



Essential Newborn Nursing for Small Hospitals

In resource restricted countries

Learner's Guide



Department of Pediatrics
WHO Collaborating Centre for Training and
Research in Newborn Care
All India Institute of Medical Sciences, New Delhi

Supported by
Saving Newborn Lives, Save the Children

Neonatal Division, AIIMS, New Delhi

Demonstration



Oral Drill



Role Play



Group Discussion



Video



FAQ's



Skill Demonstration



Self Evaluation





1st Edition, July 2004

Compiled by faculty, residents and nursing staff of the WHO Collaborating Centre for Training and Research in Newborn Care, All India Institute of Medical Sciences, New Delhi, in collaboration with College of Nursing, All India Institute of Medical Sciences, New Delhi

This publication is supported with funds provided by Save the Children (US) through a grant from the Bill and Melinda Gates Foundation. Its contents are solely the responsibility of the authors and do not necessarily reflect the views of Save the Children (US) or the Bill and Melinda Gates Foundation.

The protocols and recommendations in the module are based on an extensive review of available literature and the standard practices in leading neonatal centres in the country. The publications of the World Health Organization, Saving Newborn Lives, American Academy of Pediatrics, JHPIEGO, Kangaroo Foundation and National Neonatology Forum, among others, served as important sources of information. The evidence-based principles of newborn care were carefully adapted for application in the operational milieu of small facilities.

Medical and nursing knowledge keeps changing rapidly. Therefore, the users of this Guide are advised to refer to literature and amend these practices with passage of time to suit the situation prevalent in their units. The practices and policies may vary from one facility to another, hence there can be no universal recommendations.

The practices mentioned in this guide are just guidelines and are not to be taken to be firm and final or the only way to perform such procedures in newborn. The authors or sponsors will in no way be responsible for any harm or damage to patients, care givers or equipment resulting from misinterpretation or misuse of these practice guidelines.

Published by

Division of Neonatology,
Department of Pediatrics, AIIMS, New Delhi

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Printed by

Noble Vision, New Delhi Tel: 98101-15714





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Foreword

India is at the threshold of an unprecedented scaling up of neonatal health services. Complementing the household and community level interventions, a massive, country-wide strengthening of newborn care is envisaged in government facilities in the second phase of the Reproductive and Child Health Program (2005-2010). Nearly 12000 primary health centers (PHCs) and 2000 first referral units (FRUs) will provide neonatal services in conjunction with emergency obstetric and sick child care by 2010. And, nurses will be the key providers, attending deliveries and providing care to inborn and outborn babies. A large number of nurses will be recruited and deployed on contract basis to ensure round-the clock coverage. Because the pre-service training of nurses often lacks adequate emphasis on neonatal care skills, in-service training in this area will be essential.

This training module is thus a timely product. The module is tailored to the special needs of the nursing colleagues working at small hospitals such as the district hospitals, FRUs and PHCs. It also covers the core competencies required at level II nurseries. The contents are carefully chosen and the focus is on skills and practice. The facilitation approaches of the program promote active learning and attitudinal transformation.

I would like to congratulate the contributors, reviewers and editors for developing an outstanding resource material. It is heartening to note that, many of the contributors are themselves nurses with long experience in neonatal nursing. They deserve special compliments for their inputs and insights.

This module bridges a critical gap in operationalizing newborn care at the secondary level in the country, the Region and beyond.

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1 July, 2004





Preface

Nurses play important roles in Perinatal-neonatal care at healthcare facilities from being skilled attendants at birth, to managing sick neonates; from counselling mothers about breast feeding to advising home care of low birth weight babies; from instituting Kangaroo Mother Care, to stabilizing sick neonates brought to health facility. Their contribution to newborn care at district and subdistrict facilities is even more critical because of shortage of physicians. They and not the physicians, conduct most newborn deliveries. They treat sick neonates brought from the community under guidance of physicians. Intrapartum, post-partum and neonatal monitoring is largely the responsibility of the nurses. Nurses perform critical care procedures and look after neonatal equipment. Nurses are interface with the community and the family in regard to the promotion of healthy newborn care practices. It is not an overstatement to assert that nurses form backbone of newborn care at First Referral Units and District Hospitals and play a more important role than the physicians.

There is no well-structured or standardised in-service training program in newborn care for nurses employed at above health facilities. The newborn care curriculum in the pre-service training course of the nurses is often scanty and theoretical. It is in this background that AIIMS took a lead in developing a high quality training module directed to clinical care practices on Essential Newborn Nursing.

This training module is the result of a series of technical meetings and considerable team efforts. Almost 60 eminent experts, teachers, neonatologist and nurses have contributed to the making of this module. Intense inputs from AIIMS team of nurses, residents and faculty to translate the agreed contents into an easy readable resource material using participatory teaching learning strategies. The resultant module which has latest evidence based practices related to newborn care has drawn heavily from the attributes of the IMCI modules and materials. Following pilot testing the modules have undergone field testing at Jaipur, Indore, Dacca. Incorporation of feedback from the facilitators and monitors have resulted in creation of this training tool.

AIIMS team are indebted to the contributors for their outstanding efforts in providing technical inputs. Rotary International Focus Group Study Exchange programme between Rotary District 3010 (Delhi, India) and Rotary District 5360 (Calgary, Canada); support for workshops from UNICEF in September 2000; Laerdal Foundation, Norway in Jan 2003; DFID, British Council March 2004 and funds saved from continuing medical education of Doctors at AIIMS have sown the seed for this initiative. We would like to express our appreciation to team at Centre of Medical Education & Technology, AIIMS for developing video films. Special thanks to Saving Newborn Lives Initiative, Save the Children (US) for the ongoing financial assistance for dissemination and capacity building of newborn nursing in India.

Dr. A.K. Deorari

24th June, 2004





Contents

Module I Kangaroo Mother Care	-1-
Module II Thermal Protection	-13-
Module III Feeding of Healthy Normal and Low Birth Weight Babies	-25-
Module IV Neonatal Resuscitation	-51-
Module V Prevention of Infection	-71-
Module VI Common Procedures	-87-
Module VII Management of the 'Normal', 'At Risk and Sick Neonate'	-105-
Annexures (i) References (ii) Key operationalization criteria of ENBC	-118-





MODULE I : KANGAROO MOTHER CARE

This module on Kangaroo Mother Care is designed to complement in service education orientation and continuing education of nursing personnel involved in newborn care.

LEARNING OBJECTIVE

The participants will learn about benefits and procedure of Kangaroo Mother Care (KMC).

Module contents

The module includes following elements:

- **Text material:** Easy to read text material for the participants. Key messages are highlighted in the box.
- **Clinical skills:** Practising skills of initiation of KMC in actual case scenarios in hospital setting.
- **Role-play:** Observing steps involved in counselling of mother and successful implementation of KMC. Participant will also be provided with opportunity for role play.
- **Demonstration:** There will be demonstration of practice and procedure of KMC using a poster.
- **Video Film:** Learn initiation of KMC. Listen to views of family and health professionals about KMC.
- **Self-evaluation:** At the end of text, self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

1. INTRODUCTION

Kangaroo mother care (KMC) is a method of caring for newborn infants. In this method the infant is placed between mother's breasts in direct skin-to-skin contact. It is particularly useful in caring for low birth weight infants below 2000 grams.

The main components of kangaroo mother care are:

- 1.1 **Skin to skin contact :** This component involves direct skin-to-skin contact of the newborn with the mother which should be early and continued for prolonged periods of time.
- 1.2 **Exclusive breastfeeding :** Most of the babies below 2000 grams would gain weight adequately on exclusive breastmilk feeding.
- 1.3 **Physical, emotional and educational support:** This should be provided by the nursing and medical staff to the mother and the family.
- 1.4 **Early discharge and follow up:** KMC should be initiated in the hospital under supervision. KMC would





facilitate early discharge from the hospital and this practice should be continued at home. These babies should be followed up regularly to ensure a normal outcome.

2. BENEFITS OF KMC

KMC has been shown to have benefits on

- 2.1 **Breastfeeding:** Studies have shown that KMC results in increased breastfeeding rate as well as increased duration of breastfeeding. Studies conducted in developed countries, where skin-to-skin contact was even initiated late and for a limited amount of period per day, had shown a beneficial effect on breastfeeding. Experience from AIIMS has shown that KMC results in better exclusive breast feeding rate at 6 weeks of age.
- 2.2 **Thermal control and metabolism:** Studies carried out in low-income countries showed that prolonged skin-to-skin contact between the mother and her preterm/ LBW infant provides effective thermal control and are associated with a reduced risk of hypothermia. Experience from AIIMS has shown that KMC results in normal temperature during the procedure without any risk of hypothermia during the KMC.

KMC satisfies all five senses of the baby. The baby feels warmth of mother through skin-to-skin contact (touch), she listens to mother's voice & heart beat (hearing), sucks on breast (taste) has eye contact with mother (vision) and smells mother's odor (olfaction).

- 2.3 **Growth:** Infants cared for by KMC have a slightly better daily weight gain during hospital stay. Studies conducted in different parts of world as well as at AIIMS have shown that babies have better weight gain with KMC.
- 2.4 **Other effects:** KMC helps both infants and parents. Mothers report being significantly less stressed during kangaroo care than when the baby is receiving incubator care. Mothers prefer skin-to-skin contact to conventional care and report increased confidence, self-esteem, and feeling of fulfillment. They describe a sense of empowerment, confidence and a satisfaction that they can do something positive for their preterm infants. Fathers felt more relaxed, comfortable and better bonded while providing kangaroo care.

*KMC does not require additional staff compared to incubator care
KMC is acceptable to the mothers and the health-care staff working in the hospital.*



KANGAROO MOTHER CARE: A MOTHERS DELIGHT

Nurses, Residents and Faculty, Division of Neonatology

WHO Collaborating Centre for Training and Research in Newborn Care
All India Institute of Medical Sciences, New Delhi

What is Kangaroo Mother Care (KMC)?

Skin to skin contact of the infant on the mother's chest



KMC was first popularized at Bogotá, Colombia

Which babies need KMC?



Identify all **LOW** babies benefit from KMC, but the **VLBW** gain the most

How to provide KMC?

Baby upright between mother's breasts



Dr any position comfortable to the mother

How long can KMC be done?



- Each session of not less than one hour
- Provide KMC for as long and as often as possible, day and night

Where can KMC be provided?

KMC can be given in the nursery and the ward



KMC should be certified at home

Who else can provide KMC?



Other family members can also substitute and support the mother in providing KMC

How to prepare for KMC?

1. Counsel the mother



2. Prepare the baby



3. Position the baby



4. Cover with cloth



POSITIVE EFFECTS OF KMC

- Normalizes infant physiology
- Provides warmth to the baby
- Promotes lactation, ensures more successful breastfeeding
- Provides sense of security to baby
- Improves weight gain of baby
- Reduces hospital stay
- Promotes baby-mother bonding

WHAT ARE THE BENEFITS OF KMC?

KMC is a simple, low-cost and highly effective intervention which benefits low birth weight babies

- The babies and their mothers love KMC
- You too can promote KMC in your unit... start today...
- Ensures KMC for all VLBW babies

*Kangaroo Mother Care
Baby's Right Mothers Delight!*



DEMONSTRATION

Facilitator will conduct a demonstration on KMC using a poster on Kangaroo Mother Care: Baby's Right, Mother's Delight.





3. ELIGIBILITY CRITERIA FOR KMC

3.1 Baby

All babies are eligible for KMC. However very sick babies needing special care may preferably be cared under radiant warmer and KMC can be started after the baby has become stable. Some guidelines for practicing KMC include

- i. **Birth weight $\geq 1800\text{gm}$:** If stable, can be started on KMC soon after birth.
- ii. **Birth weight 1200-1799gm:** In such case the delivery should take place in a equipped facility, which can provide neonatal care. Should delivery occur elsewhere, the baby should be transferred to such facility soon after birth, preferably with the mother. One of the best ways of transporting small babies is keeping them in continuous skin-to-skin contact with the mother. It may take a couple of days for a sick baby to become stable before KMC can be initiated.
- iii. **Birth weight $< 1200\text{gm}$:** These babies benefit most from transfer before birth to a hospital with neonatal intensive care facilities. It may take days to weeks before baby's condition allows initiation of KMC.

KMC can be initiated in a baby who is otherwise stable but still on intravenous fluids or some oxygen administration.

3.2 Mother

All mothers can provide KMC, irrespective of age, parity, education, culture and religion. The following aspects must be taken into consideration when counseling for KMC:

- i. **Willingness:** The mother must be willing to provide KMC. Healthcare professionals should counsel her adequately regarding different aspects of KMC. Once mother knows about KMC, she will be willing to provide KMC to her baby.
- ii. **General health:** If the mother has suffered from complications during pregnancy or delivery or is otherwise ill, she should recover reasonably well before she can initiate KMC.
- iii. **Supportive family:** She needs support to deal with other responsibilities at home. The other family members e.g. father or grandmother should also be encouraged to provide kangaroo care to the LBW baby.
- iv. **Supportive community:** This is particularly important when there are social, economic or family constraints.





KMC can be provided using any front open garment. You can innovate / design a garment which would help mother to provide KMC to her baby.

If the mother is a smoker, advise her on the importance of stopping smoking or refraining from doing it in the room where the baby is being nursed. Explain to her the danger of passive smoking to her baby.

4. INITIATION OF KMC

- 4.1 **Counselling:** When baby is ready for KMC, arrange a time with the mother that is convenient for her and her baby. The first session is important and requires time and undivided attention. Ask her to wear light, loose clothing. Provide a warm place for her. Respect her requirement of privacy while providing KMC. Encourage her to bring her mother-in-law, other relatives or her husband if she wishes, as it helps to lend support and reassurance. Talk to other key family members especially mother-in-law, sister-in-law and husband. Unless they are convinced, it will not be possible for the mother to do KMC at home.
- 4.2 **Baby clothing:** Baby should be naked except cap, socks and nappy.
- 4.3 **Kangaroo positioning:** The baby should be placed between the mother's breasts in an upright position. The head should be turned to one side and in slightly extended position. This slightly extended head position





keeps the airway open and allows eye-to-eye contact between the mother and the baby. Avoid both forward flexion and hyperextension of the head. The hips should be flexed and abducted in a “frog” position; the elbows should also be flexed. Baby’s abdomen should be somewhere at the level of the mother’s epigastrium. This way baby has enough room for abdominal breathing. Mother’s breathing stimulates the baby, thus reducing the occurrence of apnea. Mother can provide KMC sitting or reclining in a bed or a chair. She can keep herself in slightly backward reclining position and support baby’s body and neck using her own hand.

Feeding: The mother should be explained that she should breastfeed in the kangaroo position and that KMC actually makes breastfeeding easier. Furthermore, holding the baby near the breast stimulates milk production.

- 4.4 **Psychological support:** The mother should be encouraged to ask for help if she is worried. The health personnel should be prepared to respond to her questions and anxieties.



When mother is not available, other family member such as grandmother, father or other relative can provide KMC.

5. TIME OF INITIATION

KMC can be started as soon as the baby is stable. Babies with severe illness or requiring special treatment should wait until they are reasonably stable before KMC can be initiated. During this period babies are treated according to neonatal unit clinical guidelines. Short KMC sessions can be initiated during recovery with ongoing medical treatment (IV fluids, low concentration of oxygen). KMC can be provided while the baby is being fed via orogastric tube. Once the baby begins to recover, family members should be motivated to practice KMC.

6. DURATION OF KMC

Skin-to-skin contact should start gradually, with a smooth transition from conventional care to continuous KMC. Sessions that last less than one hour should, however, be avoided because frequent handling may be too stressful for the baby. The length of skin-to-skin contacts should gradually be increased to become as prolonged as possible,





interrupted only for changing diapers, especially where no other means of thermal control are available.

When the mother needs to be away from her baby, other family members (father, grandmother etc.) can also help by caring for the baby in skin-to-skin kangaroo position.

It may not be possible for mother to provide KMC for prolonged period in the beginning. Encourage her to increase the duration each time. The aim should be to provide KMC as long as possible.

7. CAN THE MOTHER CONTINUE KMC DURING SLEEP AND RESTING?

The mother can sleep with the baby in kangaroo position in a reclined or semi-recumbent position, about 15 degree from horizontal. This can be achieved with an adjustable bed, if available, or with several pillows on an ordinary bed. It has been observed that this position may decrease the risk of apnea for the baby.

If the mother finds the semi-recumbent uncomfortable, allow her to sleep as she prefers and she can continue KMC as much as possible. A comfortable chair with adjustable back may be useful for resting during the day.



8. DISCHARGE CRITERIA FOR BABY MOTHER DYAD PRACTICING KMC

Usually, a KMC baby can be discharged from the hospital when the following criteria are met:

- The baby's general health is good and there is no concurrent disease such as apnea or infection.
- Baby is feeding well, and is receiving exclusively or predominantly breastmilk.
- Baby is gaining weight (at least 15g/kg/day for at least three consecutive days) and has regained birth weight.
- Baby's temperature is stable in the KMC position (within the normal range for at least three consecutive days).
- The mother is confident of taking care of her baby at home and would be able to come regularly for follow-up visits.





These criteria are usually met by the time baby weighs around 1500gm. The home environment is also very important for the successful outcome of KMC. The mother should go back to a warm, smoke-free home. She should have support for everyday household tasks.

9. HOW LONG TO CONTINUE KMC?

Babies love to be cared skin-to-skin with mothers after going home. This should be continued for some time at home and other family members can also participate in providing KMC. It can be weaned off, once the baby starts becoming intolerant to the procedure or at 40 weeks of post conceptional age.

10. FOLLOW UP PLAN

The smaller the baby at discharge, the earlier and more frequent follow-up visits would be needed. If the baby is discharged in accordance with the above criteria, the following suggestions would be valid in most circumstances. More frequent visits should be made if baby is not growing well or if his condition demands.

- One follow-up visit every 2 weeks period till weight of the baby is 3 kg.
- Thereafter one follow-up per month till 6 months of age.
- One follow-up every three months till one year of age.





SELF EVALUATION

1. Components of KMC include
 - a.
 - b.
 - c.
 - d.

2. Benefits of KMC include
 - a.
 - b.
 - c.
 - d.

3. Mother should practice KMC at least for _____ in one sitting

4. Do you need additional staff for implementing KMC in your unit: Yes / No

5. Who all can practice KMC?

6. A mother is practicing KMC during the day. How can KMC be provided during the night while she is sleeping.

7. Mention the discharge criteria from the hospital of a mother baby dyad practicing KMC.

You will be given individual feedback after you have evaluated yourself.





VIDEO

There will be video demonstration on initiation, procedure of KMC. The video demonstration will be followed by discussion.

1. Following aspects of KMC were shown

- i) _____
- ii) _____
- iii) _____
- iv) _____
- v) _____

2. Comments on Video

Good aspects

Need improvement

3. Video covered

- | | |
|--|----------|
| i) Demonstrated procedure of KMC | Yes / No |
| ii) Precautions to be taken while practicing KMC | Yes / No |
| iii) Benefits of KMC | Yes / No |
| iv) Views of Mothers, Nurses | Yes / No |





ROLE PLAY

Motivating and counselling of the mother for providing KMC.

Checklist for demonstration roleplay

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____

Checklist for roleplay by participants

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____



MODULE II : THERMAL PROTECTION

The thermal protection module is designed to complement in-service education orientation and continuing education of nursing personnel involved in newborn care.

LEARNING OBJECTIVES

The participants will learn about:

- Mechanisms of heat loss in newborns.
- The concept of warm chain.
- Identification of hypothermia by hand touch.
- Recording axillary temperature.
- Appropriate nursing interventions, in a baby experiencing hypothermia.
- Hyperthermia and its prevention.

Module contents

The module includes following elements:

- **Text material:** Easy to read format for quick reproduction and essential reference material for the participants. Key messages are highlighted in the boxes.
- **Case studies:** Simple cases which involve nursing interventions related to thermoregulation.
- **Oral drill:** You will learn assessment of temperature in normal and hypothermic baby and steps to be undertaken as a staff nurse caring for the baby.
- **Role-play:** Observing steps to keep baby warm in postnatal ward. Participant will also be provided with opportunity to role play.
- **Self-evaluation:** At the end of text, self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

1. IMPORTANCE OF HYPOTHERMIA

Newborn babies are often not able to keep themselves warm with low environmental temperature resulting in hypothermia. Hypothermia continues to be a very important cause of neonatal morbidity and mortality due to lack of attention by health care providers.

2. HANDICAPS OF NEWBORN IN TEMPERATURE REGULATION

A newborn is more prone to develop hypothermia because of a large surface area per unit of body weight. A low birth weight baby has decreased thermal insulation due to less subcutaneous fat and reduced amount of brown fat.

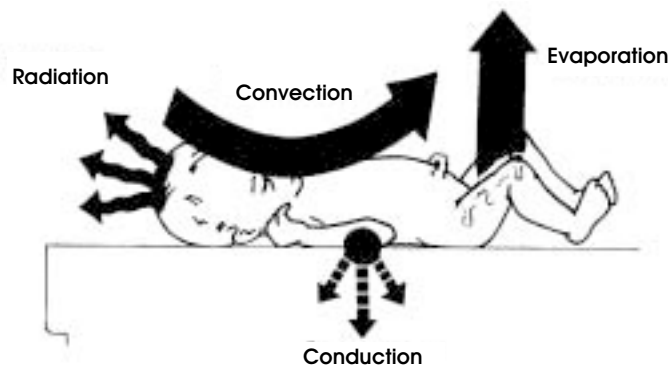
**Why newborns are prone to develop hypothermia?**

- Larger surface area
- Decreased thermal insulation due to lack of subcutaneous fat (LBW infant)
- Reduced amount of brown fat (LBW infant)

Brown fat is the site of heat production. It is localized around the adrenal glands, kidneys, nape of neck, inter scapular and axillary region. Metabolism of brown fat results in heat production. Blood flowing through the brown fat becomes warm and through circulation transfers heat to other parts of the body. This mechanism of heat production is called as **non-shivering thermogenesis**. LBW babies lack this effective mechanism of heat production.

3. MECHANISM OF HEAT LOSS AND HEAT GAIN

Newborn loses heat by evaporation (particularly soon after birth due to evaporation of amniotic fluid from skin surface), conduction (by coming in contact with cold objects-cloth, tray, etc.), convection (by air currents in which cold air from open windows replaces warm air around baby) and radiation (to colder solid objects in vicinity-walls). The process of heat gain is by conduction, convection and radiation in addition to non-shivering thermogenesis (see next page).



Four ways a newborn may lose heat to the environment

4. TEMPERATURE RECORDING

Normal temperature in a newborn is 36.5-37.5° C

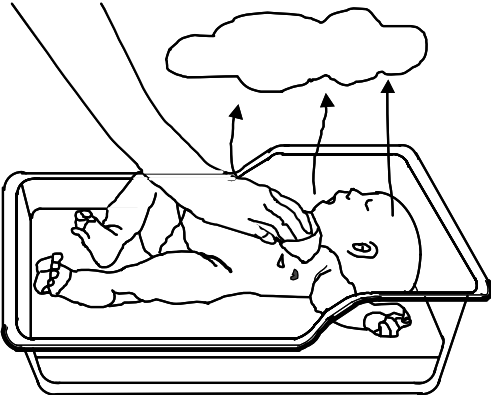
Preferably low reading thermometer recording temperature as low as 30°C should be used in the newborn to record temperature (records between 30°C to 40°C).

4.1 Axillary temperature is as good as rectal and safer (less risk of injury or infection). It is recorded by placing the bulb of thermometer against the roof of dry axilla, free from moisture. Baby's arm is held close to the body to keep thermometer in place. The temperature is read after three minutes.





Evaporation: Involves the loss of heat when a liquid is converted to a vapour.

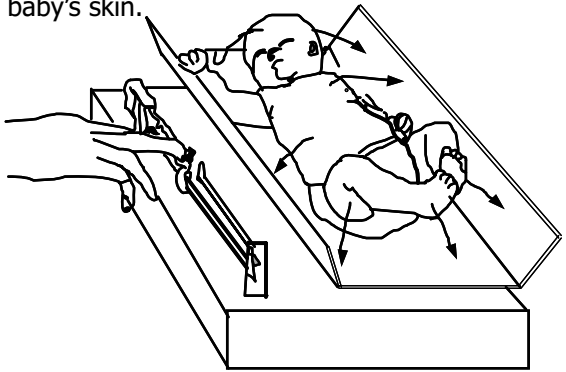


DRYING AT BIRTH

Nursing implication

- Keep infant dry
- Remove wet nappies
- Minimize exposure during baths

Conduction: Involves the loss of body heat to cooler objects which come in direct contact with baby's skin.

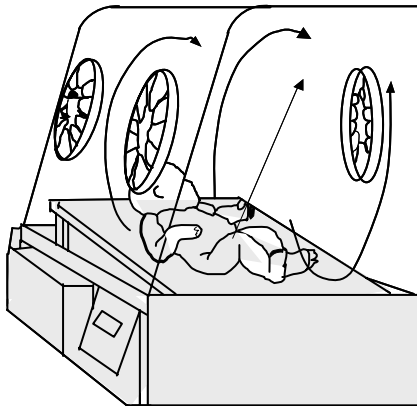


WEIGHING A BABY

Nursing implication:

- Put the baby on prewarmed sheet
- Cover scales, and X-ray cassettes with warm towel or blanket

Radiation: Involves loss of infant's body heat to cooler solid objects that are not directly in contact with him.

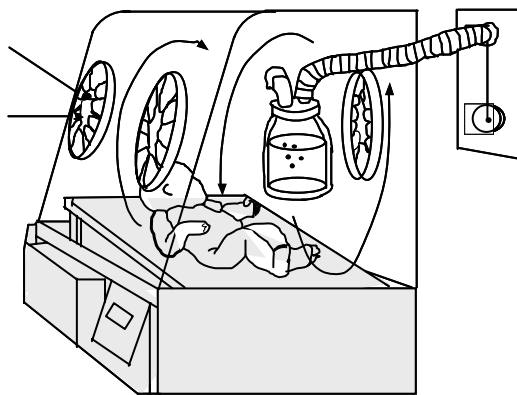


BABY INSIDE INCUBATOR

Nursing implication

- Keep baby cots and incubators away from outside walls, air conditioners.
- Cover the baby if stable.

Convection: Involves the flow of heat from the body surface to cooler surrounding air or to air circulating over body surface.



INCUBATOR WITH HUMIDIFICATION

Nursing implication

- Avoid current of airs.
- Manage babies inside incubator, if possible.
- Organize work to minimize opening portholes.
- Provide warm humidified oxygen.



4.2 **Rectal temperature:** Do not use this method for routine monitoring. However, it can be used as a guide for core temperature in cold (hypothermic) sick neonates. It is recorded by inserting the greased bulb of the special thermometer backwards and upwards to a depth of 3 cm in a term baby (2 cm in a preterm baby). Keep thermometer in place at least for 2 minute.

Rectal temperature is not recorded as a routine procedure in neonate. Record rectal temperature only for a sick, hypothermic newborn.

The difference in rectal and axillary temperature is not clinically significant.

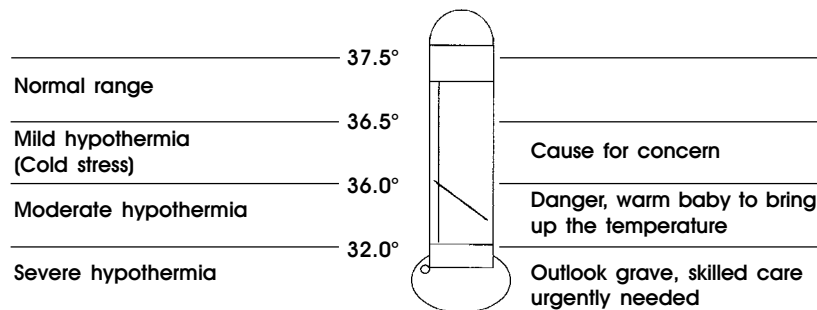
4.3 **Skin temperature:** Skin temperature is recorded by a thermister. The probe of the thermister is attached to the skin over upper abdomen. The thermister senses the skin temperature and displays it on the panel.

5 ASSESSMENT OF TEMPERATURE BY TOUCH

Baby’s temperature can be assessed with reasonable precision by touching with dorsum of hand over abdomen, hands and feet. In newborn, abdominal temperature is representative of the core temperature.

When feet are cold and abdomen is warm, it indicates that the baby is in cold stress. In hypothermia, both feet and abdomen are cold to touch.

In normothermic baby (baby with normal temperature) both abdomen and feet are warm to touch.



Axillary temperature in the newborn infant (°C)

6. WARM CHAIN

The “warm chain” is a set of interlinked procedures carried out at birth and later, which will minimize the likelihood of hypothermia in all newborns. Baby must be kept warm at the place of birth (home or hospital), during transportation for special care from home to hospital or within the hospital. Satisfactory control of baby’s temperature demands both prevention of heat loss and providing extra heat using an appropriate source.



6.1 **Common situations where cold stress can occur**

- i. At birth.
- ii. After giving bath.
- iii. During changing of nappy/clothes.
- iv. Malfunctioning heat source or removing the baby from heat source.
- v. While transporting a sick baby.

6.2 **Steps to prevent heat loss in labor room**

- i. Warm delivery room (25°C).
- ii. Newborn care corner temperature 30°C .
- iii. Drying immediately. Dry with one towel. Remove the wet towel and cover with another pre-warmed towel.
- iv. Skin-to-skin contact between mother and baby.

6.3 **Steps to prevent heat loss in postnatal ward**

- i. Breast feeding.
- ii. Appropriate clothing, cover head and extremities.
- iii. Keep mother and baby together.
- iv. Keep room warm.
- v. Postpone bathing and weighing.

Use thermometer to keep room temperature at 25°C

6.4 **How to keep baby warm?**

- i. Use dry, warm towel to hold baby at birth. Remove wet towel after cleaning.
 - ii. Adequate and appropriate clothing.
 - iii. Skin-to-skin contact or next to mother (Rooming in).
 - iv. Radiant warmer in nursery (works best if room temperature >20°C).
 - v. Keep the room temperature of baby care area 25°C.
- * Using a 200 watt bulb may not be sufficient to keep the baby warm. There is a risk of breakage of bulb.

6.5 **How to keep room warm?**

- i. Avoid too cool air conditioner in summer.
- ii. Keep windows and doors closed in winter.
- iii. Don't use ceiling fan, specially high speed.
- iv. Warm the room by convector/heater.





SELF EVALUATION

1. Newborn baby is prone to develop hypothermia due to _____

2. Newborn baby loses heat by four mechanism, name them _____

3. Steps of "Warm chain" in hospital include following _____

4. Routine temperature should be recorded by _____ route.

5. Normal axillary temperature range is _____ - _____.

6. How can you assess baby's temperature by touch? _____.

7. If you touch a baby with normal temperature, he will have warm abdomen and _____ soles/
palms.

You will be given individual feedback after you have evaluated yourself .



**ORAL DRILL**

There will be an oral drill by the facilitator on

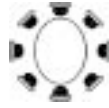
Assessment of temperature and management of hypothermia

Category	Temp. range	Feel by touch	Clinical features	Action
Normal	36.5 to 37.5°C	Warm trunk Warm extremities	Normal baby	<ul style="list-style-type: none"> • Cover adequately with prewarmed cloth • Keep next to mother • Encourage breast feeding
Mild hypothermia (cold stress)	36 to 36.4°C	Warm trunk Cold extremities	Extremities bluish and cold Poor weight gain if chronic cold stress	<ul style="list-style-type: none"> • Skin-to-skin contact • Cover adequately • Ensure room is warm • Provide warmth • Encourage breast feeding
Moderate Hypothermia	32 to 35.9°C	Cold trunk Cold extremities	Poor sucking, Lethargy Weak cry Fast breathing	<ul style="list-style-type: none"> • Wrap mother and baby together using prewarmed clothes • Cover adequately • Provide warmth • Vitamin K (if not given) • Reassess every 15 minutes if doesn't improve provide additional heat • Encourage breast feeding
Severe hypothermia	Less than 32°C	Cold trunk & cold extremities	Lethargic Poor perfusion/mottling Fast or slow breathing, Bleeding	<ul style="list-style-type: none"> • Rapid re-warming till baby is 34°C and then slow re-warming • Oxygen • IV fluids dextrose (warm) • Inj Vit K

- *Inform the doctor immediately if temperature is less than 36°C
Remove the wet cloth, place the baby under heat source, encourage breastfeeding. Start oxygen administration if the baby has respiratory distress or cyanosis.*

*Avoid use of hot water bottle for (re) warming the baby.
Warm clothes to be worn by baby can be used for providing extra warmth in places where electricity is not available using tawa.*





GROUP DISCUSSION – CASE STUDY

You are posted in postnatal ward. A recently delivered mother complains that her baby is lethargic. On examination you found a 6 hr old, 2.8 kg baby lying in a separate cot not yet dressed in any clothes and only wrapped in a hospital cotton sheet. HR is 140/minute, RR 56/minute, capillary refill time 2 sec. Extermities are cold to touch and bluish while abdomen is warm to touch. You record axillary temperature which is 36.1°C. The room is too cold.

Q1. What is your assessment?

Q2. What are the adverse effects of this condition?

Q.3 What led to the situation in this baby?

Q.4 What will you do to rectify those conditions?

There will be a group discussion by facilitator after you have answered above questions.





ROLE PLAY

You will observe role play being conducted by two facilitators on how to keep baby warm in postnatal ward. Write your comments for discussion at the end of the role play.

Objective : To demonstrate how to keep baby warm in postnatal ward.

Checklist for demonstration roleplay

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____

Checklist for roleplay by participants

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____





7. KEEPING RADIANT WARMER READY TO RECEIVE A BABY

Prepare a bed at least 30 minutes before the baby arrives in the Nursery to ensure the baby is received in warm, comfortable environment.

Steps

- i. Clean the radiant warmer/incubator properly before use.
- ii. Switch on the mains.
- iii. Put the baby sheet on the bed. Arrange all the necessary items near the bed.
- iv. Put the radiant warmer on the manual mode with 100% heater output so that the temperature of all items likely to come in contact with baby are warm.
- v. Once the radiant warmer is ready – switch to skin mode with desired setting.

8. HYPERTHERMIA/HIGH TEMPERATURE

8.1 *What is a high temperature?*

High temperature, fever or hyperthermia, occurs when the body temperature rises above 37.5°C. It is not as common as hypothermia, but it is equally dangerous. The causes of high temperature may be:

- The room is too hot
- The baby has too many covers or clothes
- The baby has an infection

8.2 *How to prevent high temperature?*

- Keep the baby away from sources of heat, direct sunlight
- If the baby feels hot remove a layer of clothing

Signs and symptoms of hyperthermia

- Irritable baby
- Very warm to touch on abdomen and extremities
- Red flushed skin
- Hot and dry skin
- Lethargy and pallor
- Stupor, coma, convulsions (esp. if temperature >41°C)

8.3 *Steps to be undertaken if the elevated body temperature is due to overheating.*

- Place the baby in a normal temperature environment (25 to 28°C), away from any source of heat.
- Undress the baby partially or fully, if necessary.
- Give frequent breastfeeds.
- Measure the baby's axillary temperature every hour until it is in the normal range.
- If the body temperature is very high (>39°C), sponge the baby with tap water.
- Examine the infant for infection.

Don't use cold / ice water for sponge. Tap water is good enough





- If the baby has been under a radiant warmer
 - Reduce the temperature setting till temperature becomes normal, then dress and cover the baby according to the warming device used.
 - Undress the baby partially or fully till temperature becomes normal, then dress and cover the baby according to the warming device used.
 - Measure the baby's body temperature every hour until it is in normal range.
 - Measure the temperature under the radiant warmer every hour and adjust the temperature setting accordingly.
 - If there is no obvious reason to suspect overheating, inform Doctor who will evaluate.

Both hypothermia and hyperthermia can be signs of sepsis. If a baby has been in a stable temperature environment with fairly constant temperature readings, but begins to have fluctuating temperature readings (low, high or both) inform the Doctor for evaluation.





FREQUENTLY ASKED QUESTIONS

There will be group discussion on FAQs related to thermal protection among the facilitators and participants.

1. How should you keep thermometer in the axilla to record temperature?

2. Should we add 1°C to the measured axillary temperature to get core- temperature ?

3. How frequently should one record temperature in
 - i. A normal baby in ward _____
 - ii. A sick but otherwise stable baby _____
 - iii. A hypothermic baby who is being provided extra heat source _____

4. Enumerate specific measures to keep baby's temperature normal in summer months

5. A baby has high temperature. How you will be sure that this is due to infection or raised environmental temperature?

You may raise any more additional questions





MODULE III : FEEDING OF NORMAL AND LOW BIRTH WEIGHT BABIES

This module is designed to complement in-service education orientation and continuing education of nursing personnel involved in newborn care.

LEARNING OBJECTIVES

The participants will learn about enteral feeding of:

- Normal birth weight babies (≥ 2500 gms)
- Low birth weight babies (< 2500 gms)

Module contents

The module includes following elements

- **Text material:** Easy to read text material for the participants. Key messages are highlighted in the box.
- **Clinical skills:** Practising skills on actual case scenarios in hospital setting with mothers and babies.
- **Demonstration:** Observing steps involved in successful breast feeding in hospital setting.
- **Role play:** There will be role play on "initiation of breastfeeding" and "not enough milk".
- **Video film:** Learning positioning, attachment and effective sucking by baby on breast.
- **Self evaluation:** At the end of the text, self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

FEEDING OF NORMAL BIRTH WEIGHT BABIES

The best milk for a newborn baby is unquestionably breast milk. All health professionals must have knowledge of superiority of breast milk and about the correct technique of breast feeding in order to promote breast feeding with conviction and to support breast feeding by mothers with confidence.

1. ADVANTAGES OF BREAST FEEDING

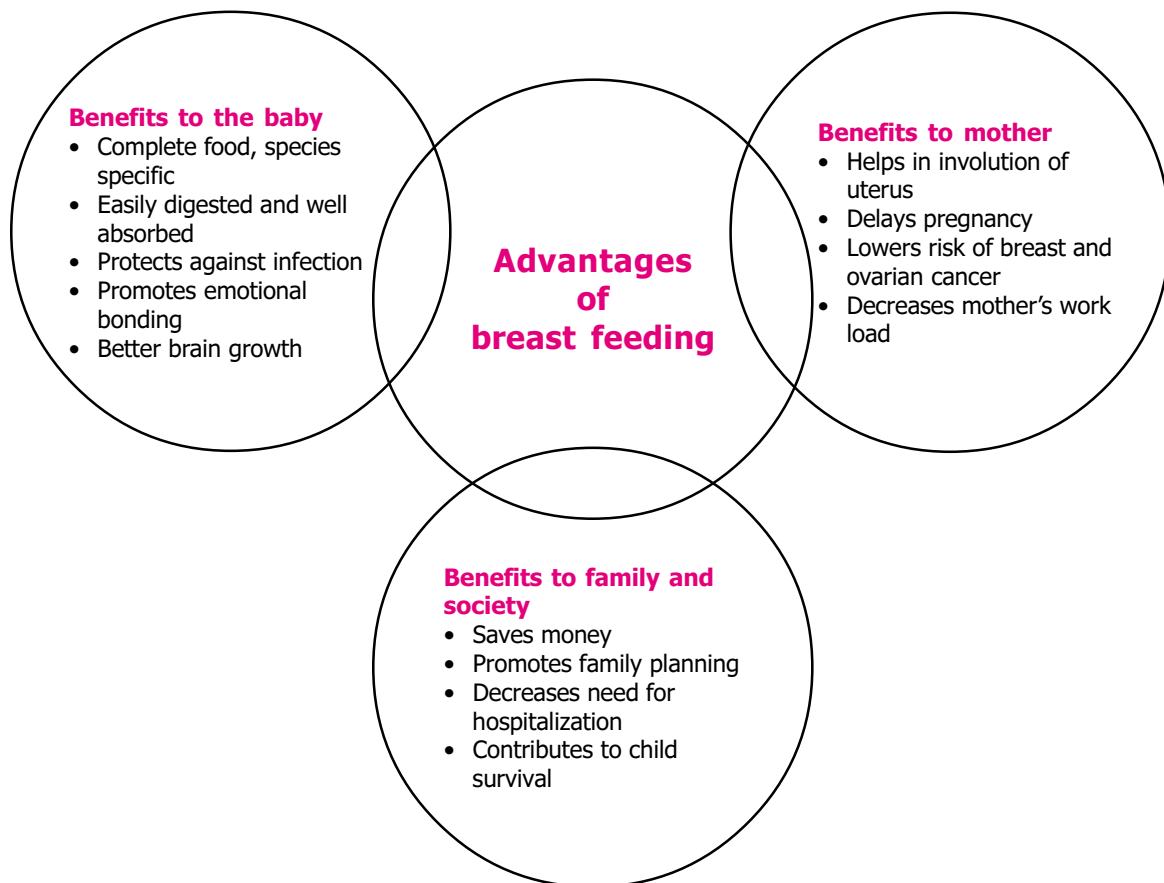
Exclusive breast fed babies are at decreased risk of

- Diarrhea
- Pneumonia
- Ear infection
- Death in first year of life





Preferably low reading thermometer recording temperature as low as 30°C should be used in the newborn to record temperature (records between 30°C to 40°C).





DEMONSTRATION

There will be demonstration using Demonstration Aids by the facilitators on Anatomy of breast and Physiology of Lactation.

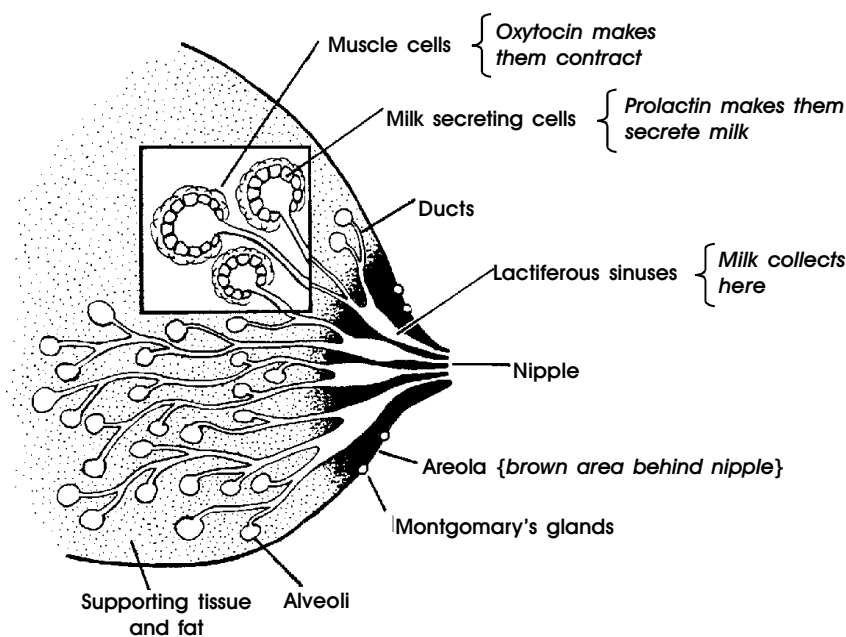




2. ANATOMY AND PHYSIOLOGY

In order to successfully impart knowledge on breast feeding, it is necessary to study the relevant anatomy and physiology of the breast, to understand how and where milk is produced, and factors which may affect lactation and ejection of milk.

The breast consists of glandular tissue and supporting tissue and fat. Milk is secreted by the glands and travels through tubules which drain into lactiferous sinuses. The sinuses which store small quantities of milk, lie below the areola. They open out on to the nipple through lactiferous ducts. The thin layer of muscle (myo-epithelium) surrounds each gland. The contraction of these muscles causes ejection of milk from the glands.



Anatomy of Breast

3. MILK PRODUCTION AND SECRETION

Milk is produced as a result of the interaction between hormones and reflexes. During pregnancy, the glandular tissue is stimulated to produce milk due to various hormonal influences. Two reflexes, mediated by two different hormones, come into play during lactation.

3.1 Prolactin reflex

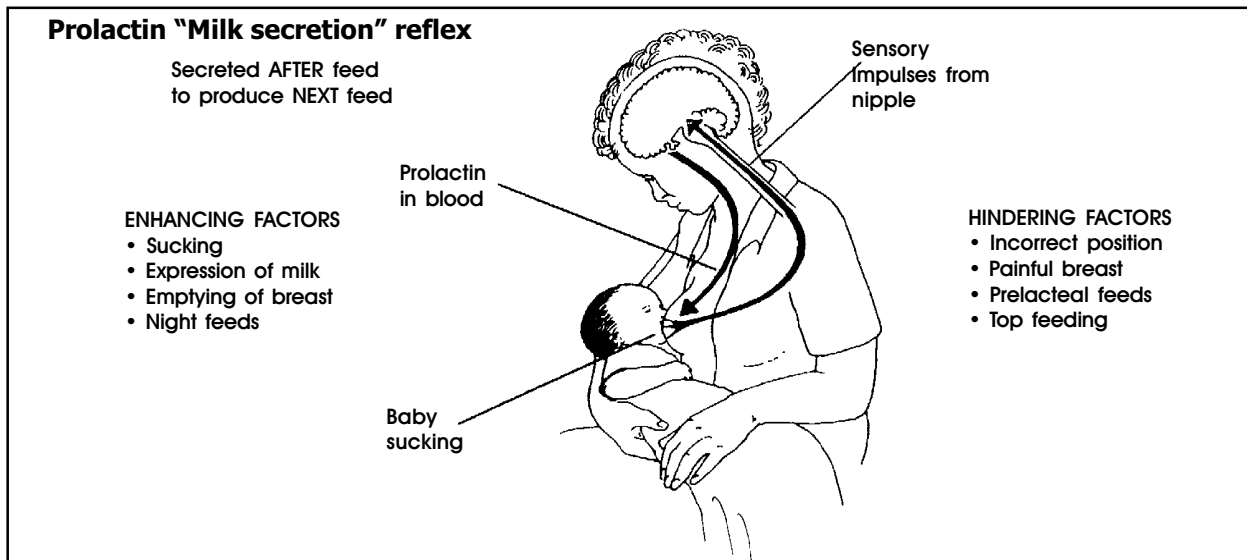
Prolactin is produced by the anterior pituitary gland which is responsible for milk secretion by the mammary gland cells. When the baby sucks, the nerve endings in the nipple carry message to the anterior pituitary which in turn releases prolactin. This hormone passes through the blood to the glands in the breast, promoting milk secretion.

This cycle from stimulation to secretion is called the prolactin reflex or the "milk secretion reflex". The earlier



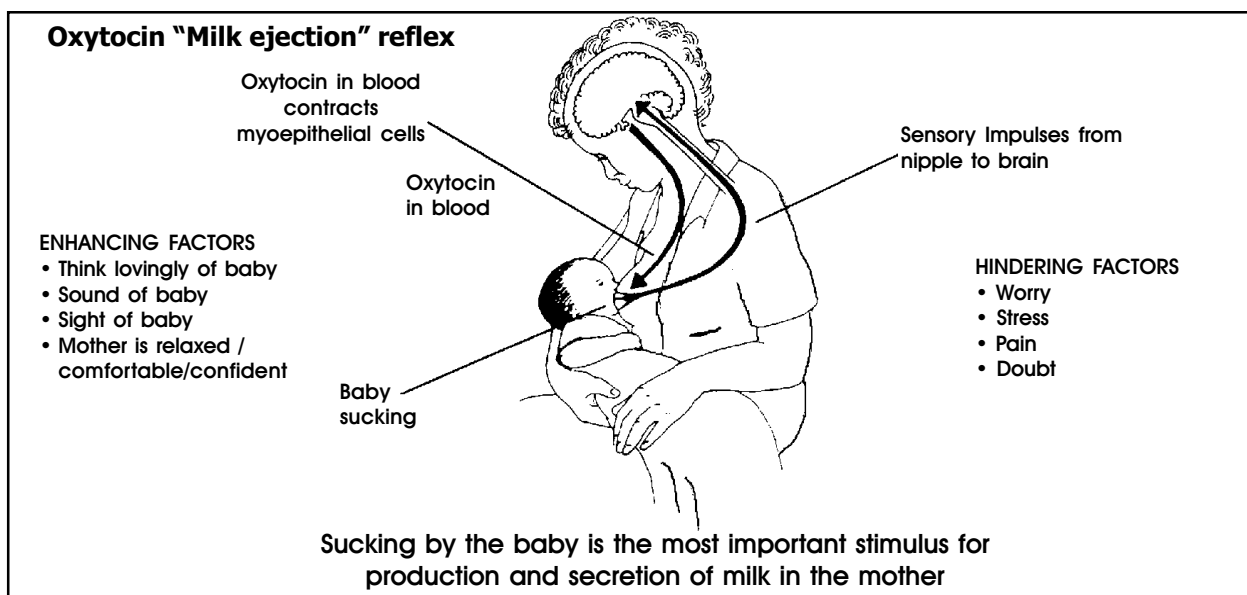


the baby is put on the breast, the sooner the reflex is initiated. The more the baby sucks at the breast, the greater is the stimulus for milk production. The greater is the demand for milk, larger is the volume of milk produced. It is therefore important for the mothers to feed baby early, frequently and ensure complete emptying of the breasts at each feed.



3.2 Oxytocin reflex

Oxytocin is a hormone produced by the posterior pituitary. It is responsible for contraction of the myoepithelium around the glands leading to ejection of the milk from the glands into the lacteal sinuses and the lacteal ducts. This hormone is produced in response to stimulation to the nerve endings in the nipple by sucking as well as by the thought, sight or sound of the baby. Since this reflex is affected by the mother's emotions, a relaxed, confident attitude helps this "milk ejection reflex". On the other hand, tension, pain and lack of confidence, hinders the milk flow. This stresses the importance of a kind and supportive person - professional health worker or a relative - to reassure the mother and help gain confidence so that she can successfully breastfeed.





4. TYPES OF BREAST MILK

The composition of breast milk varies at different stages after birth to suit the needs of the baby. Milk of a mother who had delivered a preterm baby is different from milk of a mother who has delivered a full term baby.

1. *Colostrum* is the milk secreted during first week after delivery. It is yellow, thick and contain more antibodies and white blood cells. Though secreted only in small quantities, it has higher protein content and is most suited for the needs of the baby, it should NEVER be discarded.
2. *Transitional milk* is the milk secreted during the following two weeks. The immunoglobulin and protein content decreases while the fat and sugar content increases.
3. *Mature milk* follows transitional milk. It is thinner and watery but contains all the nutrients essential for optimal growth of the baby.
4. *Preterm milk* is the breast milk of a mother who delivers prematurely. It contains higher quantities of proteins, sodium, iron, immunoglobulins that are needed by her preterm baby.
5. *Fore milk* is the milk secreted at the start of a feed. It is watery and is rich in proteins, sugar, vitamins, minerals and water and satisfies the baby's thirst.
6. *Hind milk* comes later towards the end of a feed and is richer in fat content and provides more energy, and satisfies the baby's hunger. For optimum growth the baby needs both fore and hind milk. The baby should therefore be allowed to empty one breast. The second breast should be offered after emptying the first.

Ensure exclusive breast feeding during first 6 months of life. Additional water is not necessary even in summer.



Exclusive breastfeeding should be given for initial six months. The mother can continue breastfeeding as long as she wishes but at least during first year; complimentary food should be started after six months of age.





Key messages to promote exclusive breast feeding

- Put baby to feed at breast as soon as possible after birth preferably in the delivery room. This is important for the mother, baby and for milk production.
- On the first day, breast milk is thick and yellowish (known as colostrum). Feeding this milk provides nutrition and prevents infections. DO NOT DISCARD COLOSTRUM.
- Keep baby close to mother. It is safe for baby to sleep with mother.
- Mother may lie down, sit on a bed, chair or floor to breast feed her baby.
- Breast feed during day and at night at least eight times, whenever baby cries with hunger.
- The more the baby sucks at breast the more milk the breast will produce and the healthier baby becomes.
- Allow baby to feed at one breast until he leaves the nipple on his own. Then feed him at the other breast if he continues to be hungry.
- Give baby only breast milk for the first 6 months.
- Don't give baby ghutti water, gripe water, honey, animal or powdered milk before 6 months.
- Never use bottles or pacifier. They are harmful and are likely to make baby frequently ill.



Breast feeding should be continued during diarrhea as well as other illnesses. It helps the baby to get optimal nutrition and recover from the illness faster.





SELF EVALUATION

Let us see how much you have learnt

1. Benefits of breast feeding for baby and mother are:

Benefits to baby

Benefits to mother

2. How long should exclusive breastfeeding be continued for babies?

3. Milk secretion is caused by _____ hormone, while milk ejection (letdown) by _____ hormone.

4. Enumerate factors which enhance "milk secretion reflex" by increasing prolactin production

5. Oxytocin reflex is stimulated by:

6. Look at the picture. Is Malti doing the right thing? Yes/No
How many times she should breast feed in a day? _____ times.



You will be given individual feedback after you have evaluated yourself





5. POSITIONING AND ATTACHMENT

5.1 Position of the mother



A mother holding her baby in the underarm position (foot ball position)
Useful for:

- Twins
- Blocked duct
- Difficulty in attaching the baby



A mother holding her baby in the arm opposite the breast
Useful for:

- Very small
- Sick babies



A mother breastfeeding her baby while lying



Mother should be in comfortable position. She may sit on a chair, bed, stool or ground with back properly supported. She should slightly recline backward and should not lean on the baby. She can feed the baby in lying or semi-reclining posture.

5.2 *Proper position of baby while breastfeeding includes*

- Supporting whole of baby's body.
- Ensure baby's head, neck and back are in same plane.
- Entire baby's body should face mother.
- Baby's abdomen touches mother's abdomen.

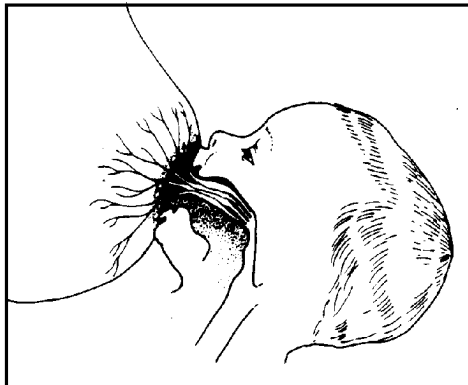
Correct positioning will ensure effective sucking and prevent sore nipples and breast engorgement.

5.3 *Attachment of baby on mother's breast*

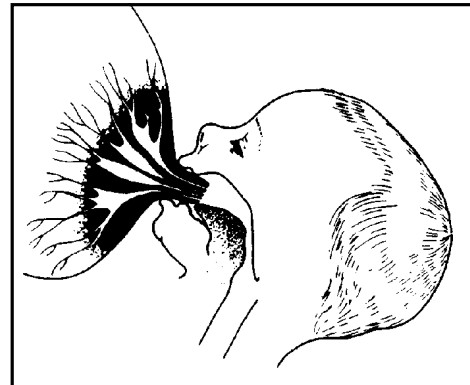
Four signs of good attachment are:

- Baby's mouth wide open.
- Lower lip turned outwards.
- Baby's chin touches mother's breast.
- Majority of areola inside baby's mouth.

Good attachment



Poor attachment



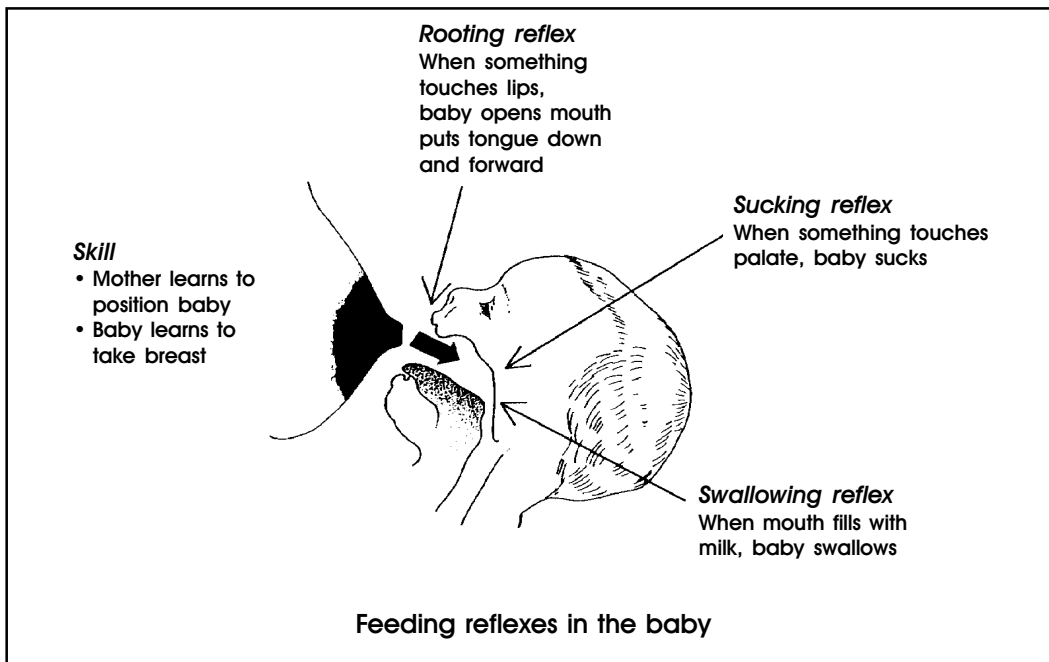
5.4 *Causes of poor attachment*

- Use of feeding bottles.
- Inexperienced mother.
- Lack of skilled support.
- Inverted nipples.



5.5 Poor attachment result in

- a. Pain or damage to nipple or sore nipple.
- b. Breast milk not removed effectively thus causing breast engorgement.
- c. Poor milk supply hence baby is not satisfied after feeding.
- d. Breast produces less milk resulting in a frustrated baby and refusal to suck. This leads to poor weight gain.



6. HOW DOES MOTHER FEED THE BABY WHEN SHE HAS TWINS?

- i) Listen to mother's concerns
- ii) Often mother is able to produce enough milk for two babies. Counsel and motivate her that she can continue exclusive breastfeeding for twin babies also. The supply of milk is related to demand by the baby. More is the demand, greater is the production.
- iii) She can breastfeed the babies - either together at a time or alternately.

7. INDICATORS OF ADEQUATE BREASTFEEDING

- i) Baby passes urine 6-8 times in 24 hours.
- ii) Goes to sleep for 2-3 hrs after the feeds.
- iii) Gains weight @20-40 gm/d.
- iv) Crosses birth weight by 2 weeks.





SELF EVALUATION

Let us see how much you have learnt

1. When mother's nipple touches the baby's cheek, he turns in the direction of the nipple, opens his mouth. This reflex in newborn is called _____.

2. Can a mother feed baby in lying position? Yes/No

3. Enumerate the steps of good positioning of baby for proper attachment.

- i. _____
- ii. _____
- iii. _____
- iv. _____

4. Signs of good attachment are

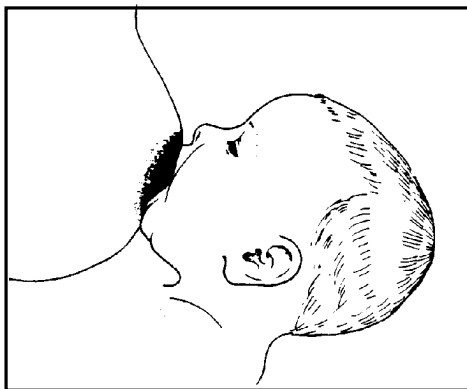
- i. _____
- ii. _____
- iii. _____
- iv. _____

5. What differences do you see?

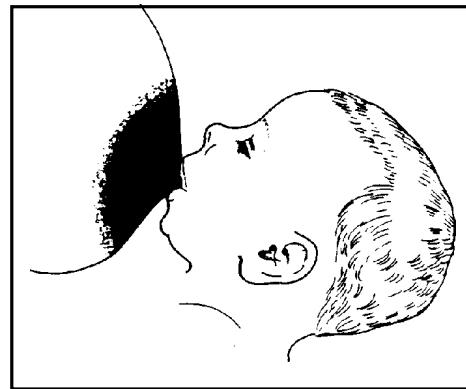
Baby sucking on _____

Baby sucking on _____

1



2



6. Enumerate problems because of poor attachment.

7. Should the mother stop breast feeding a baby if baby has loose stools? Yes/No

You will be given individual feedback after you have completed the exercise.





VIDEO

In this video you will learn correct positioning of mother and baby, signs of good attachment and effective sucking.

1. Following aspects of breast feeding were shown:

i. _____

ii. _____

iii. _____

2. Comments on video

Good aspects

Need improvement

3. Video covered

- | | |
|------------------------------------|--------|
| i. Four signs of good attachment | Yes/No |
| ii. Four signs of good positioning | Yes/No |
| iii. Signs of effective sucking | Yes/No |





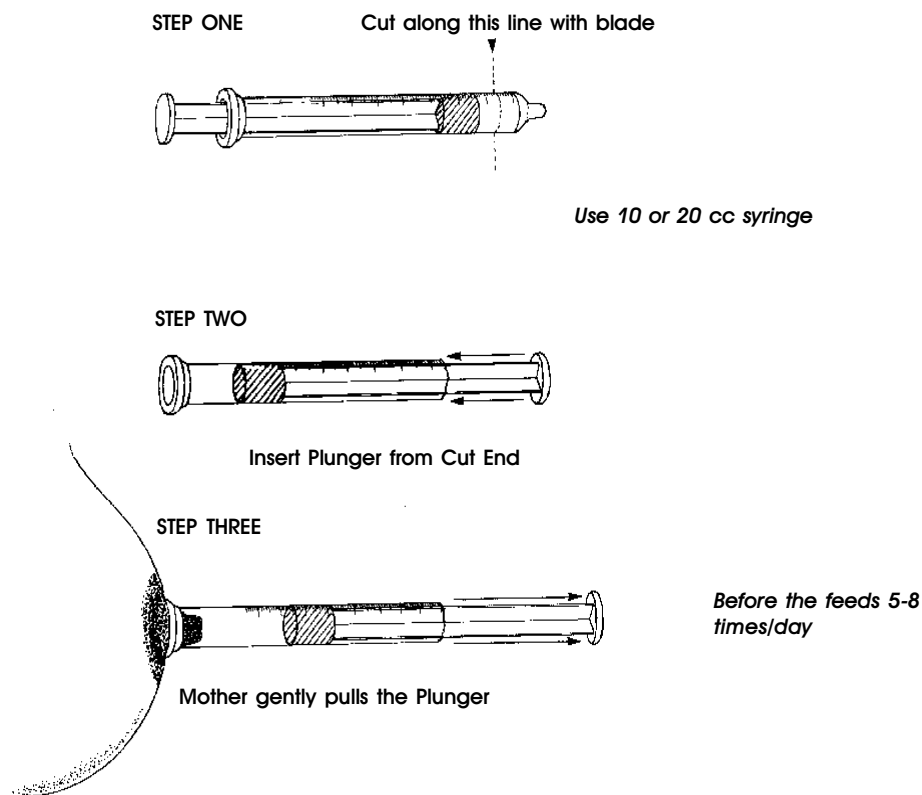
8. PROBLEMS IN BREASTFEEDING

8.1 *Inverted / flat nipples*

Flat or short nipples which protract well (become prominent or pull out easily) do not cause difficulty in breast feeding.

Inverted or retracted nipples make attachment to the breast difficult. They should be diagnosed in the antenatal period. These mothers need additional support to feed their babies.

Treatment is started after birth of the baby. Nipple is manually stretched and rolled out several times a day. A plastic syringe is used to draw out the nipple and the baby is then put to the breast.



Management of inverted nipple using syringe

8.2 *Sore nipples*

A sore nipple is caused by incorrect attachment of the baby to the breast. A baby who sucks only at the nipple does not get enough milk so he sucks more vigorously resulting in a sore nipple. Frequent washing with soap and





water, pulling the baby off the breast while he is still sucking may result in a sore nipple. Fungal infection of the nipple may be cause of sore nipple after first few weeks.

Treatment consists of correct positioning and attachment of the baby to the breast. Hind milk should be applied to the nipple after a feed and the nipples should be allowed to heal in between feeds.

Sore nipples

Causes

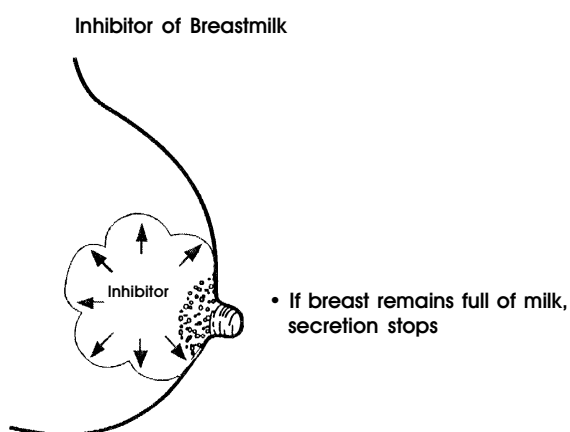
- Incorrect attachment: Nipple sucking.
- Frequent use of soap and water.
- Fungal infection of nipple.

Treatment

- Continue breastfeeding and change position.
- Attach baby to the areola while feeding.
- Apply hind milk to the nipple after breastfeed.
- Expose the nipple to air between feeds. Do not wash each time before and after feed.

8.3 Breast engorgement

The milk production increases during the second and third day after delivery. If feeding is delayed or infrequent, or the baby is not well positioned at the breast, the milk accumulates in the alveoli. As milk production increases, the amount of milk in the breast exceeds the capacity of the alveoli to store it comfortably. Such a breast becomes swollen, hard, warm and painful and is termed as an engorged breast.



Treatment: Breast engorgement can be prevented by early and frequent breast feeds and correct attachment of the baby to the breast. Treatment consists of local warm water packs. Paracetamol can be given to the mother to relieve pain. Gently express the milk to soften the breast and then help the mother to correctly latch the baby to the breast.





EXPRESSION OF BREAST MILK: Refer to module on procedures page

8.4 Breast abscess

If conditions like engorged breast, cracked nipple, blocked duct or mastitis are not treated early, then breast abscess may form. The mother may have high grade fever and pain in breast.

Treatment: Mother must be treated with analgesics and antibiotics. The abscess must be incised and drained. Breast feeding must be continued from the other breast.

8.5 Not enough milk

Mothers may complain that they do not have enough milk. One has to make sure that her perception about adequacy of milk is true. Reassurance is needed if baby is gaining weight and passing adequate amount of urine. Common causes of not enough milk include - not breastfeeding frequently, too short or hurried breastfeeds, poor position, breast engorgement or mastitis (see table given below).

REASONS WHY A BABY MAY NOT GET ENOUGH BREAST MILK

Breastfeeding factor	Mother: psychological factors	Mother physical condition	Baby's condition
<ul style="list-style-type: none"> • Delayed start • Feeding at fixed times • Infrequent feeds • No night feeds • Short feeds • Poor attachment • Use of bottles, pacifiers • Offering other fluids (water, tea) 	<ul style="list-style-type: none"> • Lack of confidence • Worries, stress • Unwilling for breastfeeding • Tiredness 	<ul style="list-style-type: none"> • Illness • Pain • Smoking 	<ul style="list-style-type: none"> • Illness

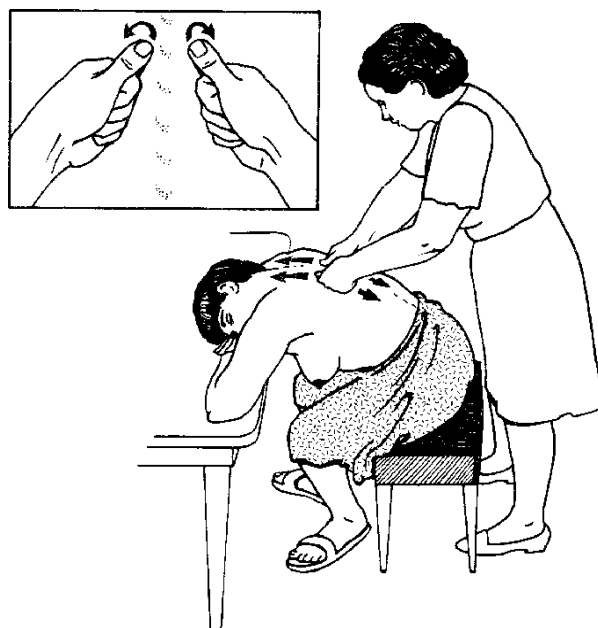
These do not affect the breast milk supply
<ul style="list-style-type: none"> • Age of mother • Sexual activity • Menstruation • Age of baby • Cesarean section • Preterm delivery • Simple, ordinary diet • Many children • Size of the breasts





Treatment: If baby is not gaining weight adequately, ask mother to feed the baby more frequently and feed especially during night. Make sure that attachment is proper. Any painful condition in mother such as sore nipple, mastitis should be taken care of. Back massages are especially useful for stimulating lactation, metoclopramide may also help in some cases.

A helper rubbing a mother's back to release her stress



Back massages are helpful in relaxation of mother thus stimulating hormone production. You should demonstrate the technique of massage to the relative who can provide it to the mother. Massage should be provided for 15-30 minutes, three-four times a day.

9. TEN STEPS TO SUCCESSFUL BREASTFEEDING

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half-hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they are separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated .
7. Practice rooming-in. Allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.





10. CONTRAINDICATIONS TO BREASTFEEDING

Mother can feed their babies in nearly all situations. There are indeed very few contraindications to breastfeeding as mentioned below:

1. HIV infection: Breastfeeding in such situation increases the risk of transmission of HIV infection to the baby. However if alternative milk is not safe, affordable, sustainable or feasible, exclusive breastfeeding is still the best option.
2. Mother on antimetabolic/anticancer/radioactive drug: In these situations, breastfeeding should be withheld for the period the mother is on the drug. Meanwhile she can express and discard the milk so as to maintain lactation. Mother can resume lactation after a certain period of cessation of the medication.





SELF EVALUATION

Let us see how much you have learnt

1. Causes of not enough milk in a primi-gravida mother include

2. What advice will you give to a mother who develops heaviness and pain in breast on third day after delivery?

3. How you will manage a mother with sore nipple?

4. What will you do for a mother who complains of insufficient milk production?

You will be given individual feedback after you have evaluated yourself





ROLE PLAY

Issues: Initiation of breastfeeding

Lata has delivered 4 hour back. Her baby is healthy and with the mother. Nurse comes to help her initiate breast feeding.

Checklist for demonstration roleplay

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____

Checklist for roleplay by participants

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____





11. FEEDING OF HEALTHY LBW BABIES

Feeding of LBW babies differs from that of normal birth weight babies. The low birth weight and preterm babies require higher calories and proteins. Milk of a mother who has delivered prematurely has a higher protein content and fulfills the requirements of her preterm baby. The higher level of immunoglobulins protect the baby from infections. These babies (especially those <1.8 kg) have difficulty in taking milk directly from breast and may require more help and ongoing monitoring.

11.1 Methods of feeding

For the first few days, a baby (usually one <1500 gm) may not be able to take any oral feeds. Oral feeds should begin as soon as the baby is stable.

Method of feeding LBW babies

- <1200 gm - Inform Doctor, baby may need IV fluids initially. Then initiate gavage feeding gradually.
- 1201-1500 gm - Intermittent gavage feeding, if stable.
- 1501-1800 gm - Paladai feeds; initiate breastfeeds gradually.
- >1800 gm - Breastfeed as normal birth weight babies but with monitoring.

Babies who are less than 1500 gm usually need to be fed by orogastric tube. Give expressed breastmilk by tube. One can try cup or spoon feeds once or twice a day while a baby is still having most of his feeds by tube. If he accepts well, one can reduce the number of tube feeds. The mother can let baby suck on her breast before she expresses milk to stimulate her lactation.

Babies between 1500-1800 gm are usually able to take feeds from paladai. Mother should be involved in care of baby and should be trained and supervised for paladai feeding.

Babies more than 1800 gm are able to feed on the breast. Let the mother put her baby to breast as soon as she is well enough. He may only root for the nipple and lick it at first, or he may suckle a little. Continue giving expressed breast milk by cup or spoon or tube, to make sure baby gets sufficient nutrition. These babies usually take what they need directly from the breast. Continue to follow babies up and weigh them regularly to make sure that they are getting all the breast milk they need.

- *LBW baby must have active rooting reflex if being offered spoon or breastfeed. Feeds should be supervised by nurse, if mother is feeding observe baby for tiredness after feeds.*
- *Feed breast milk.*

11.2 Procedure of paladai feeding

- Put the baby on breast for non-nutritive sucking.
- Place the baby in upright posture with cotton napkin around the neck to mop the spillage.
Take the required amount of expressed milk in the paladai / cup.
- Fill the paladai spoon with milk little short of the brim, place it at the lips of baby in the corner of the





mouth and let the milk flow into the baby's mouth without spill. Baby will actually swallow the milk. For spoon feeding small amount of milk should be poured directly into the side of the mouth.

- iv) Repeat the process until the required amount has been fed. If the baby do not actively accept and swallow the feed try to arouse the baby with gentle stimulation.

While estimating the intake, deduct the amount of milk spilled.

After feeding, the utensils should be washed thoroughly with soap and water. Boil for 10 minutes to sterilize before next feed.

Advantages

Simple and effective method to feed babies who are not able to suck directly at the breast.

Reduces risk of infection. This method has replaced bottle feeding in nurseries. The method is easy to follow and socially acceptable.





11.3 Why cup or spoon feeding is safer than bottle-feeding

- Cups are easy to clean with soap and water if boiling is not possible.
- Cups are less likely to get contaminated than bottle. Hence, use of cup is far better.
- Cup or spoon feeding is an active process. The person who feeds the baby involves himself and provides contact.
- A cup does not interfere with the suckling on the breast.





SELF EVALUATION

Let us see how much you have learnt

1. Describe best mode of feeding in following babies.

1080 gm: _____

1560 gm: _____

1996 gm: _____

2. When should we start feeds in a baby who is born with birth weight of 1180 gm and does not have any respiratory distress?

3. The best milk to be given by orogastric tube feeding is _____

4. Advantages of spoon feeding include _____

You will be given individual feedback after you have evaluated yourself.





ROLE PLAY ON "NOT ENOUGH MILK"

A common complaint of mothers in the postnatal ward is "Not enough milk". We shall perform a role play to address this problem.

Checklist for demonstration roleplay

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____

Checklist for roleplay by participants

A (Ask) _____

L (Listen) _____

P (Praise) _____

A (Advise) _____

C (Check understanding) _____





FREQUENTLY ASKED QUESTIONS (FAQs)

1. What should be done for cesarean born term babies?

2. Can a mother feed her baby lying down?

3. How many times should a baby be breastfed?

4. Can mother skip one or two night feeds?

Yes

No

5. Can a mother with twins exclusively breast feed her two babies?

Yes

No

6. Do we need to supplement water to an exclusively breastfed baby?

Yes

No

You may raise any additional questions





MODULE IV : NEONATAL RESUSCITATION

This module is designed for continuing education of nursing personnel for resuscitation of newborns in the delivery room. The same principles apply for resuscitation of a sick newborn and infants up to age of three months in the wards and nursery.

LEARNING OBJECTIVES

After completion of this module this module, you should be able to:

- Identify neonates who need routine care after birth
- Provide initial steps of resuscitation
- Demonstrate steps of resuscitation of an asphyxiated newborn
- Demonstrate use of bag and mask ventilation on the manikin
- Perform chest compressions
- Organise delivery room care for newborn

The components of the module include:

- **Text material:** Easy to read format for quick reproduction and essential reference material for the participants.
- **Demonstration:** Observing steps of resuscitation on the manikin.
- **Clinical skills:** Developing clinical skills on the manikin (return demonstration).
- **Case studies:** Plan out steps for a given case.
- **Self evaluation:** At the end of text, there will be a self evaluation based on what you have already learnt. Feel free to consult your text material or facilitator, if you need any assistance.

1. INTRODUCTION

Oxygen is important for every part of the human body. Without oxygen the cells that make up our organs, brain and other body parts will die. During pregnancy a baby receives oxygen from his mother through the placenta. After the baby is born, the baby starts to use his own lungs to get the oxygen he needs. For most babies this change happens without any problem. But some babies need help to start or continue breathing. The skill of newborn resuscitation gives that help.

About 5% - 10% of newborns need resuscitation. Nearly 1 million newborns die because of asphyxia (difficulty in breathing due to lack of oxygen). So for many babies newborn resuscitation can be life saving. In your role as a health provider, recognizing when a baby has breathing problems and using resuscitation skills when needed are essential to newborn care.

2. WHAT IS ASPHYXIA?

Asphyxia is failure of the baby to breathe spontaneously at birth. Asphyxia can start before or after the baby is born.





If the baby has asphyxia: 1) the baby has trouble in breathing (gasping or breathing very irregularly or no breathing), 2) the baby's color is pale or blue. This is when the skill of newborn resuscitation can save the life of the newborn.

3. WHICH BABIES ARE AT HIGHER RISK FOR ASPHYXIA?

Whole variety of conditions can predispose a baby to asphyxia. However, it is important to realize that you may not be able to predict it. Half of the babies with asphyxia do not have any risk factor at all.

Conditions predisposing baby to asphyxia

- **Mother:** Pregnancy Induced Hypertension, Bleeding (placenta previa or abruptio placentae), Prolonged or obstructed labor, fever in labor, post-term pregnancy (after 42 weeks pregnancy).
- **Umbilical cord:** Cord around the baby's neck, short cord, knot in the cord, prolapsed cord.
- **During or after birth:** Premature baby (before 37 weeks pregnancy), difficult delivery (breech, multiple birth, stuck shoulders, vacuum extraction, forceps), congenital or genetic anomalies, meconium in the amniotic fluid, mother had drugs given for pain or sedation very close to the time of birth (can make baby too sleepy to breath), baby has too much fluid in its mouth and throat.

Asphyxia can also happen in the womb when there is pressure on the umbilical cord so less blood flows through the cord to the baby.

4. PREPARATION FOR NEWBORN RESUSCITATION

When a baby has asphyxia, you must start resuscitation right away. If things are not prepared to do newborn resuscitation, much time can be lost before starting resuscitation. With this lost time a baby can become worse. Preparations should include having: warmth, place to do the resuscitation, and equipment and supplies.

4.1 Warmth

Keeping a newborn baby warm saves the baby's energy for breathing. There are many ways to keep a baby warm. If possible use all these methods:

- **Room:** Keep the room warm (at least 25° C) and keep it free from air currents.
- **Heat:** Use a radiant warmer or heater or 200 watt bulb above where the baby will be. Turn on heat source before the delivery and keep it on during the resuscitation. For babies needing routine care use skin to skin contact for providing warmth.
- **Dry the baby:** Dry immediately after birth and then remove the wet cloth and cover the baby with another warm dry sheet.

4.2 Resuscitation place

A flat surface is needed as the place to do the resuscitation. A table or trolley in the room or next to the mother can be used. It needs to be clean (see infection prevention in Module V) and warm.





NEONATAL RESUSCITATION SUPPLIES AND EQUIPMENT

Suction equipment

- De Lee Trap
- Mechanical suction
- Suction catheters, No. 12FG, 14FG
- Feeding tube 6F and 20-mL syringe

Bag and mask equipment

- Neonatal resuscitation bag
- Face masks, term and preterm sizes
- Oxygen with flowmeter and tubing

Intubation equipment

- Laryngoscope with straight blades, No. 0 (preterm) and No. 1 (term)
- Extra bulbs and batteries for laryngoscope
- Endotracheal tubes : 2.5, 3.0, 3.5, 4.0 mm internal diameter
- Scissors

Medications

- Epinephrine
- Naloxone hydrochloride
- Normal saline
- Sodium bicarbonate
- Sterile water

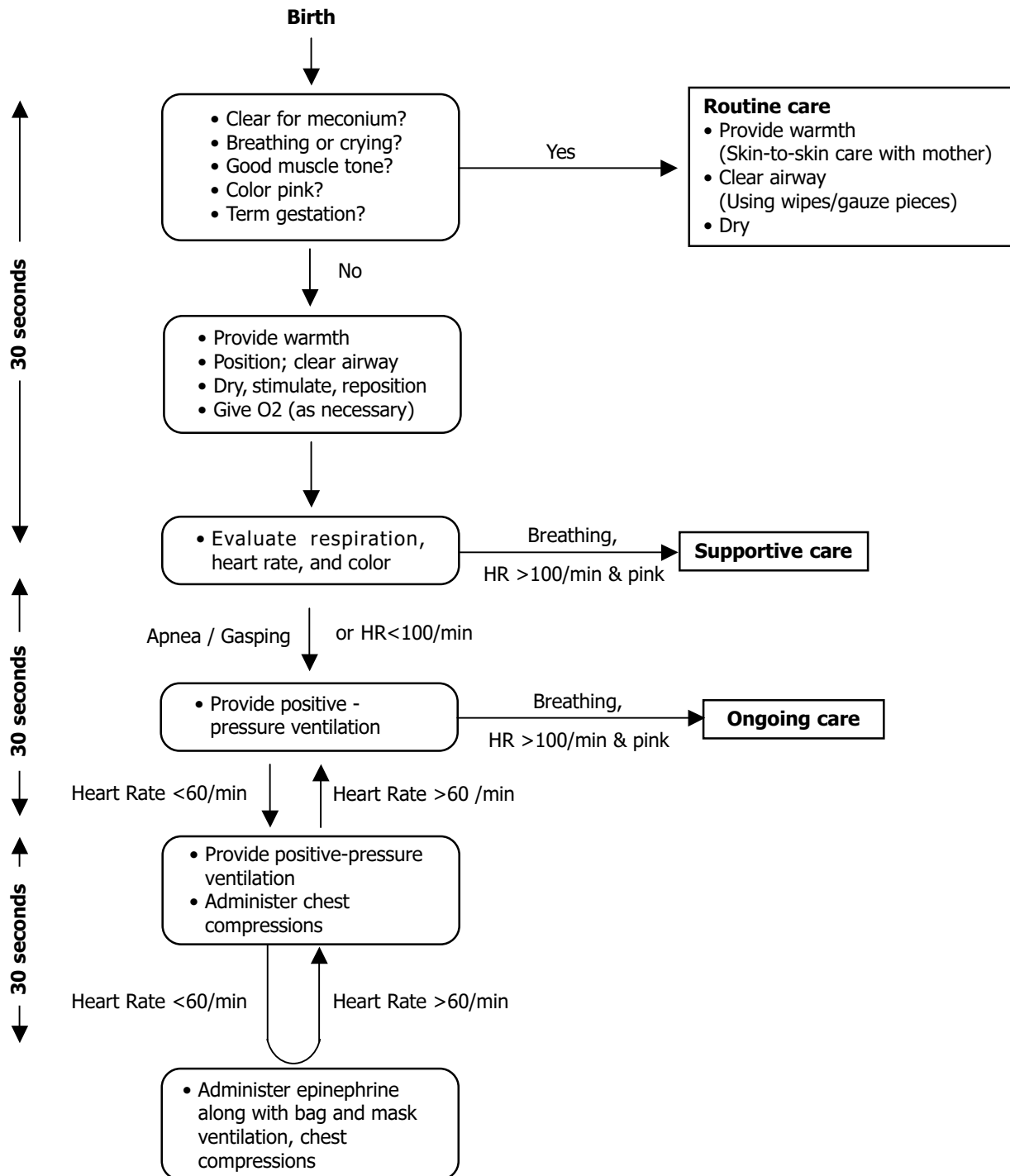
Miscellaneous

- Watch with seconds' hand
- Linen, Shoulder role
- Radiant warmer
- Stethoscope
- Adhesive tape
- Syringes 1, 2, 10, 20, 50ml
- Gauze pieces
- Umbilical catheters 3.5FG, 5FG
- Three-way stopcocks
- Sterile gloves





FLOW DIAGRAM FOR NEONATAL RESUSCITATION



This flow diagram describes resuscitation procedures. The diagram begins with the birth of the baby. Each resuscitation step is shown in a block. Below each block is a decision point to help you decide if you need to proceed to the next step.



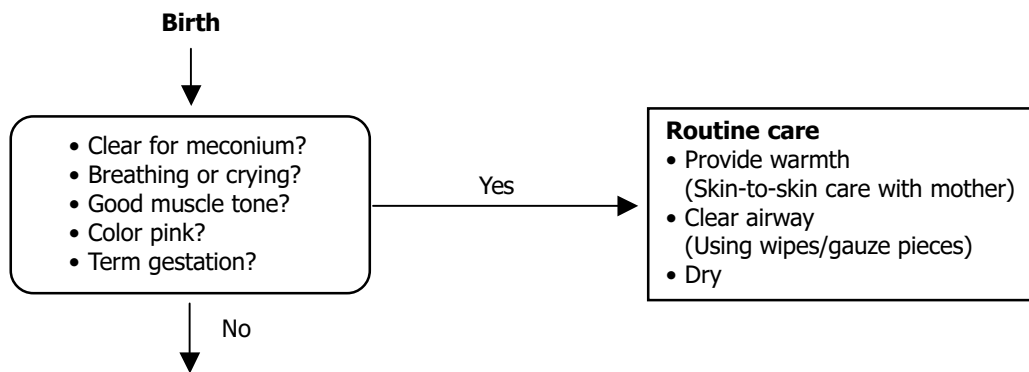


1. Routine Care

Nearly 90% of newborns are vigorous term babies with no risk factors and clear amniotic fluid. These babies do not need to be separated from their mothers to receive initial steps. Temperature can be maintained by putting the baby directly on the mother's chest, drying and covering with dry linen. Warmth is maintained by direct skin to skin contact. Clearing of the airway can be done by wiping the babies nose and mouth with sterile cloth.

Assess for the five questions (refer to algorithm)

If the answer is "No" to any of these questions, begin initial steps of resuscitation. Provide initial care (refer to algorithm) - Provide warmth, position, clear airway (as necessary), dry, stimulate, reposition and give O₂ (as necessary).



Maintain Asepsis
Resuscitation procedure should be undertaken with full aseptic precautions. Universal precautions against HIV infection should also be observed.





DEMONSTRATION

Facilitators will demonstrate the initial steps to be undertaken in the sequential fashion in a baby who needs initial steps using wall chart.

Routine Care

- Provide warmth
 - Drying
 - Skin-to-skin contact
- Clear airway (as necessary)

Initial Steps

- Provide warmth
 - Drying
 - Use heat source
- Clear airway
 - Positioning
 - Suctioning

Facilitators will show the correct and wrong methods of tactile stimulation in an apneic baby and method of providing free flow of oxygen in a cyanosed baby.





2. INITIAL STEPS

- 2.1 Preventing heat loss
- 2.2 Positioning
- 2.3 Suctioning
- 2.4 Evaluation
- 2.5 Tactile stimulation
- 2.6 Free flow oxygen

2.1 Preventing heat loss

To avoid the metabolic problems brought on by cold stress, an important step in the care of the newborn is to prevent the loss of body heat. This can be especially critical in a newborn who needs resuscitation. Even healthy term infants have a limited ability to produce heat when exposed to a cold environment, particularly during the first 12 hours of life.

Following steps are undertaken for preventing heat loss :

2.1.1 Drying the infant

As soon as an infant is placed under the radiant warmer, the body and head should be quickly dried to remove amniotic fluid and to prevent evaporative heat loss. It is preferable to dry the infant with a prewarmed towel or blanket. The next step is to remove the wet towel or blanket from the infant. After removing the wet linen, heat loss can be reduced even further by laying the infant on another prewarmed towel or blanket.

2.1.2 Using a radiant heat source/ other means to keep infant warm

An overhead radiant heater provides a suitable thermal environment that minimizes radiant heat loss. It is important to switch on the radiant warmer so that the infant is placed on a warm mattress. A radiant warmer allows easy access to the baby and provides full visualization of the infant. Initially, blankets and clothing should not be used to cover the infant because they limit the ability to observe him or her.

If radiant heat source is not available, a lamp with 200 W bulb or a suitably fixed room heater can be used.

2.2 Positioning



Correct position of the head for ventilation





The neonate should be placed on his or her back or side with the neck slightly extended, head towards the health provider assisting delivery. Care should be taken to prevent hyperextension or under flexion of the neck since either may decrease air entry. To help maintain the correct position, you may place a rolled blanket or towel under the shoulders, elevating them 3/4 to 1 inch. If the infant has copious secretions coming from the mouth, you may want to turn the head to the side. This will allow secretions to collect in the mouth, from where they can be easily removed.

2.3 Suctioning

If no meconium is present, the mouth and nose should be suctioned. The mouth is suctioned first to prevent aspiration which can happen if nose is suctioned first (Remember 'M' comes before 'N'). A mucus aspirator (trap) or mechanical suction can be used to remove secretions. Be careful not to be too vigorous as you suction and do not insert catheter deep in the mouth. Stimulation of the posterior pharynx during the first few minutes after birth can produce a vagal response, causing severe bradycardia or apnea. If bradycardia occurs stop suctioning and re-evaluate heart rate.

For suctioning, the size of suction catheter should be 10 Fr, The suction pressure should be set so that when the suction tubing is occluded, the negative pressure does not exceed 100 mm Hg. (130 cm water) and is generally kept around 80 mm Hg (100 cm water).

If meconium is present, use 12FG or 14 FG catheter for oral suction before the delivery of shoulder at table. Non-vigorous baby will need tracheal suction (skilled professional help is required), DO NOT DRY THE BABY JUST WRAP IN PREWARMED CLOTHES.

Inform skilled person for assistance in meconium stained amniotic fluid.

2.4 Evaluation

The infant should be evaluated on the basis of three vital signs :

- 1. Respiration:** Observe and evaluate the infant's respiration by observing the chest movement. Breathing is classified as SPONTANEOUS if baby is crying or has regular, effective respirations.
 - If breathing is spontaneous, go on to check the heart rate. If not, begin tactile stimulation (see below for details). If still no spontaneous respiration, start PPV (Positive Pressure Ventilation).
- 2. Heart rate:** This is done by auscultating the heart or by palpating the umbilical pulsations for 6 seconds. Whatever the number of beats/pulsations, it is multiplied by 10 to obtain the heart rate per minute. (e. g. a count of 12 in 6 seconds is a HR of 120/min).
 - If more than 100 beats per minute, look for color. If not, initiate PPV.
- 3. Color:** If the infant is breathing spontaneously and the heart rate is more than 100 beats per minute, evaluate the infant's color by looking for cyanosis at lips/tongue (central).
 - If central cyanosis is present, administer oxygen.

2.5 Providing tactile stimulation

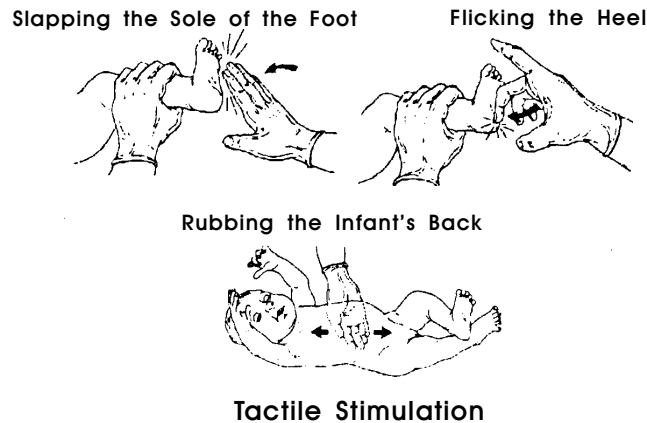
Both drying and suctioning the infant produce stimulation, which for many baby is enough to induce respirations.





However, if the infant does not have adequate respirations, additional tactile stimulation may be briefly provided to stimulate breathing. If you choose to provide tactile stimulation, free-flow oxygen should be given along with while you are stimulating the infant. There are two safe and appropriate methods of providing additional tactile stimulation:

- Slapping or flicking the soles of the feet
- Rubbing the infant's back



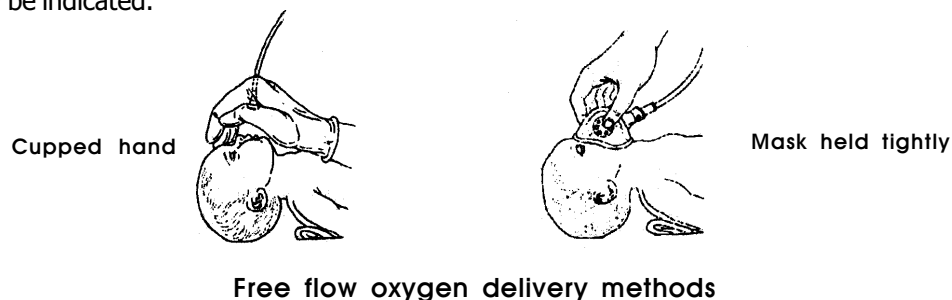
- One or two slaps or flicks to the soles of the feet or rubbing the back once or twice will usually stimulate breathing in an infant with apnea. However, if the infant remains apneic, tactile stimulation should be abandoned and bag and mask ventilation initiated immediately.
- Continued use of tactile stimulation in an infant who does not respond is not warranted and may be harmful, since valuable time is being wasted.

Harmful ways of stimulation

- Slapping in back
- Squeezing the rib cage
- Forcing thigh on abdomen
- Using hot or cold compress
- Shaking

2.6 Using free-flow oxygen

Free flow of oxygen is used when an infant has established regular respirations and the heart rate is greater than 100 beats per minute but central cyanosis persists. In these circumstances free-flow 100% oxygen at 5 L/min be given. Once the infant becomes pink, the oxygen should be gradually withdrawn. Observe the infant till he can remain pink while breathing room air. If cyanosis persists despite 100% free-flow oxygen, a trial of bag and mask ventilation may be indicated.



Free flow oxygen delivery methods





Free flow of oxygen is indicated for central cyanosis. This can be provided by

- *Oxygen mask held over the baby's face.*
- *Oxygen tubing cupped closely over the baby's mouth and nose*

Promptness and skill both are equally important. These initial steps should be done in no more than 20 to 30 seconds





SELF EVALUATION

1. A newborn who is breathing well, has pink color, and has no meconium in the amniotic fluid or on the skin will need _____ care but no initial steps.
2. When a suction catheter is used to clear the oropharynx of meconium before inserting an endotracheal tube, the appropriate size is _____ or _____.
3. In suctioning a baby's nose and mouth, the rule is to first suction the _____ and then the _____.

4. Correct ways of providing tactile stimulation

5. A 24-year-old woman enters the hospital in active labor at term. The membranes ruptured 1 hour before arrival, and the amniotic fluid was clear. The cervix dilates progressively and, after several hours, a baby girl is born vaginally in vertex presentation.

i. What preparations you will make until delivery occurs?

ii. What five questions you will ask to yourself once baby is delivered?
Is baby:

iii. What care will you provide if answer to all five questions is yes?

iv. What will you do if answer to any of the questions is no?

You will be given individual feedback after you have evaluated yourself.





DEMONSTRATION

Facilitator will demonstrate the parts of resuscitation bag, safety features, function and mechanism of increasing oxygen concentration using reservoir & types of masks.

Show the assembly and testing of Bag and Mask equipment using palm.

Show the procedure of Bag and Mask ventilation on the manikin.





3. BAG AND MASK VENTILATION

3.1 Equipment

3.2 Ventilation

3.1 Equipment

It is important that you become completely familiar with the specific equipment used where you work.

3.1.1. Self-inflating bag

The self-inflating bag is designed to inflate automatically as you release your grip on the bag. It does not require a compressed gas source to fill. You should be able to identify various parts of a self-inflating bag.

As the bag re-expands following compression, gas is drawn into the bag through a one-way valve that may be located at either end of the bag depending on the design. This valve is called the air inlet.

Every self-inflating bag has an oxygen inlet, which is usually located near the air inlet. The outlet is a small nipple or projection to which oxygen tubing can be attached when oxygen is needed.

The patient outlet is where gas exits from the bag to the infant and where the mask or ET tube attaches.

In many self-inflating bags, the valve assembly allows gas to flow from the bag through the patient outlet only while bag is being compressed. Since oxygen flow is not continuous, these bags cannot be used to provide free-flow oxygen.

An oxygen reservoir is an appliance that can be placed over the bag's air inlet. It helps in delivering a high concentration of oxygen to the baby and allows oxygen to be administered in a concentration as high as 90% to 100%.

A resuscitation bag used in neonatal resuscitation has a safety mechanism in the form of a pressure release valve to guard against inadvertent transmission of excess pressure to the baby's lungs. Pressure release valves on self-inflating bags are generally set to release at 30 to 40 cm H₂O. If pressures greater than 30 to 40 cm H₂O are generated as the bag is compressed, the valve opens, limiting the pressure being transmitted to the lungs of infant. The ideal size of the bag for neonates is 240 to 500ml capacity.

3.1.2. Resuscitation masks

Masks come in a variety of shapes, sizes and materials. Resuscitation masks should have cushioned rim for

Fitting mask over face

Right size and position of mask



Right

Mask head too low



Wrong

Mask too small



Wrong

Mask too Large



Wrong



better seal. The rim conforms more easily to the shape of the infant's face, making it easier to form a seal. It requires less pressure on the infant's face to obtain a seal. There is less chance of damaging the infant's eyes if the mask is correctly positioned. Masks come in several sizes. Masks suitable for small, premature infants as well as for term infants should be available for use. For the mask to be of correct size, the rim will cover tip of the chin, the mouth and the nose but not the eyes.

3.1.3 Assembling equipment

The bag should be assembled and connected to oxygen so that it will provide the necessary 90% to 100%. If a self-inflating bag is used, be sure the oxygen reservoir is attached. Connect the mask to the bag.

3.1.4 Testing equipment

To check a self-inflating bag, block the mask or patient outlet by making an airtight seal with the palm of your hand. Then squeeze the bag:

- Do you feel pressure against you hand?
- Can you force the pressure-release valve open?
- Is the valve assembly present and moving as it should?

If not :

- Is there a crack or leak in the bag?
- Is the pressure-release valve missing or stuck or closed?
- Is the patient outlet completely blocked?

If your bag generates adequate pressure and the safety features are working, while the mask-patient outlet is blocked, check to see :

- Does the bag re-inflate quickly when you release your grip?

3.2.1 Preparation

The need for possible resuscitation of a neonate should be anticipated.

Bag -mask ventilation may be attempted in the spontaneously breathing infant who remains cyanotic despite administration of 100% free-flow oxygen.

Bag and mask ventilation is indicated if after tactile stimulation:

- The infant is apneic or gasping*
- Respiration is spontaneous but heart rate is below 100 beats per minute.*

In diaphragmatic hernia, bag and mask ventilation is contraindicated. In meconium stained non-vigorous baby bag and mask ventilation is carried out after tracheal suction (skilled professional is required).

Non vigorous baby: Presence of any one of three signs - limp, cyanotic, HR<100/mt



3.2.4 Select equipment

The first step is to select the appropriate equipment:

- Obtain a resuscitation bag with oxygen reservoir and connect it to any oxygen source.
- Select a mask of the proper size.
- Quickly check the bag to be sure it functions properly (if you did not do so previously).

3.2.5 Position mask and obtain seal

The infant's neck should be slightly extended to ensure an open airway.

Place the mask in position and check the seal by ventilating two or three times. Observe for an appropriate rise of the chest.



If chest does not rise:

Action	Condition corrected
1. Reapply mask	Inadequate seal
2. Reposition infant's head	Blocked airway
3. Check for secretions, suction if present	Blocked airway
4. Ventilate with mouth slightly open	Blocked airway
5. Increase pressure slightly	Inadequate pressure

If chest does not rise, get a new bag, check it, and try again.

Normal Rise: When a normal rise of the chest is observed, begin ventilating.

3.2.6 Ventilate the infant

Rate: 40 to 60 breaths per minute.

Pressure: The best guide to adequate pressure during bag and mask ventilation is an easy rise and fall of the chest with each breath. Usual pressure required for the first breath is 30-40 cm of water. For subsequent breaths, pressures of 15-20 cm of water are adequate.





3.2.7 Check heart rate

After the infant received 30 seconds of ventilation with 100% oxygen, check the heart rate. Is the heart rate below 60, between 60 to 100, or above 100 beats per minute?

Heart Rate	Action
Above 100	If spontaneous respirations are present, monitor heart rate, respiration, and color. If not breathing or if gasping, continue ventilation
60 to 100	Continue ventilation
Below 60	Continue to ventilate Begin chest compressions

3.2.8 Signs of improvement

Three signs indicate improvement in the condition of an infant undergoing resuscitation:

- Increasing heart rate
- Spontaneous respirations
- Improving color





SELF EVALUATION

1. List the two indications for positive pressure ventilation.

2. When selecting a face mask, make sure that the rim covers the tip of the _____, then _____, and the _____ but does not cover the eyes.

3. Compress the bag enough to cause a visible chest expansion at the rate of _____/ minute.

4. You are using a self inflating bag to ventilate a baby. The bag fills after every squeeze. But the baby's chest is not rising. List 3 reasons

i. _____

ii. _____

iii. _____

6. A 20-year-old woman with pregnancy-induced hypertension has labor induced at 37 weeks gestation. Several late fetal bradycardia (heart rate <100/mt) rate are noted, but labor progresses quickly, and a baby girl is delivered rapidly.

She is taken to the radiant warmer, where the resuscitation team finds her to be apneic, limp, and cyanotic. She is appropriately positioned to open her airway, while her mouth and nose are cleared of secretions with a bulb syringe. She is dried with warmed towels, wet linen is removed, her head is repositioned and further attempts to stimulate her to breath are provided by flicking the soles of her feet.

No spontaneous respirations are noted even after tactile stimulation and bag and mask ventilation is started.

i. What are indications in this case of bag and mask ventilation?

ii. How will you know that bag and mask ventilation is effective?

iii. During bag and mask ventilation if there is no chest rise what are possible reasons?

iv. Enumerate corrective measures you will undertake to ensure adequate chest rise?

You will be given individual feedback after you have evaluated yourself.





4. CHEST COMPRESSIONS

The heart circulates blood throughout the body, delivering oxygen to vital organs. When an infant becomes hypoxic, the heart rate slows and myocardial contractility decreases. As a result, there is a diminished flow of blood and oxygen to the vital organs. The decreased supply of oxygen can lead to irreversible damage to the brain, heart, kidneys and bowel. Chest compressions are used to temporarily increase circulation and oxygen delivery.

Chest compressions must always be accompanied by ventilation with 100% oxygen. Ventilation must be performed to ensure that the blood being circulated during chest compressions gets oxygenated.

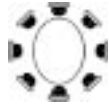
5. ENDOTRACHEAL INTUBATION

Endotracheal (ET) intubation is required in only a small proportion of asphyxiated neonates. Intubation is a relatively more difficult skill to master and it requires frequent practice to maintain this skill.

Babies requiring chest compressions, intubation and medications often need presence of skilled healthcare provider (Doctor).

Every healthcare provider need to undergo neonatal resuscitation course on periodic basis so as to be aware of correct evidence based practice guidelines.





GROUP DISCUSSION - CASE STUDY

Veena, 22 years old primi admitted with labour pains. She delivered a full term female baby. Baby did not cry immediately after birth.

Q1. What are the initial steps you take in resuscitation?

Q2. After wiping the baby, positioning and cleaning the mouth and nose, there is no spontaneous respiration. How do you continue resuscitation?

Q3. After giving effective bag and mask ventilation for 30 seconds, what signs you evaluate in the baby?

Q4. There is no spontaneous breathing. HR is 5 in 6 sec. What do you do?

Q5. After 30 sec. of bag and mask ventilation with chest compression, HR is 4 in 6 sec. What do you do next?

You will be given individual feedback after you have evaluated yourself.





VIDEO

There will be video film on neonatal resuscitation.

1. Following aspects were shown:

- i. _____
- ii. _____
- iii. _____

2. Comments on video

Good aspects	Need improvement
_____	_____
_____	_____

3. Following aspects were highlighted:

- | | |
|--|--------|
| i. Routine care | Yes/No |
| ii. Initial steps | Yes/No |
| iii. Bag and mask equipments | Yes/No |
| iv. Testing of bag and mask equipments | Yes/No |
| v. Procedure of bag and mask ventilation | Yes/No |





MODULE V : PREVENTION OF INFECTION

This module is designed for inservice orientation and continuing education of nursing personnel involved in the care of newborn babies in the hospital.

LEARNING OBJECTIVES

After completing this module, you should be able to:

- Enumerate key points which prevent infection in the hospital.
- Enumerate six steps of effective hand washing.
- Refer to housekeeping and disinfection routines for the hospital.
- Learn waste disposal in the hospital.
- Plan surveillance for infection.

Module contents

The module includes following elements:

- **Text material** : Easy to read format for quick reproduction and essential reference material for the participant.
- **Demonstration**: Observing nursing routines for asepsis (house keeping, disinfectant use).
- **Skills**: Practising skills in hospital setting.
- **Self evaluation**: At the end of text evaluation, based on what you have already learnt. Feel free to consult your test material, if you need assistance in recapitulating.
- **Video film**: Learn asepsis routines for prevention of infection and hospital waste disposal in baby care area.

Sepsis is the most important cause of neonatal death in hospital. Every hospital should establish its own detailed policies to prevent infection of newborn in the baby care area.

Normally the newborn is free from harmful organisms for initial few hours after birth. Staff working in hospitals tend to transmit organisms during routine procedures, thus leading to colonization of organisms on surrounding skin of the abdomen, the perineum, groins and respiratory tract.

Prevention of infection is more cost effective than treating infection in neonates

1. ASEPSIS BASICS

Basic requirements for asepsis in a baby care area

- Running water supply
- Soap
- Elbow or foot operated taps
- Strict hand washing
- Avoid overcrowding, optimal number of nurses for care of more babies
- Plenty of disposables
- Rational antibiotic policy
- Obsession with good housekeeping and asepsis routines



Guidelines for ENTRY into the baby care area

- Remove shoes, socks, woollens, watch, bangles, rings. Roll up the full sleeves upto elbow.
- Put on new slippers, wash hands with soap and water for 2 minutes (follow six steps of hand washing).
- Put on sterile half sleeve gown.

Policy regarding VISITORS

- Only parents of the babies should be allowed entry into the nursery.
- Mothers are welcome at any time, they can come every 2 to 3 hours to the baby care area.
- Fathers should be allowed at the time of admission to the nursery, after stabilizing the baby, during hospital visiting hours 4 to 6 pm or when the newborn is sick. Father should be allowed especially after the rounds or at a convenient time in the unit (This policy can be framed in consultation with your pediatrician).
- Parents should be guided and supervised about proper handwashing technique.

Personnel with active infection should not be allowed entry into the baby care area

Sterile gloves

- Always use sterile gloves for invasive procedures like sampling, starting intravenous lines, giving intravenous injections etc.
- Wash gloved hands to remove the blood stains and secretions. Remove gloves and put in the polar bleach bucket. Wash hands again with soap and water.
- Used gloves should be cleaned, dried, powdered and packed in a paper (e.g. a piece of newspaper) for re-autoclaving. Adequate number of pairs should be prepared every day. One can use disposable gloves, if available.

Full sleeve gown and masks

- Use them for all invasive procedures e.g. lumbar puncture, blood exchange transfusion etc.

Other basics

- Keep separate spirit and betadine swab containers, stethoscope, tape measure and thermometer for each baby.
- Change intravenous sets daily or as per set routine.
- Feeding tubes as long as baby can keep.
- Do not keep FOMITES e.g. files, X-ray films, pens etc. on the baby cot.
- Change antiseptic solution in SUCTION BOTTLES and sterile water in oxygen humidification chambers everyday, and sterilize the bottles/chambers daily by dipping in 2% glutaraldehyde for 4 to 6 hours.

Nursery environment

- The nursery temperature should be maintained between 28-30° C.
- The environment should be calm and clean.
- Ensure 24 hours water and electricity supply with adequate lighting and ventilation.
- Over crowding should be avoided.
- Floor should be cleaned with diluted phenyl once in each nursing shift and as and when required. No dry mopping, only wet cleaning should be done.
- Clean the walls with 2% of bacillocid once in each nursing shift.
- Dustbin should be washed daily with soap and water, polythene should be changed daily or whenever full.



2. HAND WASHING

- It is the single MOST IMPORTANT means of preventing nosocomial infections.
- It is VERY SIMPLE.
- It is CHEAP.

Handwashing norm

- 2 MINUTES, handwashing (6 steps) to be done before entering the unit. 20 seconds handwashing to be done before and after touching babies.

Steps of effective handwashing

- Roll sleeves above elbow
- Remove wrist watch, bangles, rings etc.
- Using plain water and soap, wash parts of the hand in the following sequence:
 1. Palms and fingers and web spaces
 2. Back of hands
 3. Fingers and knuckles
 4. Thumbs
 5. Finger tips
 6. Wrists and forearm upto elbow

Once you have washed your hands, do not touch anything e.g. hair, pen or any fomite till you carry out the required job.

- Keep elbows always dependent, i.e. lower than your hands.
- Close the tap with elbow.
- Dry hands using single-use sterile napkin or autoclaved newspaper pieces.
- Discard napkin in the bin kept for the purpose, if newspaper pieces-in the black bucket.
- Do not keep long or polished nails.



(1) The palms and fingers



(2) The back of hands



(3) Wash fingers & knuckles



(4) The thumbs



(5) The finger tips



(6) The wrists & arms upto elbows

Remember - Rinsing hands with alcohol is NOT A SUBSTITUTE for proper hand washing before entering the unit





3. SKIN PREPARATION FOR INSERTION OF IV CANNULA, VENEPUNCTURE AND OTHER PROCEDURES

Skin preparation is an important part of asepsis routines. It should be performed meticulously to avoid entry of pathogens during insertion of IV cannula, pricks or procedure. Always wear sterile gloves after 2 minutes of thorough hand washing.

Procedure

1. Wash and dry hands.
2. Wear sterile gloves.
3. Prepare skin site, confine to smallest possible area of skin.
4. Swab with alcohol first, allow it to dry.
5. Swab iodine on site and allow it to dry.
6. Swab again with alcohol to wipe off iodine, allow it to dry.
7. Skin is now ready for puncture or prick.

4. OTHER RECOMMENDATIONS

- Never use stock IV fluids. Do not use a single dextrose/saline bottle for >24 hours.
- There should be separate IV fluid bottle for each baby.
- Label the bottle with date and time of opening.
- After seal is removed, first clean with spirit swabs, then use Betadine soaked sterile cotton to cover the stopper of the bottle.
- Change the burette set every 24 hour or as per policy of your unit.
- Use syrups within 1 week of opening, write the opening date.
- Antibiotics vials to be changed after 24 hrs. e.g. injections Ampicillin and Cefotaxime.
- There is no need for flushing with heparinised saline to keep the IV line patent.
- Use separate IV line for giving antibiotics (do not open the IV fluid line for giving injections).

Strict housekeeping routines for disinfection

There should be a written policy guidelines (in the form of a manual) for cleaning of floors, walls, articles, equipment and fumigation of the unit.





SELF EVALUATION

Let us see how much you have learnt about prevention of infection

1. Basic requirements for asepsis in baby care area include:

2. Single **Most Important, Very Simple** and **Cheap** method for prevention of infection in baby care area is

3. The key features of good hand washing technique include:
 - a. _____ steps

 - a. _____ minutes hand washing before entering the newborn care area.

 - b. _____ seconds hand washing in between and after touching the baby.

4. Sterile gloves should be worn for the following procedures (Enumerate any three).

5. What are the steps of skin preparation for IV cannula insertion or needle prick?

You will be given individual feedback after you have completed the exercise.





ORAL DRILL

Facilitator will conduct a drill on

- a. Indications of disinfectant and germicide use.
- b. House keeping and disinfection routines.



**DISINFECTANTS AND GERMICIDES**

Name	Indication for use	Direction for use and special consideration
Bacillocid spray (2%)	<ul style="list-style-type: none"> • Walls of nursery • Incubators & warmers (when not in use) • Surface of weighing machine 	<ul style="list-style-type: none"> • Prepare solution as per instruction of manufacturer • Put off air conditioners at the time of spray
Cidex (2%) (Glutaraldehyde)	<ul style="list-style-type: none"> • Oxygen / suction tubings • Face mask & Ambu bag • Reservoir 	<p>Before immersing into cidex, clean thoroughly with soap and water</p> <p>Time of contact (once prepared, solution is active for 14 days)</p> <ul style="list-style-type: none"> • For sterilization : 4-6 hours • For disinfection : 15 mins
Formalin (40%)	Fumigation of nursery	Routine fumigation: 30 ml formalin with 90 ml water per 1000 cubic feet area. Nursery is to be sealed properly. Switch off AC and seal AC duct. Take desired amount of formalin and water in the OT care. Switch on the machine for half an hour. Open and clean the nursery after 6 hrs.
Sodium hypochlorite (bleach)	Sharps / needles and disposables	Keep the solution covered, change it every 24 hours
Spirit	Skin preparation, cleaning laryngoscopes blades, tape measures stethoscope	Do not use to clean incubators and warmers
Soap and water	Oxygen hood, feeding utensils, swab containers, injection tray, face mask, buckets	After washing in soap and water, boil the feeding utensils for 10 min
Phenyl	Cleaning floors	
Betadine	Skin preparation	



HOUSE KEEPING AND DISINFECTION ROUTINES**A.**

Name	Disinfection method	Frequency & other consideration
Floors	Phenyl	Once in each shift No dry sweeping Use wet mopping only Do not use cidex
Walls	2% Bacillocid	Once in each shift
Fans	Clea with wet clean cloth	Once a week
Window AC	Surface and filters to be washed with soap and water	Once a week
Refrigerator	Defrost and clean with soap and water	Once a week
Buckets	Soap and water	Daily in the morning shift
Sinks	Vim, surf and teepol	Daily in morning shift or as required

B.

Name	Disinfection method	Frequency & other considerations
Baby linen, blanket, blanket cover	Wash and autoclave	Use autoclaved linen each time
Cotton gauze	Autoclave	As required. Every time use autoclaved cotton
Feeding utensils (paladay, spoon & katories etc.)	Wash with soap and water and then boil for 10 minutes	Before each use
Swab container, injection and medicine tray	Wash with soap and water / autoclave	Daily morning shift. Use separate swab containers for each baby
Sets for procedures	Autoclave	After each use. Every 72 hours if not used
Cheattle forceps	Autoclave	Daily. Put in sterile autoclaved bottle containing dry sterile cotton
Steel drums	Autoclave	After use and every 48 hrs.

C.

Name	Disinfection method	Frequency & other consideration
Stethoscope, measuring tape, thermometer, BP cuffs, probes of • radiant warmer/incubator • pulse oximeter	Clean with spirit swab	Daily
Laryngoscope	Clean with spirit swabs thoroughly daily and after each use. Wrap in autoclaved cloth, put date on cover	Never put in cidex. If used for an infected baby, wash with soap and water, blade after removing bulb can be put in 2% cidex, wash thoroughly, dry and wrap in an autoclaved linen, put the date
Syringe pumps	Clean with wet clean cloth. If blood stained use soap and water	Daily in morning shift In each shift, if possible
Oxygen hood	Wash with soap and water	Daily in morning shift. Dry with autoclaved linen
Face mask	Clean with soap and water, immerse in Cidex for 20 min, rinse in distilled / running water, dry with autoclaved linen and wrap in autoclaved linen and put date	Daily and after each use
Resuscitation bag and reservoirs, oxygen tubings, bottle and tubings of suction machine	Clean with detergent/soap and water after dismantling. Immerse in cidex for 4-6 hours. Rinse in distilled water. Dry, wrap in autoclaved linen and put a date	Weekly resuscitation bag and reservoir. Daily for others
Weighing machine	Wipe with 2% Bacillocid	Daily in morning shift and when required
Radiant warmer & Incubator	Clean with soap water daily, if occupied. If not occupied, clean with 2% Bacillocid	Daily
Pulse oximeter, Phototherapy units	Wet mop with plain water	Daily

5. SURVEILLANCE

• What is surveillance ?

- It is the monitoring of infections in the unit by conducting periodic surveys in order to identify unusual pattern of flora and infections.
- It also includes monitoring of antibiotic use and resistance, whereby positive culture are reviewed every 4-6 months and based on which antibiotic policy of the unit is revised, if necessary.

• How frequently should surveillance be carried out? What all should be cultured?

- Room air weekly.
- Surfaces (viz. laminar flow, warmer, incubator, trolleys) weekly.
- Equipment (viz. laryngoscopes, AMBU bags, mask, stethoscopes, oxygen hoods, B.P. cuffs) weekly.

• Liquids (viz water in humidifier bottles) twice weekly

Babies

- Blood / CSF culture whenever indicated.
- Pus cultures whenever present.
- Personnel: hands, nasal, throat, swabs as required.

Terminal disinfection

Terminal disinfection is done after transferring out, discharge or death of a baby. Preferably all items of the baby to be kept in the incubator and fumigated with 40% formalin (grossly infected baby). Otherwise one can just do the routine cleaning thoroughly.

Primary nurse assignment

Primary nurse is one who receives the baby in the nursery. She should be assigned that baby in each shift, whenever she is on duty. She should discuss with the parents, the condition of the baby from the time of the admission till discharge. Parents will also have more confidence on that nurse.

Assignment in the NICU and nursery: Baby should be assigned to the nurses, seeing the total number of babies, sick babies, stable babies and the number of nurses present on duty in each shift. It helps the babies as well as the nurses and helps in the prevention of infection also.

Parents role: Parents are the part and parcel of newborn care team. They should be informed every morning and evening about the condition of the baby. They should be trained and supervised about the asepsis routines of the unit. Mother is welcome any time in nursery except during the rounds when the discussions are on, or caring for a very serious newborn.

Mother should be involved fully in the care of her baby. She should come in and look at her baby. If baby is stable, she can lift her baby, keep him in her lap, give breast feeds, or give katori spoon feed. She can help in changing napkin. She should be counselled regularly regarding.

- Her doubts/queries.
- How to look after the baby in special care room/at home.
- Risk factors and identification of signs of illness.



- Prognosis of the baby.
- Follow up.

Setting of a bed: Keep a warm bed ready for the new admission.

- Clean the radiant warmer with soap water/Bacillocid.
- Use autoclaved linen.
- Keep oxygen hood and source of oxygen ready.
- Keep suction machine, suction catheter ready.
- Keep supplies for initiating I.V. line ready.
- Keep the following articles near the warmer for exclusive use of each baby:
 1. Spirit swab container.
 2. Betadine swab container.
 3. Thermometer (clinical).
 4. Stethoscope.
 5. Tape measure.
 6. Micropore tape for fixing lines / probes.





DEMONSTRATION

There will be demonstration by facilitator on safe disposal of hospital waste using demonstration aid.





6. SAFE DISPOSAL OF HOSPITAL WASTE

Proper disposal of hospital waste is important to keep the environment clean. To keep the environment clean, in each unit of ward, the waste should be disposed off in a proper way.

The following are different colour drums with different color polythene for different type of waste, to be disposed off in a different way.

Black drums / Bags

Left over food, fruits feeds, vegetables, waste paper, packing material, empty box, bags etc. This waste is disposed off by routine municipal council committee machinery.

Yellow drums / Bags

Infected non-plastic waste

Human anatomical waste, blood, body fluids, placenta etc. This type of waste requires incineration.

Blue drums / Bags

Infected plastic waste

Used disposable syringes, needles (first destroy the needle in the needle destroyer).

Used sharps, blade and broken glass etc. Patients IV set, BT set, ET tube, catheter, urine bag etc. should be cut into pieces and disposed in blue bag. This waste will be autoclaved to make it non-infectious. This is then shredded and disposed off.





SELF EVALUATION

1. Indicate the bucket you will use for following wastes:

- Paper towel after use _____
- Soiled nappy of the baby _____
- Used disposable syringe _____

2. How do you sterilize the following:

- Thermometer _____
- Ambu bag _____
- Cheattle forceps _____
- Probe of pulse oximeter _____
- Oxygen tubing _____
- Stethoscope _____

3. B/o Rajkumari is a 32 wk preterm baby with birth weight of 1.3 kg. The baby is 2 days old now. Mother is now recovered from her delivery problems and wants to help you in baby's work, what are the areas you would like to involve the mother?

1. _____
2. _____
3. _____
4. _____

You will be given individual feedback after you have completed the exercise.





There will be a video demonstration on asepsis routines for prevention of infection in baby care area followed by a group discussion.

1. Following aspects of infection prevention were shown

- i. _____
- ii. _____
- iii. _____
- iv. _____
- vi. _____

2. Comments on video

Good aspects

Need improvement

3. Video covered

- | | |
|---|--------|
| i. Demonstrated six steps hand washing | Yes/No |
| ii. Demonstrated guidelines for hospital waste disposal | Yes/No |
| iii. Steps for skin preparation for IV insertion | Yes/No |
| iv. House keeping routines for baby care area | Yes/No |





FREQUENTLY ASKED QUESTIONS (FAQ'S)

1. Do we need to wear mask and cap before entering baby care area?

2. Can we use distilled / boiled water for preparation of skin for IV insertion?

3. Do I need to wash hands before I wear gloves for doing procedure on sick neonate?

4. Can a mother be allowed to enter baby care area? Does it increase chances of infection?





MODULE VI : COMMON PROCEDURES

This module is designed to complement your skills for management of sick newborn in hospital.

LEARNING OBJECTIVE

- Learn appropriate method of IM injection and preparation of common medications.
- Record weight and temperature of a newborn.
- Initiate oxygen therapy and intravenous access.
- Learn insertion of feeding tube and administration of expressed breastmilk through it.
- Organize safe transport of sick neonate.

Module contents

The module includes following elements

- **Text material:** Easy to read text material for the participants. Key messages are highlighted in boxes.
- **Clinical skills:** Practicing skills of initiation of tube feeding, oxygen therapy and oropharyngeal suction on actual case scenarios in hospital setting.
- **Demonstration:** Observing steps involved in preparation of medication, administering IM injection, manual expression of breastmilk.
- **Video film:** Learn ideal way for common procedures required for management of sick newborn in hospital.
- **Self-evaluation:** At the end of text self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

1. INTRAMUSCULAR INJECTION

Purpose

For administration of vitamin K, vaccines and antibiotics.

Objective

The learner will be able to

- Identify the purpose of intramuscular injections.
- Locate the site for intramuscular injections.
- Know how to give the intramuscular injection.

Point to remember

Do not use gluteal region for intramuscular injections in newborn, the reason being inadvertent injury to sciatic nerve resulting in paralysis of the limb.



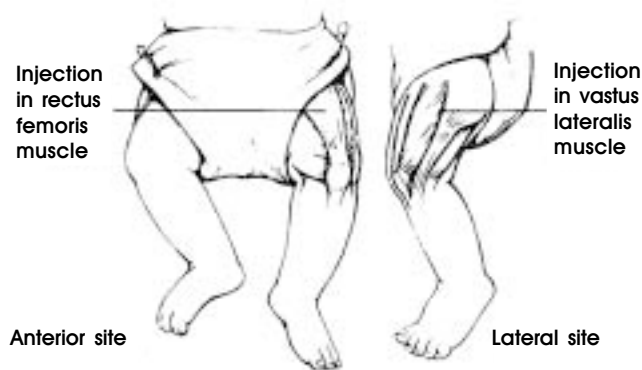


Equipment

Disposable or sterile glass syringe with needle size 24 or 26 G
Cotton swabs
Alcohol / spirit

Procedure

- Follow asepsis routine and universal precautions.
- Attach needle and load syringe with the required accurate dose.
- Attach fresh needle.
- Restrain the baby.
- Expose the thigh and identify injection site (lateral side of the thigh).



- Cleanse with alcohol and wipe.
- Grasp the muscle between thumb and finger of your hand and introduce the needle of the loaded syringe at right angles into the middle of vastus lateralis muscle.
- Aspirate the syringe to rule out that the needle is not in a blood vessel (if blood is aspirated take out the needle and prick again at another site).
- Inject the required amount of medication.
- Withdraw the needle.
- Press with dry cotton.

Demonstration

One of participants will demonstrate on a manikin the procedure of IM injection of vitamin K 1 mg.

2. COMMONLY USED MEDICATIONS

General principles

- Administer only medications you have prepared or verified.
- Give medications from legibly labelled containers.
- Check all medications for expiry date and discard all expired drugs.
- Be careful to ensure correct dose.





- Always get the calculation counter checked by another person and initial it.
- Always document the procedure immediately after administering the medication.
- Protocols of the commonly used drugs with doses, side effects, contraindications, and routes of administration should be available in the nursery.

Procedure

1. Check for the written order of the physician.
2. Observe the five rights for administering medications.
 - Right patient
 - Right drug
 - Right dose
 - Right route
 - Right time
3. Read the label of the medication carefully before loading the drug and confirm once again.
4. Use disposable / sterile glass syringe and needles for administering drugs.
5. Give all intravenous drugs slowly.
6. Follow the aseptic technique i.e. skin preparation / clean the IV cannula with spirit, betadine, spirit swab.
7. Document in the chart.

The commonly used drugs in the nursery are presented here in alphabetical order based on their generic names.

Simple formula for calculation of drug amount

$$\frac{\text{Desired strength of x quantity}}{\text{Strength of drug}} = \text{amount}$$

Adrenaline (Epinephrine)	
Presentation	1 mg/ml (1:1000 concentration)
Uses	As a part of newborn resuscitation Cardio-pulmonary resuscitation
Dosage	0.1-0.3 ml/kg/dose of 1:10,000 dilution, repeat every 3-5 minute, if necessary
Route	Intravenous or endotracheal route (For endotracheal route, refer to newborn resuscitation)
Directions for use	Take 0.1 ml in syringe. Dilute it with 0.9 ml to make with water for injection (10 times dilution). The resultant concentration is 1:10,000 solution.



**Aminophylline**

Presentation	Injection 250 mg in 10 ml ampoules
Uses	Apnea of prematurity
Dosage	Loading dose: 5.0-8.0 mg/kg IV Maintenance: 1-2 mg/kg/dose q 8 hourly IV, PO
Directions for use	250 mg/10 ml vial Take 0.1 ml of solution in 1 ml syringe. Dilute with 0.9 ml to make 1 ml with water for injection. Resultant concentration is 2.5 mg/ml. Administer required dose IV over 20 minutes.
Compatible	With 5% dextrose, normal saline, ringer lactate
Incompatible	Sodium bicarbonate
Caution	Never give intramuscular

Ampicillin

Presentation	Injection 100, 250 & 500 mg vials
Dosage	50-100 mg/kg/day divided q 8-12 hourly IV, IM Meningitis: 100-200 mg/kg/day divide q 6-8 hourly IV
Directions for use	250 mg vial Add 2.5 ml water for injection. Resultant concentration 50 mg/ml. Administer the required quantity IV slowly.
Stability	Use prepared solutions within 4 hours.
Compatible	Normal saline, ringer lactate
Incompatible	Dextrose solution, sodium bicarbonate



**Calcium Gluconate**

Presentation	9 mg/ml
Uses	Treatment of low blood calcium level
Dosage	1-2 ml/kg/dose every 6-8 hourly
Route	Intravenous route (infusion or bolus)
Directions for use	<ol style="list-style-type: none">1. To be diluted in equal amount of distilled water.2. Inject very slowly while monitoring heart rate. If there is bradycardia discontinue the injection.3. Take care to avoid extravasation, if being given as infusion - as it may cause sloughing of skin.

Gentamicin

Presentation	Injection 80 mg, 40 mg and 20 mg/2 ml
Dosage	Conventional <7 days 2.5 mg/kg/dose q 12 hourly IV, IM >7 days 2.5 mg/kg/dose q 8 hourly IV, IM Single dose Preterm: 4 mg/kg/dose 24 hourly IV, IM Term: 5 mg/kg/dose 24 hourly IV, IM
Direction for use	20 mg/1 ml (40 mg/2ml) Take 0.1 ml and dilute with 0.9 ml with water for injection to make 1 ml Resultant concentration is 2 mg/ml.
Compatible	With 5% dextrose, normal saline
Incompatible	Sodium bicarbonate, heparin, chloramphenicol



**Phenobarbitone**

Presentation	Injection 200 mg/ml 1 ml ampoules
Uses	Neonatal seizures
Dosage	Loading dose: 15-20 mg/kg IV Maintenance: 3-5 mg/kg/day IV, PO in 1-2 divided doses
Direction for use	200 mg/1ml Take 0.1 ml of solution and dilute with 0.9 ml of water for injection to make 1 ml. Resultant concentration is 20 mg/ml. Give required amount slowly over 15-20 minutes.
Caution	May cause respiratory arrest

Phenytoin

Presentation	Injection 100 mg/2 ml
Dosage	Loading dose 15-20 mg/kg IV
Direction for use	Dilute in normal saline and give slowly at a rate 1 mg/kg/min infusion.
Compatible	Normal saline only
Incompatible	With all other solutions
Caution	After giving, flush the cannula with saline to prevent phlebitis. Do not use cloudy solutions.

Demonstration

One participant will be asked to prepare desired strength of a common medication while others will observe the steps. Facilitator will conduct discussion on the steps of procedure.





3. FIXATION OF INTRAVENOUS CANNULA

Purpose

- Fluid therapy
- Stabilization of sick newborn
- Intravenous medication
- Infusion of blood products

Equipments

- Scalp vein set / cannula 24G
- Syringe
- Normal saline
- Cotton
- Alcohol, iodine
- Splint
- Tape, scissor

Procedure

- Intravenous access should be initiated by the physician, nurse is expected to
 - Prepare all materials.
 - Help in identification of suitable vein.
 - Assist in immobilization i.e., taping and splinting.
 - Connect intravenous fluid and monitor infusion rate.
 - Administer IV medications.
 - Remove cannula after use.
- Assist physician by holding the extremity and making the vein prominently visible and easy to cannulate.
- Secure cannula after insertion with tapes. Keep visibility of cannula tip area above skin insertion. This allows early detection of extravasation (see figure). Use splint to immobilize joint.
- Attach intravenous infusion line.
- Document timing of intravenous access and medications given.
- Monitoring**
 - Infusion flow rate.
 - Leaking from cannula site / connection.
 - Extravasation (swelling, redness).
 - Blockage (non-passage of fluid / medication).
- Saline Locking**

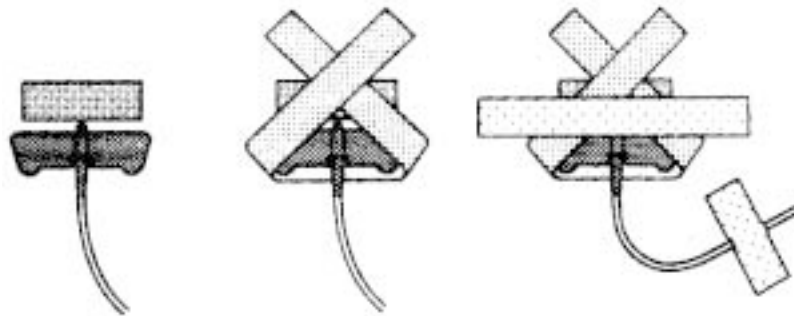
To allow periodic intravenous administration of drugs when continuous IV administration of fluids is not necessary.

 - Remove cap (keep on sterile area) and flush 0.4 ml normal saline to ensure patency.
 - Administer medication.





- c) Flush again with 0.4 ml normal saline.
- d) Replace cap.



Method to securely fix the scalp vein set

Demonstration

Your facilitator will show you the method of fixation of intravenous line using a model.

4. OXYGEN THERAPY BY HOOD

Purpose

To relieve hypoxia in a neonate.

Who needs oxygen?

Baby with respiratory distress, grunting, central cyanosis, pallor, cold extremities with poor pulses, sick look.

Pulse oximeter saturation <90%.

Arterial blood gas pO₂ <60.

Equipment

Mandatory

- Hood
- Tubings
- O₂ supply
- Flow meter

Desired

- Humidification device

Procedure

- i) Inform physician.
- ii) Place neonate in hood, (use shoulder roll, if necessary).
- iii) Do not seal space between infant's neck and hood.
- iv) Initiate oxygen flow of at least 5 litre/min from flow meter.
- vi) Monitor baby for respiratory rate, distress and colour.





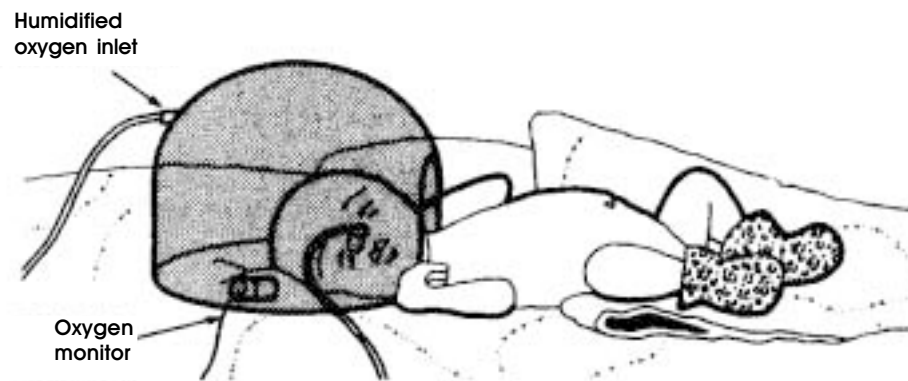
- vi) Remove hood in case of accidental disruption of O₂ supply.
- vii) Continue oxygen therapy during transfer to higher level of care.

Points to emphasize

- a) To be used only if necessary and in appropriate quantity.
- b) Oxygen adds to fire hazard, take care.

Monitoring

Monitor saturations (maintain between 90-93) by a oximeter, if available. Else give just enough oxygen to abolish the cyanosis.



Oxygen therapy with oxygenhood

5. INSERTION OF FEEDING TUBE

Purpose

To insert tube for infants who

- Are unable to feed orally and need continuous or intermittent gavage feeding
- Require gastric decompression
- Require gastric lavage

Indications

Neonates who cannot feed orally e.g. preterm LBWs, neurologically depressed or surgical neonates.

Equipment

Feeding tube 8 French size for babies >2000g
 5-6 French size for babies <2000g

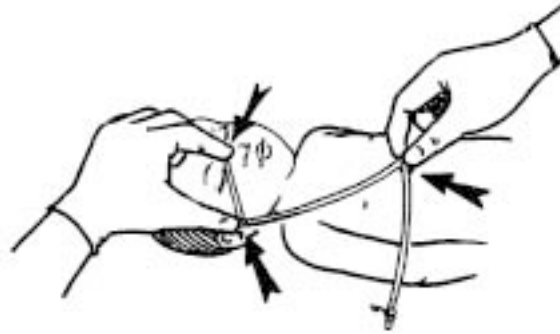
Appropriate size syringe
Stethoscope
Scissors, tape





Procedure

- i) Wash hands thoroughly.
- ii) Position baby on right side or in a supine position with head elevated. Baby may also be held in a sitting position in parent's or nurse's arms.
- iii) Open the feeding tube package and starting at the tip of the tube, measure from the bridge of the nose to the tip of the ear lobe down to the tip of the xiphoid process.



Measuring length of nasogastric tube

- iv) Mark the tube with tape or maintain measurement with thumb and finger, as this indicates the approximate distance the tube must be passed to enter the stomach.
- v) To insert an oral gastric tube:
 - Hold the feeding tube 1" - 2" from the tip.
 - Use the natural bend of the tube to follow the natural curves of the mouth and throat.
 - Insert the tube in the mouth and towards the back of the throat, gently pushing it down the esophagus until it reaches the pre-measured mark on the tube.

Note: Use sterile distilled water or preferably expressed breast milk (EBM) to lubricate. Do not use oil or paraffin to lubricate the tube.



Fixation of nasogastric tube

- vi) Establish correct placement of the feeding tube by either of the following methods:
 - Connect the syringe to other end of feeding tube and gently aspirate stomach contents. It may be necessary to advance or withdraw the tube slightly from its original position. Note the amount, color and appearance of the aspirate. This aspirate is usually fed again.





- Disconnect syringe from the feeding tube and draw up 2 cc air. Reconnect the syringe to the tube. Inject the air into the stomach while auscultating. You should hear the air enter the stomach. Gently aspirate air before commencing feed.
- vii) Observe baby for choking, gasping or cyanosis during insertion of tube. Withdraw tube immediately if baby appears to be in any distress. Tape the tube in place or always keep one hand on the tube at the pre-measured mark to prevent the tube from slipping.

Points of emphasis

- Pass the gastric tube gently so as to avoid trauma.
- Passage of the gastric tube may lead to stimulation of vagal nerve resulting in apnea or bradycardia. If this occurs tactile stimulation will assist the infant to breathe.
- Let milk flow under gravity.
- Pinch tube while filling syringe.
- Feed slowly.
- Pinch tube during removal.

6. EXPRESSION OF BREASTMILK

Remember hand expression is the most useful way to express milk. It needs no appliance, so a woman can do it anywhere, at any time. It is easy to hand express when the breasts are soft. It is more difficult when the breasts are engorged and tender. So teach a mother how to express her milk in the first or second day after delivery. Do not wait until the third day, when her breasts are full.

A mother should express her own breastmilk. The breasts are easily hurt if another person tries to do so. If you are showing a mother how to express, show her on your own body as much as possible, while she copies you. If you need to touch her to show her exactly where to press breasts, be very gentle.

How to prepare a container for expressed breastmilk (EBM)

- Choose a cup, glass, jug or jar with a wide mouth.
- Wash the cup in soap and water (she can do this before hand)
- Pour boiling water into the cup, and leave it for a few minutes. Boiling water will kill most of the germs.
- When ready to express milk, pour the water out of the cup.

Massaging breast before expression of milk

It is helpful to do simple massage before expression of milk.

- i) Take a wet warm towel and wrap the breast in it. Let it be there for 5 min.
- ii) With two fingers, massage the breast using circular motion of fingers. Use pulp of fingers only with modest pressure. Alternately she can use knuckles of a fist. Massage the breast towards nipple as if kneading dough. Massage should not hurt her.
- iii) Provide massage for 5-10 minutes on each breast before expression of milk.

How to express breastmilk by hand

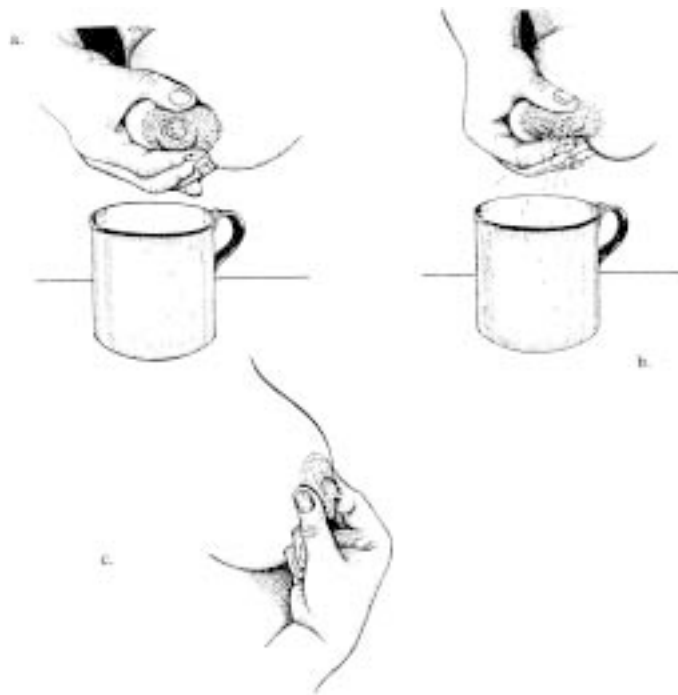
Teach a mother to do this herself. Do not express the milk for her. Touch her only to show her what to do, and be gentle.





Teach her to:

- Wash her hands thoroughly
- Sit or stand comfortably, and hold the container near her breast.
- She should think lovingly of the baby or look at a picture of her baby.
- Put her thumb on her breast ABOVE the nipple and areola, and her first finger on the breast BELOW the nipple and areola, opposite the thumb. She supports the breast with her other fingers (See Fig. 7).
- Press her thumb and first finger slightly inward towards the chest wall. She should avoid pressing too far or she may block the milk ducts.
- Press her breast behind the nipple and areola between her finger and thumb. She must press on the lactiferous sinuses beneath the areola. Sometimes in a lactating breast it is possible to feel the sinuses. They are like pods, or peanuts. If she can feel them, she can press on them.
- Press and release, press and release
This should not hurt-if it hurts, the technique is wrong.
At first no milk may come, but after pressing a few times, milk starts to drip out. It may flow in streams if the oxytocin reflex is active.
- Press the areola in the same way from the SIDES, to make sure that milk is expressed from all segments of the breast.
- Avoid rubbing or sliding her fingers along the skin. The movement of the fingers should be more like rolling.
- Avoid squeezing the nipple itself. Pressing or pulling the nipple cannot express the milk. It is the same as the baby sucking only the nipple.
- Express one breast for at least 3-5 minutes until the flow slows; then express the other side; and then repeat both sides. She can use either hand for either breast, and change when they tire.
- Explain that to express breastmilk adequately takes 20-30 minutes, especially in the first few days when only a little milk may be produced. It is important not to try to express in a shorter time.



Method of Expression of Breastmilk





- How often should she express milk - 6 to 8 times / daily.
It depends on the reason for expressing the milk, but usually as often as the baby would breastfeed.
- To establish lactation, to feed a low-birth-weight (LBW) or sick newborn
 - *She should start to express milk on the first day, within six hours of delivery if possible.* She may only express a few drops of colostrum at first, but it helps breastmilk production to begin, in the same way that a baby sucking soon after delivery helps breastmilk production to begin.
 - *She should express as much as she can as often as her baby would breastfeed.* This should be at least every 3 hours, including during the night. If she express only a few times, or if there are long intervals between expressions, she may not be able to produce enough milk.
- To sustain her milk supply to feed a sick baby:
She should express at least every 3 hours.
- To build up her milk supply, if it seems to be decreasing after a few weeks:
Express very often for a few days (every ½ - 1 hours), and at least every 3 hours during the night.
- To leave milk for a baby while she is out at work:
Express as much as possible before she goes to work, to leave for her baby. It is also very important to express while at work to help keep up her supply.
- To relieve symptoms, such as engorgement, or leaking at work:
Express only as much as is necessary.
- To keep nipple skin healthy
Express a small drop to rub on nipple after a bath or shower.

Demonstration

Facilitator will demonstrate expression of breast milk using a breast model.

7. TEMPERATURE RECORDING

Purpose

Newborn babies grow better if their core body temperature stays in normal range (36.5 - 37.5° C). A rise or drop in body temperature increases the metabolism and both calorie and oxygen consumption.

Indications

- All new admissions to Nursery-sick newborn and LBW babies.
- To diagnose hypothermia / hyperthermia.

Equipment

- Clinical thermometer or.
- Skin probe of the incubator / radiant warmer.



Procedure

- i. Skin:** Attach the probe to the skin preferably over the upper part of abdomen in supine and the flank in prone position. This site is chosen as variation of temperature is minimal and the surface is hot. This site is used for continuous recording of temperature under warmer or incubator.
- ii. Axillary:** Ensure that the axilla is dry. Place the bulb against the roof of the axilla. Tip of the thermometer should be in axilla. Hold the baby's arm firmly against the chest wall to keep thermometer in place parallel to the chest wall for three minutes. This site is used for routine temperature monitoring of normal and sick newborns.
- iii. Rectal:** Take clean rectal thermometer. Lubricate it with paraffin, hold the lower limbs of the baby off the couch. Insert the thermometer backwards and upwards for 2 cm in a preterm and 3 cm in a term baby. Hold both the buttocks together for 2 min. Take out the thermometer and clean it with dry cotton and take the reading. Clean thermometer again thoroughly first using soap swab then dry and clean again using spirit swab.

**To convert Celsius (centigrade) reading to Fahrenheit, multiply by 1.8 and add 32. To convert Fahrenheit readings to Celsius, subtract 32 and divide by 1.8*

Point of emphasis

- Axillary temperature should be checked at least once every 6-8 hours to see that it coincides with the temperature shown on the panel of the warmer or incubator. Babies under warmers require more frequent monitoring of temperature.
- Ordinary clinical thermometer is different from rectal thermometer. Rectal thermometer has a short and thick bulb.
- Each baby should have a separate thermometer.
- Disinfect thermometer with alcohol after use, keep thermometer dry and not in any disinfectant solution.

8. WEIGHT RECORDING

Weight record is essential to monitor the adequacy of nutrition as well as fluid balance. Recording of weight at birth and daily is essential for the management of VLBW babies. This procedure helps the nurses in identifying the level of care required for the baby.

Objective

- To demonstrate how to weigh the baby.
- To understand the significance of the weight recording of a baby.

Procedure

- Put the weighing scale on a flat, stable surface.
- Put a clean warm towel/cloth on the scale pan. Zero the scale, if the machine has the facility or record the weight of the towel.



- iii) Detach as many tubes/equipment as possible. Keep the naked baby on the towel and record the weight (subtract the weight of the towel if the scale has not been zeroed with the towel on the scale) up to the least count of the machine.
- iv) Keep baby in middle of scale pan.
- v) Use separate sterile towel for each baby.
- vi) If using pre-weighed splint, reduce the weight of splint from the baby's weight.
- vii) For quality assurance, check accuracy of weighing scale with standard known weights every 2 weeks.

A weighing scale can be employed to measure the urine output of the babies. Preweighed nappies should be used for nursing babies. Weighing the nappies post urination would be helpful in assessing the urine output of sick babies. Weighing a baby pre and post feed is helpful in assessing adequacy of breast feeding for newborn.

Point of emphasis

- Record weight prior to feeding.
- Accurate daily weighing would be helpful in avoiding complication due to under or over hydration. Excessive weight gain would raise suspicion of fluid overload or of heart failure/renal failure. If baby loses or gains 3% or more of body weight in a day, it should be brought to the notice of the physician.
- For monitoring of weight, one should use the same weighing scale.

9. OROPHARYNGEAL SUCTION

Suctioning is used to remove secretions from the oral and nosopharyngeal area to ensure airway patency.

Objectives

The learner will be able to:

- Identify the purpose of the suction.
- Understand the indications for suctioning of a non-intubated neonate.
- State the important points one need to keep in mind while undertaking suctioning.
- Know the maximum suctioning pressure.

Purpose

- Removal of secretions from the oral and nasopharyngeal area of the non-intubated neonate using catheter to ensure airway patency.
- To prevent aspiration of oral secretions.

Indications

- Presence of oral and/or nasal secretions in an infant unable to clear them on his own.
- Prior to bag and mask ventilation and endotracheal intubation.
- Presence of milk in airways.
- After chest physiotherapy.

Equipment

- Catheter – FG 5 or 6 for preterm; FG 8 for term babies with thumb control or Y connector.
- Portable machine suction or wall suctioning with tubing.
- Gloves.
- Distilled/boiled water.



Procedure Rationale

- i) Attach appropriate size catheter to suction tubing and insert catheter into sterile water.
- ii) Occlude catheter completely and set pressure on suction at 100 mm of Hg (130 cm of water).
- iii) Estimate length of the catheter to be inserted by measuring from the tip of the nose to the tip of the ear lobe.
- iv) Gently insert catheter to the measured distance from the mouth. During insertion keep catheter pinched or keep suction machine off.
- v) Apply suction only upon withdrawal of catheter. Limit attempts to 3-5 seconds or less.
- vi) Rinse catheter in sterile water before applying suction and between suction attempts.
- vii) Gently insert catheter into one nare and apply suction. Then repeat on other side.

Note: Insert suction catheter gently upwards and back into the nares. If the catheter is difficult to pass, try with a smaller catheter. It is not necessary to pass a catheter completely through the nares to clear secretions (this may cause trauma). Applying suction to the external nares is often sufficient.

- viii) After suctioning, reposition the infant.
- ix) Discard catheter after single use.

Point of emphasis

Avoid suctioning for 30 minutes to 1 hour after feeding, unless it is necessary to establish a patent airway.

- Suction only when necessary. Routine suctioning increases risk of vaso-vagal response which can lead to bradycardia and apnea.
- Do not exceed suction pressure of 100 mm of Hg (130 cm of water).
- Oxygen source and bag and mask should be available at beside during suctioning.
- Change the suction bottle and tubing every day to minimize bacterial colonization with pathogenic organisms.

10. TRANSPORT OF NEONATES

Purpose

Appropriate care during transport of sick newborn to higher level of care improves survival and outcome.

Components

- i) Stabilization prior to transport.
- ii) Communication with parents, referral unit.
- iii) Preparation.
- iv) Maintenance of "Warm Chain".
- v) Prevention of Hypoglycemia.
- vi) Maintenance of airway and oxygenation.
- vii) Instructions to accompanying family members about danger signs.

*Decide about doctor, nurse to accompany.

Equipment

- Appropriate clothing for baby (cotton sheets/plastic sheet, cap, woolen blanket).
- Thermometer, thermocol / card board box.
- Cotton.



- Nasogastric tube
- Mucus suction catheter
- Oxygen source and nasal cannula (if needed)
- Resuscitation bag

Procedure

i) Stabilize prior to transport

- Warm the baby till hands and feet are warm to touch.
- Suction the airway if essential.
- Aspirate gastric contents.
- Oxygenate if needed.
- Medications as per physician's order (Normal saline, Dextrose, Vitamin K, Antibiotics, Phenobarbitone, Epinephrine).

Appropriate stabilization of baby before transport is essential

ii) Communication

- Explain condition and reasons for transport to family.
- Communication with referral unit regarding condition of baby, approximate time of arrival, working diagnosis, what has already been done etc.
- Arrange for referral note mentioning reasons for transfer, medications given along with dose and timings
- Communication to accompanying family members regarding need for transport, position of baby, clearing secretions, gentle stimulation and other instructions as applicable.



**iii) Methods**

Aim	Technique
A Prevents Hypothermia	(i) Warm baby before transport. (ii) Change soiled nappy and linen. (iii) Warm clothing (cover fully with cotton clothes) or cover head, wrap in blanket, include plastic sheet wrap between layers of clothing (if available) (iv) Other alternatives are <ul style="list-style-type: none">• Skin-to-skin contact with mother/ accompanying person• Use of thermocol / cardboard box with holes for ventilation (v) Do not use hot water bottles.
B Prevent Hypoglycemia	(i) Gavage feed / IV dextrose bolus prior to transport. (confirm with physician) followed by a constant drip. (ii) Instruct regarding feeding during transport. (iii) 'Quick' transport. (iv) Prevent hypothermia.
C Prevent hypoxia	(i) Oxygenate before transport. (ii) Clear airway. (iii) Consider use of oxygen cylinder with nasal cannula or mask during transport. (iv) Instruct regarding gentle handling. (v) Instruct regarding gentle stimulation / clearing secretions / position during transport.





MODULE VII : MANAGEMENT OF NORMAL, AT RISK AND SICK NEONATE

This module is designed for continuing education of nursing personnel to categorize and plan care for 'normal', 'at-risk' and 'sick' neonates.

LEARNING OBJECTIVES

You will learn in this module

- Components of essential care for normal newborns.
- Characteristics of 'at-risk' and 'sick' neonate.
- Principles of management of 'normal', 'at risk' and 'sick' neonate.
- Steps for safe and stable transport of sick neonate.

Module contents

The module includes following elements

- **Text material:** Easy to read text material for the participants. Key messages are highlighted in the box.
- **Oral drill:** You will learn categorization of neonates as 'normal', 'at risk' and 'sick'.
- **Skill demonstration:** Practicing skills in hospital setting for managing at risk and sick neonates.
- **Self evaluation:** At the end of text, self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

A normal newborn weighs more than 2500 grams, cries lustily at birth, has warm trunk and soles to touch (temperature 36.5-37.5° C), pink in colour (no central cyanosis) with spontaneous body movements and actively sucks on breast.

Basic needs for any newborn include breathing, warmth, cleanliness, feeding mothers milk. All newborn require essential newborn care to minimize the risk of illness and maximize their growth and development. Clearly, essential care of the newborn will prevent many newborn emergencies. For example, the umbilical cord may be the most common source of neonatal sepsis and also of tetanus infection, and good cord care could dramatically reduce the risks of these serious conditions. Breastfeeding has a significant protective effect against infections. Early breastfeeding and the baby kept close to the mother reduces the risk of hypothermia, as well as hypoglycemia.

Cleanliness at delivery reduces the risk of infection for the mother and baby, especially neonatal sepsis and tetanus. Cleanliness requires mothers, families, and health professionals to avoid harmful traditional practices, and prepare necessary materials. Hand washing is the single most important behavior to emphasize for both family members and health care workers.





THE COMPONENTS OF ESSENTIAL CARE FOR NORMAL NEWBORN ARE

1. CLEAN CHAIN

1.1 Clean delivery (WHO six cleans)

- Clean attendant's hands (washed with soap).
 - Clean delivery surface.
 - Clean cord- cutting instrument (i.e. razor, blade).
 - Clean string to tie cord.
 - Clean cloth to wrap the baby.
 - Clean cloth to wrap the mother.
- (A clean birth kit may help promote clean deliveries).

1.2 After delivery

- All caregivers should wash hands before handling the baby.
- Feed only breast milk.
- Keep the cord clean and dry.
- Use a clean cloth as a diaper/napkin.
- Wash your hands after changing diaper/napkin.

2. WARM CHAIN

2.1 At delivery

- Ensure the delivery room is warm (25° C), with no draughts.
- Dry the baby immediately, remove the wet cloth.
- Wrap the baby with clean dry cloth.
- Keep the baby close to the mother (ideally skin-to-skin) to stimulate early breastfeeding.
- Postpone bathing for 6 hours.

2.2 After delivery

- Keep the baby clothed and wrapped with the head covered.
- Minimize bathing, especially in cool weather or for small babies.
- Keep the baby close to the mother.
- Use kangaroo care for stable LBW babies or for rewarming stable bigger babies.
- Show the mother how to avoid hypothermia, how to recognize it, and how to rewarm a cold baby. The mother should aim to ensure that the baby's feet are warm to touch.

3. BREAST FEEDING

3.1 Early breastfeeding = breastfeeding within the first hour, with counseling for correct positioning.

- Early breastfeeding reduces the risk of postpartum hemorrhage for the mother.
- Colostrum (the "first milk") has many benefits for the baby, especially anti-infective properties.
- Skin to skin contact while feeding helps the baby to stay warm.
- The full milk supply will start more quickly and more milk will be produced in the long-term.





3.2 Exclusive breastfeeding = breast milk alone for the first 6 months

- Breastfeeding delays the mother's return to fertility because of lactational amenorrhoea.
- Breastfeeding provides the best possible nutrition for the baby.
- Feed day and night, at least 8 times in 24 hours, allowing on-demand sucking by the baby.
- If the baby is small (less than 2,500 grams), wake the baby to feed every 3 hours.
- If the baby is not feeding well, seek help.
- Successful breastfeeding requires support for the mother from the family and health institutions.
- There is no need for extra bottle feeds or water for normal babies, even in hot climates
- Exposing the baby to water increases the likelihood of infections, especially diarrhea.
- Supplementing water reduces the effectiveness of breast milk in preventing infections and providing nutrition.

4. CORD CARE

Do's

- Cut the cord with a clean instrument (i.e., razor blade).
- Tie the cord tightly with clean thread or use a cord clamp.
- Keep the cord clean and dry and wash hands before touching it.
- Tie napkin or diaper below the cord stump.
- Apply gentian violet or an iodine compound, which may be beneficial in some settings, especially if it is an alternative to harmful local practices.

Don't

- Bandages are unnecessary and may delay healing and introduce infection.
- Alcohol cleansing may delay healing.
- Applying traditional remedies to the cord may cause infections and tetanus.

Watch out for

- Pus discharge from the cord stump.
- Redness around the cord especially if there is swelling.
- High temperature (more than 38°C) or other signs of infection.

5. SKIN CARE

Do's

- Leave vernix on the skin
- Change diapers soon after they are wet or dirty.
- Ensure that caregivers wash their hands before handling the baby.

Don't

- Rubbing vernix off vigorously can damage the skin.

Watch out for

- Pustules especially in axilla, groin and neck.
- Other signs of severe infection such as fever and poor feeding.





6. EYE CARE

Do's

- Clean eyes immediately after birth with swab soaked in sterile water using separate swab for each eye. Clean from medial to lateral side.
- Give prophylactic eye drops within 1 hour of birth as per hospital policy.

Don't

- Putting anything else in baby's eyes can cause infection.

Watch out for

- Discharge from the eyes, especially with redness and swelling around the eyes.
- Other signs of severe infection, such as fever (greater than 38°C) and poor feeding.





SELF EVALUATION

Let us see how much you have learnt about essential newborn care.

1. Component of essential newborn care include

_____	_____
_____	_____

2. Six cleans at time of delivery are

_____	_____
_____	_____
_____	_____

3. Warm chain includes

_____	_____
_____	_____
_____	_____

4. Do's and don't for cord care are

Do's	Don't
_____	_____
_____	_____
_____	_____

5. Baby bath should be postponed to _____ hours after birth.

6. Normal newborn has following characteristics .

_____	_____
_____	_____
_____	_____

You will be given individual feedback after you have completed the exercise



Who is an 'at risk' neonate?

An 'at risk' neonate has one or more of the following features:

1. Weight 1500-2000g.
2. Temperature (axillary) 36.0° C - 36.5.0° C (or less than 36° C but rises to 36.5° C or more after one hour of warming).
3. Cried late (>1min), but within 5 minutes of birth.
4. Sucking poor, but not absent.
5. Depressed sensorium, but is arousable.
6. Respiratory rate of over 60 per minute, but no chest retractions.
7. Jaundice present, but no staining of palms/soles
8. Any one of the following:
 - Diarrhea or vomiting or abdominal distension.
 - Umbilicus draining pus or pustules on skin.
 - Fever.

Where is this neonate managed immediately?

The care of 'at risk' neonate is immediately initiated at the health facility itself under direct supervision. After initial improvement, further care can be provided at home.

What care is provided to the risk baby at the health facility?

The care of at risk babies is outlined below:

1. **Warmth** (Refer to Thermal Protection Module)

- If the temperature of the baby is normal (36.5°C -37.5°C): The aim here is to prevent hypothermia. Wrap the baby in layers of clothing taking care to cover the head and limbs. Place the baby in maternal, contact. In winter months, the room may have to be warmed with heater, angeethi etc.
- If the temperature of the baby is 36.0°C -36.4°C: This is cold stress and generally the extremities of the baby are cool to touch but the trunk is warm. Such a baby generally requires extra wrapping. Take care to cover the head and the limbs. Baby should be placed in close maternal contact, preferably skin to skin. If it is winter, room should be warmed up by heater.
- If the temperature of baby is less than 36°C: This is a serious situation. Baby requires immediate exposure to a radiant heat source (radiant warmer) or heater. Other measures are same as above.

2. **Stabilization**

Most of these babies do not require stabilization other than prevention for hypothermia as above. If there is occasional apnea, physical stimulation may be provided.

3. **Feeds** (Refer to Feeding Module)

The baby is started on direct breast feeding. If not sucking well, he is provided expressed breast milk by spoon or paladai. Occasionally, expressed breast milk may have to be given by gavage feeding.



4. **Specific therapy**

Some simple conditions can be readily treated at the health facility and later at home.

- i. Umbilical sepsis
Local application of gentian violet 1%
- ii. Skin pustules
Local application of gentian violet 1%
- iii. Mild pneumonia (Respiratory rate >60/min, no chest retraction)
Doctor will prescribe :
Syr Cotrimoxazole 1/3 tsf BD x 7 days
Or
Inj Procaine Penicillin 2 lakh units IM OD x 7 days

5. **Monitoring**

The following signs should be monitored every two hour:

- Temperature
- Sucking
- Sensorium
- Respiration
- Apnea
- Cyanosis
- Convulsion
- Bleeding
- Diarrhea
- Vomiting
- Abdominal distension

6. **Re-evaluation**

Two cardinal signs of improvement are:

- i. The temperature will become normal (36.5° C-37.5°) and
- ii. The baby will accept feeds well.

The signs such as rapid breathing, sensorium and abdominal distention etc. will also start improving. Such a baby can be sent home after advising the mother/family regarding care at home. Prepare a brief note regarding baby's condition, treatment and advice.

On the other hand, if the baby does not improve and exhibits signs indicative of very sick state, he should be referred to other hospital. The mother/family should be taken into confidence and the physician should organize efficient and stable transport of the baby.

7. **Communication**

- Reassure the mother and family.
- Prepare a note regarding baby's condition and care.
- If improves and to be sent home, explain care of the baby at home.
- If baby does not improve or worsen explain need for referral and care during transport.



**8. Follow up**

- If sent home: Provide home visit by health worker next day. Recall for evaluation after two and seven days.
- If referred: Provide home visit by health worker a day after discharge. Recall for evaluation after two and seven days.

What advice you should give to mother / family regarding home care?**1. Keep the baby warm** (Refer to Module on Thermal Protection & KMC)

Baby should be bathed only when the weight of the baby is over 2000g and that also if the baby has no other features that characterizes him at risk. Bathing an 'at risk' baby may aggravate his condition severely. Baby should be kept well clothed taking care to cover the head and limbs. He should be dried quickly if urine or stool is passed. Maternal contact, preferably skin to skin should be practiced. This not only provides warmth from mother's body, but also promotes lactation and close mother-baby bonding. Warming of the room with heater or angeethi may be required in winter.

2. Provide exclusive breast milk feeding (Refer to Module on Feeding)

Baby should be provided exclusive milk feeding. Often the baby can suck adequately on the breasts. Some babies, however, may not suck well for a few days. These babies may be provided expressed breast milk by spoon/paldai. It should be emphasized that baby must be put on the breast first, allowing him to learn sucking and to provide stimulus for lactation. This should be followed by expression of breast milk and assisted feeding with spoon or paladay. The mother should be explained the method of manual expression of breast and feeding with spoon.

3. Continue the prescribed treatment

If the baby is advised local gentian violet application on the cord for umbilical sepsis or on skin for pustules, that advice should be followed. Babies prescribed oral cotrimoxazole or intramuscular procaine penicillin for mild pneumonia should be administered the medication regularly.

4. Observe progress of baby

The mother / family should be explained that signs of well being of the 'at risk' neonate are: (i) the baby accepts feeds well and has warm trunk, warm and pink soles (and palms).

The following danger signs need to be monitored:

- Poor sucking.
- Cold to touch or febrile.
- Poor activity, not arousable.
- Tachypnea (>60/min) blue lips / tongue, stoppage of breathing (apnea) or labored respiration.
- Jaundice extending to palms/soles.
- Convulsion.
- Bleeding.
- Diarrhea or vomiting, abdominal distension.
- Umbilical discharge or skin boils.

In case any of these features are present or persistent or have reappeared, the baby should be re-evaluated without delay.





5. *Counsel and educate the mother / family*

The doctor & nurses team should explain the condition of the baby to the mother and the family. They should be reassured and educated regarding the care at home. Emphasis should be laid on keeping a careful vigil for signs of improvement and of worsening. It should be stressed upon them that a baby may require re-evaluation any time if the progress is not satisfactory or if there is worsening. Above all, the provider / physician must encourage the mother / family to gain confidence in looking after the baby.

6. *Follow-up*

A home visit by the health worker one day after evaluation at hospital is desirable. Thereafter the baby should be seen again at 2 and 7 days by health worker.

At follow up baby's weight should be taken. A gain of 15-30g per day is expected after 7 days of age. Immunization should be provided as for other neonates.



**ORAL DRILL**

There will be an oral drill by the facilitator on

Clinical	Normal Neonate	'At Risk' Neonate	Sick Neonate
Weight	>2.5 kg	1.5-2 kg	<1.5 kg
Temperature	36.5-37.5° C	36.0-36.4°C	<36°C
Cry after birth	<1 min	1-5 min	>5 min
Sucking	Good	Poor	Absent
Sensorium	Active	Depressed	Non arousal
Respiration	Rate <60 min	Rate >60 min no retractions	Retractions / Apnea / Gaspings
Jaundice	Absent	Present without staining of palms / soles	Staining of palms / soles
<ul style="list-style-type: none"> • Diarrhoea vomiting abdominal distension • Umbilical discharge (pus) / skin pustules • Fever 	None	Presence of any one	Presence of two





Who is a sick neonate?

A sick neonate is the one who has any of the following features:

1. Weight <1500 g
2. Temperature <36 °C despite warming for one hour
3. Cried after 5 minutes of birth
4. Absent sucking
5. Not arousable
6. Respiratory rate more than 60/min with chest retractions
7. Apnea or gasping respiration
8. Central cyanosis
9. Jaundice staining palms/soles
10. Convulsions
11. Bleeding
12. Major malformation
13. Presence of two of the following
 - Diarrhea or vomiting or abdominal distension
 - Umbilicus draining pus or skin pustules
 - Fever

Also remember that if an 'at risk' neonate does not improve while being observed under your care, he is also a very sick neonate.

Where is sick neonate managed? What can be done at the hospital?

A sick neonate is looked after in a district or small hospital. At smaller health facility, only immediate care is provided. The principles of care at this level are:

1. **Warmth**

The guidelines for provision of warmth have been covered in the *Module on Thermal Protection*.

2. **Stabilization** (Refer to modules on Resuscitation, oxygen therapy and IV therapy initiation)

The sick neonate may need physical stimulation, bag and mask ventilation or oxygen if there is respiratory failure. If intravenous line is to be initiated following will be ordered by Doctor.

- Inj. Dextrose (10%) 2 ml per kg IV stat followed by drip
- Inj normal saline 10 ml per kg IV slowly stat if pulses are poor or capillary refill time is over 3 seconds.

3. **Vit K 1 mg IM** (If not given at birth)

4. **Feeds** (Refer to Module on Feeding)

In a sick newborn, oral feeding should not be insisted upon. The baby is encouraged to feed on the breast. If unable to do so, expressed breast milk is given with spoon or paladai. Gavage feed may be tried only with great care.





5. Specify therapy

Doctor will order for the first dose of antibiotics:

- Inj Ampicillin 50 mg/kg IV stat
- Inj Gentamicin 2.5 mg/kg IV stat

Oxygen may be started in a baby with respiratory distress or central cyanosis.

6. Monitoring

The following signs should be monitored every one hour by staff:

- Temperature, peripheries
- Sucking
- Sensorium
- Respiration, apnea, cyanosis
- Convulsion, bleeding
- Diarrhea
- Vomiting
- Abdominal distension
- Capillary refill time

7. Communication

- Explain condition of the baby, reassure parents
- Explain need for referral, if doctor feels that baby cannot be managed
- Explain care during transport (Refer to Module)

8. Organize transport (Refer to Module on Procedure - Transport of Neonates)

Doctor will write a precise note. Following guidelines should be followed:

- Encourage mother to accompany
- If possible, let a provider accompany the baby
- Ensure warmth on the way
- Explain care on the way to family (keep baby's trunk and palms / sole warm to touch, keep airway open, physical stimulation if apneic)

Take baby to nearest facility by fastest mode of transport by the shortest route.

Pneumonics to remember for transport

- S = Sugar
- T = Temperature
- A = Airway, breathing, oxygen
- B = Blood pressure, perfusion
- L = Lines (IV), laboratory workup
- E = Emotional support, communication with family





SELF EVALUATION

Let us see how much you have learnt about 'AT RISK' and 'SICK' Neonate:

1. Where is the 'at risk' neonate managed?

2. What are the signs you will monitor in 'at risk' and sick neonate?

3. What advice you give for home care of 'at risk' baby?

4. What is the immediate care given for a sick baby?

You will be given individual feedback after you have completed the exercise





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