages would be committed to procurement of the infant formula (see Table 3). This does not take into account the overheads and incidental costs such as fuel costs and health costs that arise from the use of infant formula. The 2003-2004 NHIES illustrated that 24% of households in Namibia devote almost 60% of their income to household food commodities. Therefore, adding an additional 10% with the purchase of infant formula will drive these already vulnerable households from poor status to severely poor status. Being able to address these issues will contribute to preventing stunting and also delay the impact of transition feeding in as much as increasing the risk and prevalence of diarrhoeal disease in the first six months of life.

7.2. BENEFITS OF ACTION

Table 4 outlines the cost of action towards improving nutrition security and status as well as the economic benefits that can be realized from intervention. What is immediately evident is how low cost most of the interventions are.

7.2.1. THE BENEFIT-COST RATIOS FOR NUTRITION PROGRAMS

A. MICRONUTRIENT INTERVENTIONS

The potential savings that could be made by the Government of Namibia if simple interventions such as iodine supplementation, iodine fortification, vitamin A supplementation were set in place at scale, are assessed. Savings by the State are evidenced in reduced health costs, reduced postpartum care or

Table 4: The Benefits of intervention

Intervention Programme	Benefit Cost US\$
Breastfeeding	5-67
Iodine supplementation to women	15-520
Iron Fortification	176-200
Vitamin A supplementation (<6years)	4-43
Integrated Child Care Programmes	9-16
Water, Sanitation and Hygiene improvement	5-28

Source: Behrman, Alderman & Hoddinot, 2004

neonatal care of babies with congenital defects and costs savings on education and support of children with special needs.

Cost benefit analyses of iodine supplementation of women in endemic areas were estimated to be between US\$15 and US\$520 for every US dollar invested, which in Namibia would translate to N\$105 to N\$3640, a significant return for an intervention estimated to cost US\$2.16, which is approximately N\$15.12 (see Table 4). The benefits of under-five vitamin A supplementation have been costed at between N\$4 and N\$40 for every one Namibian dollar invested. While the benefits of breastfeeding have been costed at between N\$5 and N\$65 for every one Namibian dollar invested.

7.3. COST OF FORTIFICATION

Table 5: The individual and combined cost of micronutrient fortification

NUTRIENT	CONCENTRATION	RDA SUPPLIED	COST/PERSON/YEAR: US\$	COST/PERSON/YEAR: NAD
Vitamin A	1111 IU	30%	0.073	0.511
Vitamin D	133 IU	30%	0.016	0.112
Vitamin E	5 IU	30%	0.139	0.973
Vitamin B1	0.47mg	30%	0.004	0.028
Vitamin B2	0.57 mg	30%	0.013	0.091
Vitamin B6	0.73 mg	30%	0.006	0.042
Niacin	6.3 mg	30%	0.019	0.133
Folic Acid	66.7 mcg	30%	0.001	0.007
Vitamin B12	1 mcg	30%	0.014	0.098
Vitamin C	20 mg	30%	0.055	0.385
Iron	30 mg	100%	0.09	0.63
Iodine	300 mcg	100%*	0.05	0.35
TOTAL COST			0.48	3.15

Cited from Hunt, 2001 with adaptations



As the above analysis shows, it is within the reach of the Namibian government to marginally increase its investment in nutrition by N\$35,000,000.00 per annum to reap maximum benefits. This is less than 1% of its GDP and an additional N\$4 per capita expenditure on health.

7.4. ESTIMATED COST OF INTERVENTION

Table 6 is an analysis of the types of child survival interventions and their estimated cost to ultimately benefit the nutritional status of Namibian women and children.

Table 6: Estimated costs of undertaking interventions at scale

Intervention	Cost US\$	Cost in Namibian dollars (NAD)	TOTAL BASIC COSTS to reach target groups (NAD)
Community nutrition programs including community based breastfeeding, complementary feeding promotion, Hygiene incl. hand washing etc.	\$5-15 (\$7.50) per participant per year	52.5	15,225,000
vitamin A supplement	\$1.20 per child assuming distributed through child health days and cost shared with other interventions	8.40	2,436,000
Iron-folate to pregnant women	\$2.00 per pregnancy**	14.00	8,400,000
Therapeutic zinc when diarrhoea	Cost \$1 per child assuming 2-3 episodes of diarrhoea per year for first 5 years of child.	7.00	6,447,000
Iodised salt	\$0.05 per person per year	0.35	14,957,250
Iodine capsules when iodised salt unavailable	\$2.16 per person per year***	15.12	4,762,800
RUTFs for community treatment severe malnutrition;	Cost \$200 per child per episode, 1000kcal for 2 months****	1400	20,300,000
Prevention or treatment for moderate malnutrition children 6-23 months	Cost \$40/110 kcal \$80/225kcal.****	280/110 kcal 560/ 225 kcal	6,440,000 12,880,000
Deworming	\$0.25 per child 24-59 months per round per year	1.75	1,610,000
WASH	Improved water supply: Stand post: 2.40/ person reached Improved sanitation facilities: VIP*: 6.21 / person reached	16.80 43.47	2,016,000 5,216,400

* Ventilated Improved Pit-Latrine

**provision to all women of child bearing age assumption 500,000 women older than 18 plus +/- 100,000 girls in the 15-17 year old bracket

***assumption based on 15% goiter prevalence

****based upon 5% average WH-2SD prevalence

8. CONCLUSIONS AND DISCUSSION

National averages mask the severity of the burden of stunting among children under the age of five in Namibia. There are numerous factors that contribute to the state of undernutrition found among children under the age of five and women in Namibia. The inextricable link between maternal nutrition, women's status, women's education, childhood illness, water, sanitation and hygiene and their effects on infant and young child nutrition has been demonstrated. These linkages helps us reflect again on the UNICEF conceptual nutrition framework (see Figure 19).

Figure 42 in the first figure, illustrates the obstacles to achieving nutrition and food security resulting in a cumulative detrimental impact of not addressing nutrition at any stage of the life cycle on school performance and ultimately on work performance. Namibia needs to overcome this scenario through concerted strategic actions to address nutrition. Additionally, the second figure shows the short to long term benefits to be reaped from strategic cohesive investment of time, capital and human resources into nutrition on national development level, a process that Namibia is working to achieve.

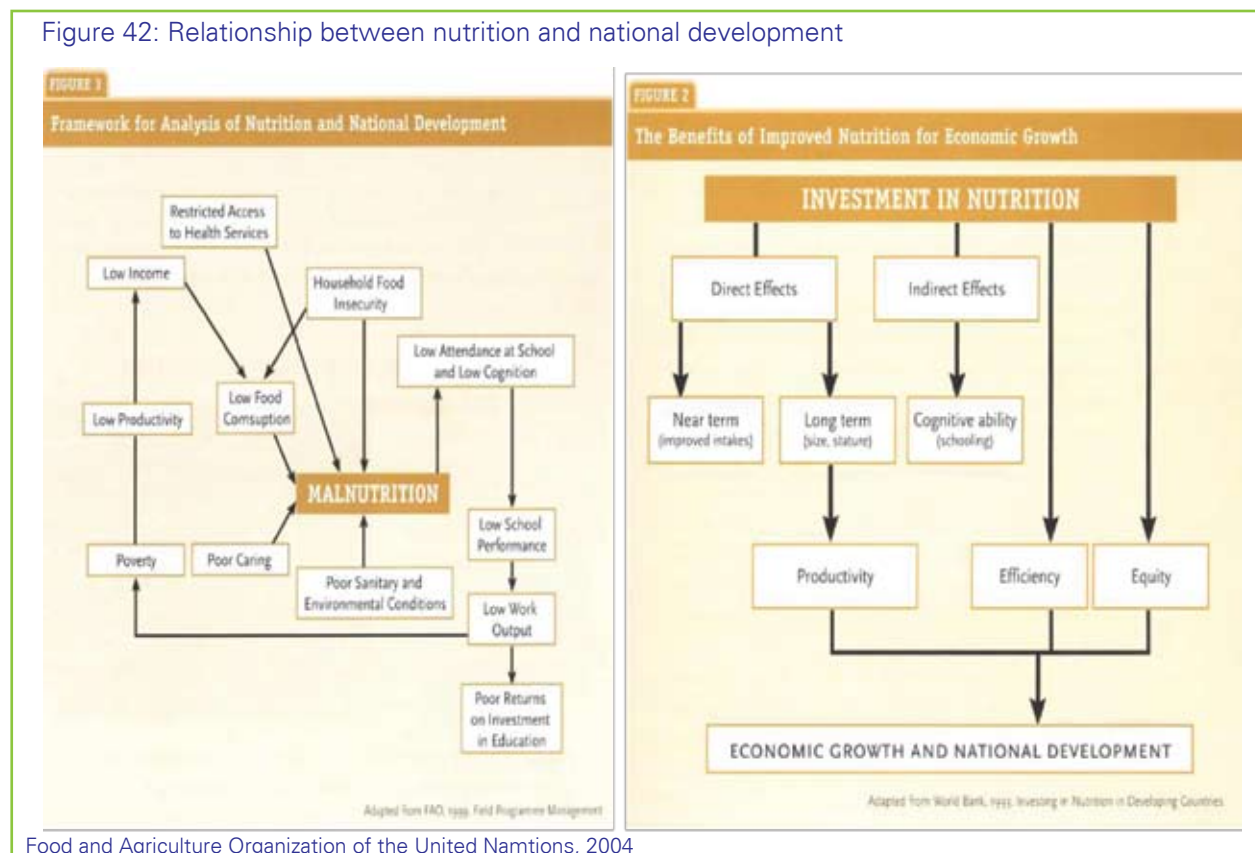
8.1. ISSUES TO ADDRESS AS WE MOVE FORWARD

8.1.1. AWARENESS

Reports on the approaches to the management of childhood diarrhoea revealed serious deficits in awareness across regional divides, educational strata and wealth status. Low levels of awareness can be addressed by health promotion activities that provide education on the importance of rehydration and continued feeding preferably with ORS and where possible zinc as part of an at-home management regimen of childhood diarrhoea.

Additionally there is a need to provide behavior change communication and health promotion activities with regard to infant and young child feeding practices specifically focusing on the use of prelacteal feeds, exclusive breastfeeding shorter than 6 months and early introduction of alternate non-milk infant feeds within the first 6 months. Breastfeeding promotion activities antenatally at facility and community level will help raise awareness about the importance of breast milk and breastfeeding especially in the first

Figure 42: Relationship between nutrition and national development



Food and Agriculture Organization of the United Nations, 2004

Community and facility level awareness campaigns and the use of national vitamin A days will help improve supplementation coverage and could be used to support a family planning message.

six months of life. However, it is also important for legislation along the ILO guidelines to be enacted that will protect the right to maternity leave so that mothers can initiate breastfeeding and sustain the practice.

The understanding of the importance of vitamin A supplementation among children under the age of five and a maternal postpartum dose; and maternal antenatal iron and folate supplementation, needs to be increased. Additionally, awareness about the detrimental effects of high fertility and short birth spacing and the impact on the health of both mothers and children needs to be raised. Community and facility level awareness campaigns and the use of national vitamin A days will help improve supplementation coverage and could be used to support a family planning message.

8.1.2. DISPARITY

As the most unequal country in the world, addressing issues of economic disparity in Namibia will require strong and sustained political will. The provision and implementation of the activities outlined above at central level is not costly. However, at an individual level it is as just under 50% of the population live under the International Poverty Line. It appears that at the household level “the contribution rule” drives economic decision making, resulting in decisions that undermine the nutritional health and security of the perceived “least” productive and yet most nutritionally vulnerable members of the family (United Nations University, 1990). This practice exists so as to protect the wellbeing of the family unit by protecting the nutritional health and resources for the “most” economically productive family members, usually the household male head. Therefore, the involvement and close collaboration of line ministries such as Health and Social Services, Education, Ministry of Gender Equality and Child Welfare to raise community awareness about the importance of childhood nutrition and the need to change intra household food and income distribution and other unfavorable sociocultural practices is urgently needed. Additionally in the most at risk households the need for targeted needs based social

protection programmes such as cash transfers or food baskets should be considered to increase disposable income in these households and maintain or increase dietary diversity.

Practices that revealed the effect of disparity were differences in access to micronutrient rich foods across wealth and educational divides, less compliance to antenatal iron supplementation regimens in the rural areas, a higher prevalence of maternal nightblindness and maternal underweight in the rural areas, short duration of breastfeeding by urban mothers and mothers in higher educational and wealth strata who most likely resumed their jobs within 3 months of delivery. Access to sanitation and water was a significant contributor to diarrhoeal disease and therefore the differences in regional access need to be addressed urgently. It is encouraging that Namibia is on target to meeting MDG1C target of halving the proportion of underweight among under-fives. Using a strong integrated multisectoral approach to address the issues raised in this report, not only can Namibia meet MDG 1C, but a strong start to addressing stunting in the country will have been made as well.

8.1.3. GAPS

There is a need to urgently undertake a national micronutrient survey so as to determine whether micronutrient deficiencies are of public health significance in Namibia. This information will strengthen the existing reports on food consumption so as to best inform where the greatest vulnerabilities exist to facilitate systematic and targeted action. Additional research is required on the quality of complementary foods and how these can be improved.

Increased dialogue between ministries, development agencies and academia and members of civil society engaged in activities and that can lead to low cost sustainable improvements in nutritional status are encouraged.

There needs to be an increase in human resources capacity development in nutrition from the grassroots possibly using the health extension workers network through related sectors and into tertiary level.

9. RECOMMENDATIONS

9.1. EARLY CHILDHOOD DEVELOPMENT AND PLAY

Figure 43 illustrates the negative impact of stunting as well as the importance of care practices, stimulation and play of infants on mental development in the first 24 months of life. In the study illustrated by Figure 41, all stunted infants had achieved the same development quotient at the start of the intervention. At the end of 24 months of intervention, infants who received no supplemental milk, or stimulation from their caregivers achieved the lowest mental development in the 24 month period. Children whose mental development increased the highest were the children who not only received a milk supplement but were also engaged actively by their caregivers. The next best performing group was the group of children who had received stimulation from their caregivers, illustrating the dual importance of play and adequate nutrition to support a child's growth and mental development. Nevertheless the mental development of the stunted children remained lower than the children who were not stunted, illustrating the damaging and lasting effects of undernutrition on mental developments.

For the Namibian situation this highlights the importance of adequate maternal nutrition and female adolescent nutrition, to prevent stunting

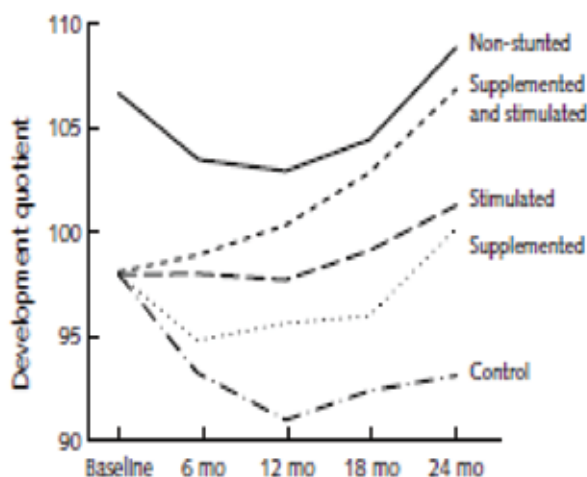
from occurring in the first place. However in the postpartum period the importance of breastfeeding and especially exclusive breastfeeding cannot be overlooked in addition to the provision of complementary foods of adequate quality and quantity. The importance of water, sanitation and hygiene is stressed here so as to prevent onset of diarrhoeal disease during the period of complementary feeding which is also the period associated with an acceleration of stunting in the under-five age group. Finally, these findings highlight the need for systematic early childhood activities and the education of mothers and caregivers as to the importance of play in the development of a child in its formative years.

9.2. SOCIAL PROTECTION : CASH TRANSFERS AND CHILD GRANTS

In addition to care practices that stimulate early childhood development there is a need for the social protection of the most vulnerable sections of society. These safety nets can be provided in the form of conditional cash transfers (CCT), unconditional cash transfers (UCT) or child support grants (CSG).

Evidence of the impact of these forms of support show that up to 70% of the cash transfers/ grants are channeled towards the provision of food into the households. Transfers have been associated with reports of reduced hunger and increase in the average number of meals provided where the value of the transfer allowed. The transfers have been associated with increased dietary diversity and increased provision of animal source foods and legumes. The child support grant when provided within the first three years of a child's life was associated with a 0.20 increase in height-for-age than a similar age child not receiving a CSG, however the grant needed to cover more than 20% of the first three years of child's life. In addition the improvements in girl's nutritional status was reported when female pensioners received the cash transfers. Pensions received by women were associated with a 1.16 increase in height-for-age for girls; this was not the case when the primary recipient of the pension was male (cited in Adato & Basset, 2009). There are valuable lessons here for Namibia where discussions are ongoing about the provisional direction of social protection packages. Additionally, as there is an ongoing pension programme there is a valuable opportunity to involve the elderly in positive behavioural change messages that cover infant and

Figure 43: Changes in infant development quotient with intervention over a 24 month period



Source: S Grantham-McGregor, Walker, Powell, 1991

“Namibia free of the diseases of poverty and inequality. The majority of Namibians are living a healthy lifestyle and are provided with safe drinking water.....Namibians enjoy food security and the people have a balanced diet”.

Namibia's Vision 2030: Section 3.3.2

young child feeding practices. Grandmothers with young children in their care, have great influence of young child feeding, but also to teach the elderly about the valuable role their pensions could play in improving the food and nutrition security of children in their care.

9.3. ALTERNATE STRATEGIES

Other strategies that could be considered are: in-home fortification of family meals using micronutrient sachets as an interim measure to address micronutrient deficiencies in the population. Alternatively, food to food fortification activities such as the addition of micronutrient rich leaves and grains such as amaranth to flours currently used in infant and young child feeding can be introduced.

As a long term measure, Namibia should investigate the feasibility of biofortified staples. Biofortification is the selective breeding of crop cultivars and varieties that have been found to naturally store higher levels of micronutrients such as β -carotene in the case of orange maize, orange flesh sweet potatoes and yellow cassava or iron in the case of beans, sorghum and millet. Currently, biofortification has been successfully undertaken in maize and sweet potatoes resulting in orange maize and orange flesh sweet potatoes (HARVESTPLUS, 2010). Efficacy trials are planned for the orange maize in Zambia and have been undertaken in Mozambique for the orange flesh sweet potatoes. Additionally, continent-wide there are investigations underway as to the potential of iron and zinc rich biofortified beans, millet and sorghum, all of which are widely used in Namibia. B-carotene biofortified cassava is under investigation in Kenya as a potential contributor to vitamin A nutrition (INSTAPA, 2010). It will be useful for Namibian nutritionists, agronomists and breeders and international partners in their networks to strive towards getting Namibia involved in ongoing biofortification research or to use current knowledge and developments towards a biofortification programme of its own. In so doing, Namibia can capitalize on existing frameworks towards using these various crops as contributors to improved micronutrient nutrition in Namibia.



10. SUGGESTIONS FOR THE WAY FORWARD

A number of important issues requiring follow up action have been brought into focus from the findings of this issue paper. Listed below are proposed follow up actions for immediate and medium term action.

STAGING OF WAY FORWARD

I. 1000 DAYS INTERVENTIONS (PRENATAL TO 24-36 MONTHS)

A. Prenatal

1. Promote dietary intake of folic acid among adolescent girls and pregnant women
2. Fortification of staple foods
3. Access to supplements through the education system
4. Folate supplementation during antenatal visits

B. Antenatal

1. Promote antenatal iron supplementation in areas with high prevalence of anaemia
2. Promote antenatal iodine supplementation in regions with reported high goiter prevalence
3. Integration and linkages of HIV services to nutrition services
 - i. Nutrition and PMTCT – maternal underweight in HIV+ women in pregnancy
 - ii. Maternal HIV treatment and vitamin A supplementation

C. Postnatal

1. Maternal Vitamin A supplementation within 6 weeks postpartum – link with infant vaccination schedule
2. Bi Annual Infant vitamin A supplementation after 9 months
3. Strengthen linkages between HIV and nutrition services in the Pediatric HIV treatment
 - i. Using the mechanisms of the growth monitoring programme
 - ii. Improve vitamin A supplementation coverage at facility level and through increased sensitization about National Immunization Days
 - iii. Establish linkages with IMAM programme once implemented
4. IMAM
 - i. Implementation of policy and action plan for facility and community

based integrated management of acute malnutrition.

5. ECD and School Based Interventions

- i. Increase coverage of early child development centres for children 2-5 years
 1. As sources of a school meal
 2. Source of play and learning to enhance mental and intellectual development
 3. Deworming twice a year for children aged 1 year to 13 years
 4. School based nutrition promotion programmes and school feeding

II. INFANT AND YOUNG CHILD FEEDING PRACTICES

1. Improve Breastfeeding duration and practice
 - i. Promote, protect and support exclusive breastfeeding for 6 months including for children born exposed to HIV under the cover of ARVs.
 - ii. Health promotion about the dangers posed by prelacteal feeds and the early introduction of alternate non-milk infant feeds within the first 6 months of the infants life
2. Legislation of the Code
 - i. Prevent and penalize unfair marketing of breastmilk substitutes
 - ii. Maternity Protection : maternity leave according to ILO guidelines

III. NUTRITIONAL SITUATION ANALYSIS AND NEEDS ASSESSMENT

- A. Update micronutrient survey data
 - i. Current biochemical micronutrient data is outdated (20 years old), does not reflect the prevailing situation of nutritional biochemistry in the Namibian population and therefore limits inference and action towards addressing micronutrient deficiency in the country
 - ii. Assess the Extent of the Problem of the Double Burden of Malnutrition
- B. Food consumption data and food composition tables
 - i. Data to guide planned staple fortification activities
 - ii. To increase knowledge and understanding of the current dietary intake patterns in the country and in the regions.
 - iii. To monitor dietary adequacy using food

- intake data so as to better identify the most vulnerable regions and sections of the populations
- iv. Extrapolate / simulate potential impact of the use of biofortified crops
- C. Strengthen Growth monitoring systems
 - i. To enable timely identification and action of childhood malnutrition and its causes

Areas for middle to long term action and implementation 18 months+

- I. NUTRITION GOVERNANCE STRENGTHENING
 - a. NDP
 - i. There is need for specific and explicit nutrition focused actions and strategies indicated in NDP 4
 - b. UNDAF
 - i. UN Agencies need to have more specific nutrition focused actions and strategies so as to reflect the urgency posed by the current burden of stunting among under-five children.
- II. ADDRESS DISPARITY ACROSS:-
 - a. Urban rural divide

- i. Improve sanitation coverage
- b. Gender
 - i. Strengthen women’s position in society
- 1. Need participation of men in the community
- c. Education
 - i. Inclusion of multidisciplinary Nutrition education (nutrition education, influence of infection and disease, importance of hygiene) into the education curriculum from primary to tertiary level
- d. Wealth status
 - i. Social Protection - Identify systems for the delivery of cash transfers and other mechanisms to the most vulnerable families
- III. CAPACITY BUILDING
 - a. Train Health extension workers in nutrition
 - b. Train diploma level nutritionists
 - c. Modification of nutrition curriculum at tertiary level institutions

Table 7 serves as an example of some of the proposed actions and the targets that the interventions undertaken could aim to achieve.

Appendix 1 provides a graphic illustration of the impact of child survival strategies in averting under-five deaths.

APPENDIX 1

Figure 44: The impact of child survival strategies in averting U5 child deaths

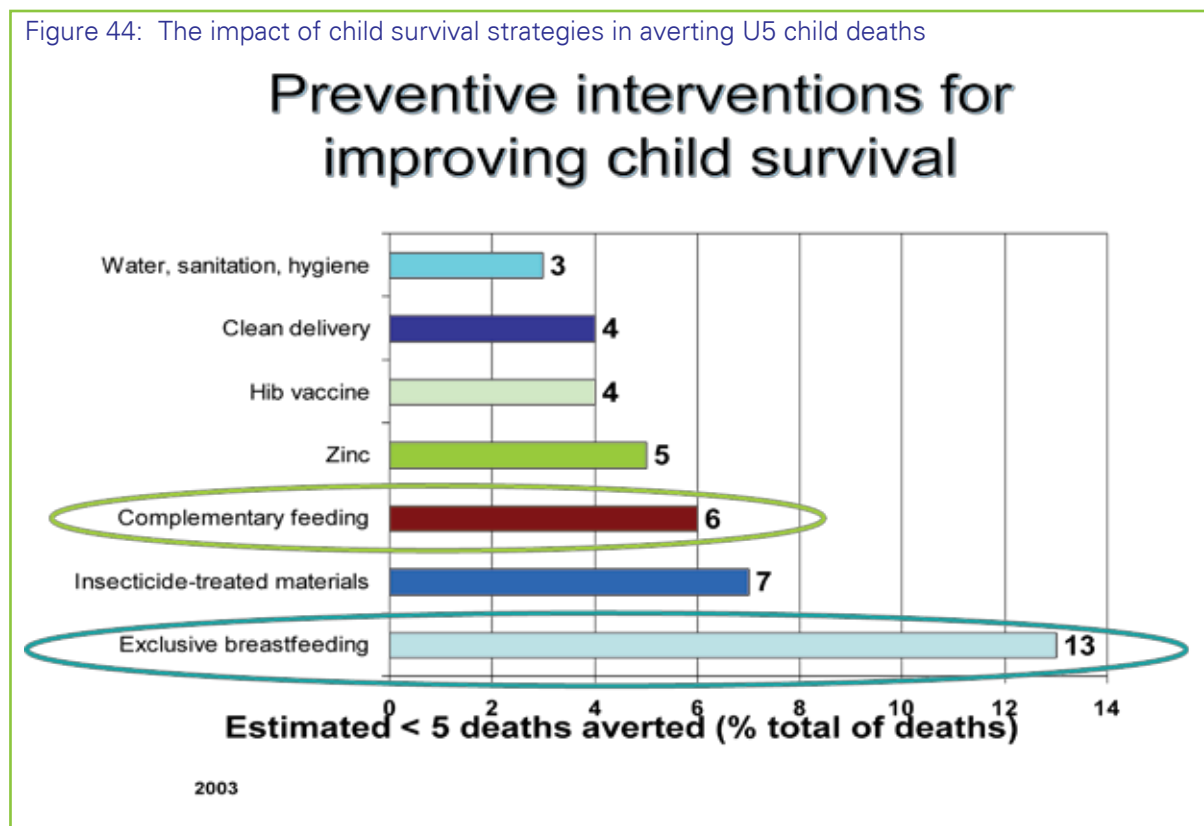


Table 7: An example of interventions and targets for the way forward

Objectives	Indicator	Baseline	Target
USI	Adequately iodised salt reaching 100% of Namibian Households	60-63%	100% national coverage Fortification Legislation
Fortification of Staples	Millet/ Maize fortified to meet 50% of RDA for vitamin Bs and iron	Voluntary fortification of wheat and maize flour.	100% reach of the population
Pregnant receive essential maternal health services	% of pregnant women that receive at least 1 IYCF counseling session; Iron/folate supplementation; have hand washing soap in the house	? – IYCF counselling 31%- Fe/ Folate ?- Handwashing soap	95% of the pregnant women receive the services
Children 0-2 years receive essential child services	% of children in the project areas that have complete immunization, vitamin A supplementation, receive monthly growth monitoring (?) and access to RUTF if they would need it.	>90% - vaccination 51.5% - VAS ? – GMP ?- RUTF	95% of the children in receive the services
Nutritional status of children is improved	% low birthweight 2010 < 2011	14%	Median % low birth weight in the country has gone down with 50%
	Levels of stunting at age of 24 months	36.4%	Reduction to below 20%
	Levels of severe malnutrition among children 0-59 months	9.9%	Reduction to below 5%
	Levels low weight for height among children 0-59 months	7.5%	Reduction to below 5%
Young child and infant feeding practices are improved	% women initiate breastfeeding at birth	90%	Increase to 100% in 5 years
	% 6 mo excl breastfed	50	Increase by 50% in 2 years
	% 20-23 mo still breastfed	10	90% more children
	% 6-11mo receiving appropriate complementary foods	80	20% more children

Objectives	Indicator	Baseline	Target
Health services are strengthened to provide adequate maternal and child health and nutrition services	% of MCH health workers in the project areas that have received at least 2-days of in-service training during the last 12 months on issues related to maternal and child health and nutrition	?	90% of MCH health workers
	Days of stock outs of supplies – vitamin A, weighing scales, iron/folate, - during the last month	?	Reduction with 50%
Improved capacities at community level to promote maternal and child health	<ul style="list-style-type: none"> • % of children below 2 years that attended community based growth monitoring during the last 4 months • Number of health extension workers trained in community nutrition • Number of diploma level nutritionists trained in nutrition • Number of nutrition graduates qualifying from tertiary institutions • Revision of local nutrition curriculum at UNAM to strengthen nutrition understanding of medics and nurses 		<ul style="list-style-type: none"> • 95% • 26 – in one year • 13- in two years • 5 in 4 years • Over a 12-18 month period

REFERENCES

- Adato, M., & Basset, L. (2009). Social protection to support vulnerable children and families: the potential of cash transfers to protect education, health and nutrition. *AIDS Care*, 21 (S1), 60-75.
- Barker, D. J. (2004). The developmental origins of wellbeing. *Philosophical Transactions of the Royal Society London: Series B*, 359, 1359-1366.
- Behrman, J., Alderman, H., & Hoddinot, J. (2004). *Hunger and Malnutrition: Copenhagen Consensus Challenge paper*. Copenhagen.
- Central Bureau of Statistics. (2006). *Preliminary report: Namibia Household Income and Expenditure Survey 2003/2004*. Windhoek, Namibia: National Planning Commission, Central Bureau of Statistics.
- Chotard, S., Conkle, J., & Mason, J. (2006). *Nutrition information in Namibia: Situation analysis & the way forward*. New Orleans, LA: Tulane University, Department of International Health, School of Public Health & Tropical Medicine.
- Commission on the Nutrition Challenges of the 21st century (2000). Ending malnutrition by 2020: An agenda for change in the Millenium: Final report to the ACC/SCN. *Food and Nutrition Bulletin*, 21(3), (supplement), 3-88.
- Desmond, C., Bland, R. M., Boyce, G., Coovadia, H. M., Coutsooudis, A., Rollins, N. & Newell, M.L. (2008). Scaling up exclusive breastfeeding support programmes: The example of Kwa Zulu-Natal. *PLoS ONE*, 3 (6), e2454.
- Doak, C. M., & Popkin, B. (2008). The rapid emergence of obesity in developing countries. In R. D. Semba, & M. W. Bloem (Eds.), *Nutrition and Health in Developing Countries*. New York, NY, USA: Humana Press.
- Food and Agriculture Organization of the United Nations [FAO]. (2004). *Incorporating nutrition considerations into development policies and programmes: Brief for policy-makers and programme planners in developing countries*. Rome, Italy: Food and Agriculture Organization of the United Nations.
- Food and Agriculture Organization of the United Nations [FAO] & World Food Programme [WFP]. (2009). *FAO/WFP Crop, Livestock and Food Security Assessment Mission to Namibia*. Rome, Italy: Food and Agriculture Organization of the United Nations.
- Government of the Republic of Namibia, National Food Security and Nutrition Technical Committee. (2008). *National food security and nutrition assessment report*. Windhoek, Namibia: Ministry of Regional and Local Government.
- Gracey, M. (1997). Diarrheal Disease in Perspective. In *Diarrheal Disease* (Vol. 1, pp. 1-12). Philadelphia, Vevey, Switzerland: Lippincott-Raven.
- Grantham-McGregor, S., Walker, S., & Powell, C. (1991). Nutritional supplementation and mental development. *The Lancet*, 21 (338), 1-5.
- HARVESTPLUS. (2010, September 7). *Scientists find that 'orange' maize is a good source of vitamin A*. Retrieved November 26, 2010, from <http://www.harvestplus.org/content/scientists-find-%E2%80%98orange%E2%80%99-maize-good-source-vitamin>

- Hunt, J. M. (2001). Investing in children: child protection and economic growth. In: Ortiz, I. (Ed.). *Social protection in Asia and the Pacific*. Manila, Philippines: Asian Development Bank (pp. 579–98).
- INSTAPA. (2010). INSTAPA. Retrieved November 26, from <http://www.instapa.org/everyone>
- Joint United Nations Programme on HIV/AIDS [UNAIDS]. (2010). Government of Republic of Namibia – United States Government HIV and AIDS Partnership Framework. Windhoek.
- Kennedy, G. L. (2009). Dietary Diversity Score is a useful indicator of micronutrient intake in non breastfeeding Filipino children. In *Evaluation of Dietary Diversity Scores for assessment of micronutrient intake and food security in developing countries*. Wageningen, The Netherlands: Wageningen University and Research Centre.
- Ministry of Health and Social Services [MOHSS]. (1992). *Iodine deficiency disorders and data in the status of vitamin A and iron*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS]. (2001). *Nationwide follow up survey on Iodine Deficiency Disorders (IDD) in Namibia 1998/99*. Windhoek, Namibia: Ministry of Health and Social Services, Directorate Primary Health Care, Division Family Health, Subdivision Food and Nutrition.
- Ministry of Health and Social Services [MOHSS]. (2003). *Namibia Demographic and Health Survey 2000*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS]. (2005). *Health Information System [Database]*.
- Ministry of Health and Social Services [MOHSS] & Macro International. (2008). *Namibia Demographic and Health Survey 2006-07*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS]. (2008a). *Health and Social Services Systems Review 2008*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS]. (2008b). *Report on the National HIV Sentinel Survey*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS] & United Nations Children’s Fund [UNICEF]. (2009). *Nutrition survey in the northern regions in Namibia*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Health and Social Services [MOHSS]. (2009). *2008/9 Estimates and Projections of the Impact of HIV/AIDS in Namibia*. Windhoek, Namibia: Ministry of Health and Social Services.
- Ministry of Labour and Social Welfare, Directorate of Labour Market Services. (2008). *Namibia labour force survey 2008 : (NLFS 2008): report of analysis*. Windhoek, Namibia: Ministry of Labour and Social Welfare, Directorate of Labour Market Services.
- National Planning Commission. (2008). *Third National Development Plan (NDP3), 2007/2008-2011-12: Volume 1: Executive summary*. Windhoek, Namibia: National Planning Commission.
- Organisation for Economic Cooperation and Development [OECD]. (Created on August 9, 2002, last updated on February 16, 2006). *OECD glossary of statistical terms*. Retrieved November 26, 2010, from <http://stats.oecd.org/glossary/detail.asp?ID=4842>

- Savage-King, F. (1992). *Helping Mothers to Breastfeed*. Nairobi: African Medical Research Foundation.
- Semba, R. D., & Delange, F. (2008). Iodine deficiency disorders. In R. D. Semba, & M. W. Bloem (Eds.), *Nutrition and health in developing countries* (2nd ed.). New York, NY: Humana Press
- Semba, R. D., & Victora, C. G. (2008). Low birth weight and neonatal mortality. In R. D. Semba, & M. W. Bloem (Eds.), *Nutrition and health in developing countries*. New York, NY, USA: Humana Press.
- Shrimpton, R., Victora, C., Onis, M. de, Costa Lima, R., Blössner, M., & Clugston, G. (2001). Worldwide timing of growth faltering: implications for nutritional intervention. *Pediatrics* 107 (5), e75.
- Sight and Life. (n.d.). *Vitamin A*. Retrieved 26 November 2010, from <http://www.sightandlife.org/topics/vitamin-a>
- Sommer, A. & West, K.P. (1996). *Vitamin A deficiency: Health, survival and vision*. New York, NY: Oxford University Press.
- Subramanian, S. V., Kawachi, I., & Smith, G. D. (2007). Income inequality and the double burden of under- and overnutrition in India. *Journal of Epidemiology and Community Health* , 61 (9), 802-809.
- United Nations Children's Fund [UNICEF] & World Health Organization [WHO]. (2004). *WHO/UNICEF joint statement: Clinical management of acute diarrhoea*. New York, NY: United Nations Children's Fund, Programme Division, Health Section.
- United Nations Children's Fund [UNICEF]. (2009, March 2). *Namibia statistics*. Retrieved October, 2010, from http://www.unicef.org/infobycountry/namibia_statistics.html
- United Nations Children's Fund [UNICEF], Joint United Nations Programme on HIV/AIDS [UNAIDS], World Health Organization [WHO], United Nations Population Fund [UNFPA]. (2009). *Children and AIDS: Fourth stocktaking report*. New York, NY: United Nations Children's Fund.
- United Nations Development Programme [UNDP]. (2009). *Human development report 2009: Overcoming barriers: Human mobility and development*. Houndmills, England: Palgrave Macmillan.
- United Nations, Administrative Committee on Coordination, Sub-Committee on Nutrition & International Food Policy Research Institute. (2000). *4th Report on the world nutrition situation: Nutrition throughout the life cycle*. Geneva, Switzerland: United Nations, Administrative Committee on Coordination. Sub-Committee on Nutrition Secretariat.
- United Nations University. (1990). *Intra-Household Resource Allocation: Issues and Methods for Development Policy and Planning*. Retrieved November 2010, from <http://unu.edu/unupress/unupbooks/80733e/80733E00.htm#Contents>
- Wasserman. (2009). *Nutrition and Lifecycle (1)*. Chapters 11 and 8. Rutgers State University.
- Weigel, R., Phiri, S., Chiputula, F., Gumulira, J., Brinkof, M., Gsponer, T., ... Keiser, O. (2010). Growth response to antiretroviral treatment in HIV infected children: A cohort study form Lilongwe Malawi. *Tropical Medicine and International Health* 15 (8), 934-944.
- World Bank. Development Data Group (2008). *Poverty data: A supplement to World Development Indicators 2008*. Washington, DC: World Bank.

- World Food Programme [WFP]. (2010). *Countries - Namibia*. Retrieved 26 November 2010 from <http://www.wfp.org/countries/namibia>
- World Health Organization [WHO]. (last updated 2009, June 22). *Vitamin and Mineral Information System*. Retrieved November 2010, from WHO Global Database on Iodine Deficiency - Namibia: http://www.who.int/vmnis/iodine/data/database/countries/nam_idd.pdf
- World Health Organization, Expert Committee on Physical Status [WHO]. (1995). *Physical status: the use and interpretation of anthropometry: report of a WHO Expert Committee*. Geneva, Switzerland: World Health Organization.
- World Health Organization [WHO]. (2002). *Meeting of Advisory Group on Maternal Nutrition and Low Birthweight*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2003). *Nutrient requirements for people living with HIV/AIDS: Report of a technical consultation*. Geneva, Switzerland: World Health Organization.
- World Health Organization Nutrition for Health and Development/ Making Pregnancy Safer/ Evidence and Information for Policy. (2003). *WHO Technical Consultation Towards the Development of a Strategy for Promoting Optimal Fetal Development*. Geneva, Switzerland: World Health Organization.
- World Health Organization, Department of Nutrition for Health and Development. [WHO]. (2004). *Iodine status worldwide: WHO global database on iodine deficiency* [CD-ROM]. Geneva, Switzerland: World Health Organization, Department of Nutrition for Health and Development.
- World Health Organization [WHO] & Food and Agriculture Organization of the United Nations [FAO]. (2006). *Guidelines on food fortification with micronutrients*. Geneva, Switzerland: World Health Organization.
- World Health Organization [WHO] & United Nations Children's Fund [UNICEF]. (2006). *Infant and young child feeding counselling: An integrated course*. Geneva, Switzerland: World Health Organization.
- World Health Organization [WHO]. (2009). *Maternal and child health in Namibia*. Windhoek, Namibia: World Health Organization.
- World Health Organization [WHO], Joint United Nations Programme on HIV/AIDS [UNAIDS] & United Nations Children's Fund [UNICEF]. (2010). *Towards universal access: Scaling up priority HIV/AIDS interventions in the health sector: progress report 2010*. Geneva, Switzerland: World Health Organization, Department of HIV/AIDS.

