NEWBORN NURSING

for Facility Based Care

Level II units

Participatory Module-Based Learning

Directed for Skills Upgradation

3rd Ed, 2014-15

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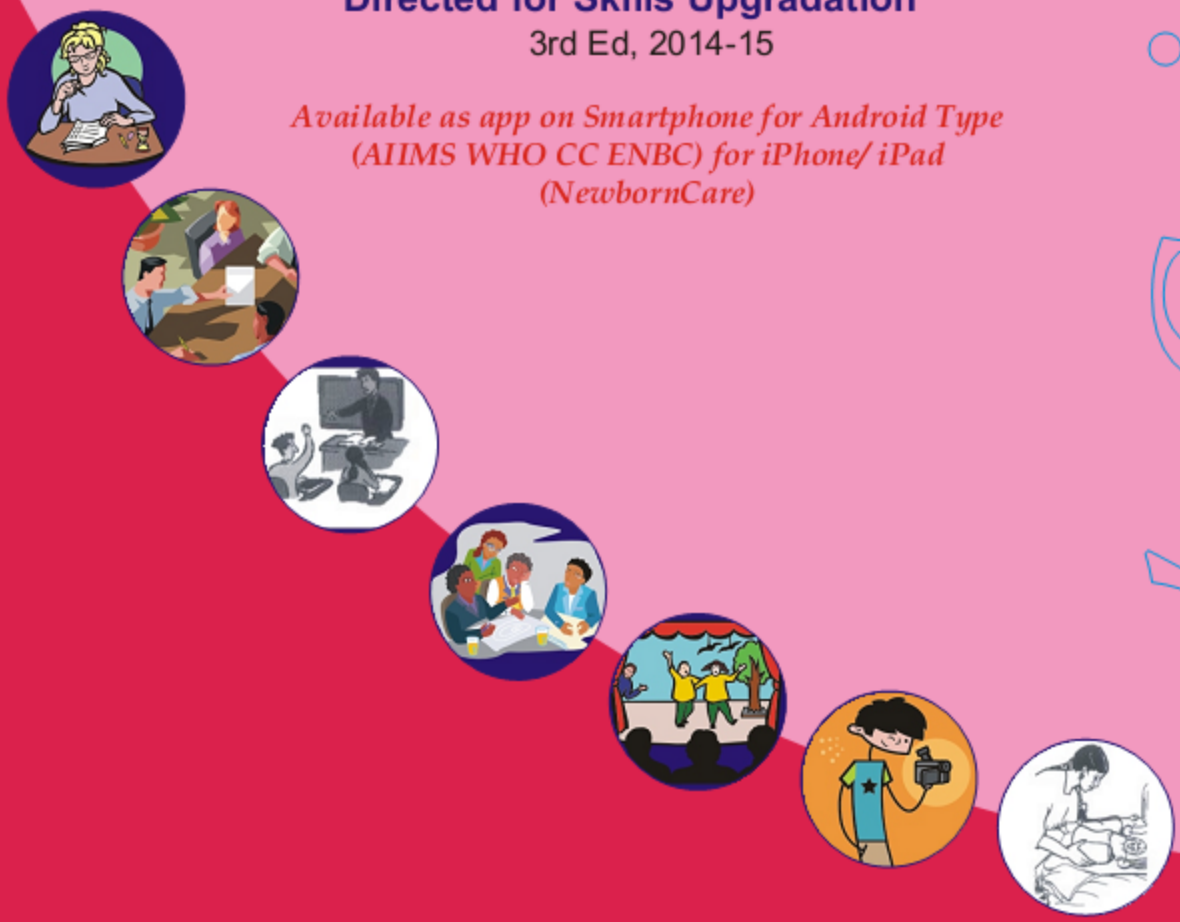

Learner's Guide

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

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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.

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FOREWORD

Ensuring healthy survival of all neonates has clearly emerged as a key area for improving child health. The global community has committed itself to attain an under-five child mortality rate of less than 20 per 1000 live births in all counties by 2035. This would only be achieved if the neonatal mortality rate declines to under 10 per 1000 births. For India ,this would be a two -thirds reduction from the prevailing level of 29. Since 99% of neonatal death occur in middle and low income countries, the strategies and tools that are appropriate for these settings are urgently required to be developed, disseminated and translated into action. Investments in newborn nursing is all the more important as staff nurses are identified as one of the important service providers to deliver the recently launched Every Newborn Action Plan (ENAP). The Newborn Nursing for Facility Based Care intends empowering nurses to provide skilled care to sick and premature neonates for use in India and in other developing countries.

Care of mothers, neonates and children in small hospitals is largely shouldered by our nursing colleagues. It is the nurses who primarily provide the life-saving interventions to the babies, enable the mothers for their babies care, and counsel the families. Nurses have an important role in all clinical disciplines, but for neonatal care their role as skilled professionals with human touch is central. For quality care it is essential to have well trained health acre professionals. The present package aims to strengthen their core competence. The focus is on skills and the approach is participatory. We proudly believe that this resource material is of global standards and is relevant not only in India, but also many other countries across the world.

I would like to congratulate the contributors, reviewers and the editorial team for a product of outstanding educational and technical quality. It is indeed remarkable that a majority of contributors are experienced nurses themselves. Professor A K Deorari has set new standards in training methods and technology through this educational endeavour. I warmly compliment him for his stellar leadership.

I am sure this training resource material will contribute toward saving many newborn infants in years to come.

Prof. Vinod Paul
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Research in Newborn Care
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14th November 2014

PREFACE

Nurses play a pivotal and varied role in many developing countries healthcare facilities, including providing prenatal education, labor and delivery, and ongoing newborn care. Most notably, it is nurses who are providing skilled attendance during birth, performing newborn resuscitation, initial newborn care, stabilization of at-risk and sick newborns, and determine the need for transfer to regional hospitals when necessary. In addition, nurses provide counseling to mothers about the importance of instituting kangaroo mother care and breast feeding as well as the special needs of low birth weight babies. Due to a shortage of physicians, especially in rural areas in developing countries, the nurses role is especially critical at district, sub-district areas, and villages. Often they perform critical care procedures and look after neonatal equipment.

There is no well-structured or standardized 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 Newborn Nursing for facility based care building upon earlier package of essential newborn nursing of 2009. The module uses participatory learning methodology using self reading, self evaluation, demonstration, oral drill, role play, case discussion, group work, video and clinical skill demonstration. The entire package is also available on smart phone as a memory 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; WHO-SEARO 2007-08 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 NIPI (Norway India Partnership Initiative) and UNICEF UNICEF India office for the ongoing support for dissemination and capacity building of newborn nursing in India.

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Newborn Week 2014

CARE OF THE NORMAL BABY AT BIRTH

The module is designed to complement in-service education and orientation of health personnel involved in care of newborns.

LEARNING OBJECTIVES

At the end of this session, participants will be able to:

- **Describe basic needs at birth and every day care of the newborn baby**
- **Describe evidence-based routine care of a newborn baby at birth**
- **Enumerate the components of 'Clean chain' and 'Warm chain'**
- **Educate mother how to look after her baby and what to do if her baby is sick**

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.
- ***Role-play:*** Observing the steps of normal newborn care at birth. Participant will also be provided with an opportunity to do role play.
- ***Demonstration:*** Demonstration of immediate care of cord and eye at the time of birth.
- ***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.

I. CARE OF BABY AT BIRTH

1. INTRODUCTION

The first hour after birth has a major influence on the survival, future health, and well being of a newly born infant. The health workers have an important role at this time. The care they provide during this period is critical in helping to prevent complications and ensuring survival. All mothers need help, support, and advice in the initial few days after delivery to ensure proper care of their newly born baby.

2. THE BASIC NEEDS OF A NORMAL BABY AT BIRTH

The four basic needs of ALL babies at the time of birth (and for the first few weeks of life) are:

i. **Warmth**
ii. **Normal breathing**
iii. **Mother's milk**
iv. **Prevention of infection**

These basic needs indicate that a baby's survival is totally dependent upon her mother and other caregivers. Therefore it is important to provide proper care to all the neonates immediately after birth. All newborns require essential newborn care to minimize the risk of illness and maximize their growth and development. This care will also 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 can dramatically reduce the risks of these serious conditions. Exclusive breastfeeding has a significant protective effect against infections. Early breastfeeding and keeping the baby close to the mother reduce the risk of hypothermia and hypoglycemia.

The basic needs of a baby at birth are :warmth, normal breathing , mother's milk and prevention of infections.

Though most of these are discussed in separate modules, a brief overview is given here.

3. CARE OF THE NORMAL NEWBORN AT THE TIME OF BIRTH

The steps to be undertaken at the time of birth for all babies (including those who need resuscitation) are covered in the module on 'Basic resuscitation'. Here, we shall review the steps that are essential for a normal newborn baby at birth. The steps are summarized in the box below:

Immediate care of a normal newborn at the time of birth

1. Call out the time of birth.
2. Deliver the baby onto a warm, clean and dry towel or cloth and keep on mother's abdomen or chest (between the breasts).
3. Wipe both the eyes separately with sterile swab.
4. Clamp and cut the umbilical cord after 1 minute ,if baby breathing well.
5. Immediately dry the baby with a warm clean towel or piece of cloth.
6. Assess the baby's breathing while drying.*
7. Leave the baby between the mother's breasts to start skin-to-skin care for at least an hour.
8. Cover the baby's head with a cap. Cover the mother and baby with a warm cloth.
9. Place an identity label/band on the baby.
10. Encourage mother to initiate breastfeeding (within half an hour of birth).

if the baby is not crying or breathing well, the next steps of resuscitation have to be carried out after immediate clamping the cord and taking the baby to warmer(as explained in the module on 'Basic resuscitation').

The individual steps are briefly explained below:

1. Call out the time of birth

It is important to call loudly the time of birth - this helps in accurate recording of the time and more importantly, alerts other personnel in case any help is needed.

2. Receive the baby on to a warm, clean and dry towel or cloth

The baby should be delivered on to a warm clean towel and kept on the mother's abdomen or chest. If this is not possible, the baby should be kept in a clean, warm, safe place close to the mother.

3. Immediately dry the baby with a warm clean towel or piece of cloth

Immediately dry baby the baby but if secretions are present suction first and then dry (this will prevent aspiration as drying itself is stimulation for a baby to breath). Blood or meconium on the baby's skin should be wiped away; however, the white greasy substance covering the baby's body (vernix) should not be wiped off. Because this vernix helps to protect the baby's skin and gets reabsorbed within few hours .

4. Wipe both the eyes with sterile swab

Clean the eyes using sterile gauze/cotton. Use separate gauze for each eye. Wipe from the medial side (inner canthus) to the lateral side (outer canthus).

5. *Assess the baby's breathing while drying*

At the time of drying itself, the baby's breathing should be assessed. A normal newborn should be crying vigorously or breathing regularly at a rate of 40-60 breaths per minute. If the baby is not breathing well, then the steps of resuscitation have to be carried out. (refer to basic resuscitation)

6. *Clamp and cut the umbilical cord*

The umbilical cord should be clamped after 1 minute using a sterile, disposable clamp or a sterile tie and cut using a sterile blade about 2-3 cm away from the skin.

7. *Leave the baby between the mother's breasts to start skin-to-skin care*

Once the cord is cut, the baby should be placed between the mother's breasts to initiate skin-to-skin care. This will help in maintaining the normal temperature of the baby as well as in promoting early breastfeeding.

8. *Cover the baby's head with a cap. Cover the mother and baby with a warm cloth*

Both the mother and the baby should be covered with a warm cloth, especially if the delivery room is cold (temperature less than 25°C). Since head is the major contributor to the surface area of the body, a newborn baby's head should be covered with a cap to prevent loss of heat.

9. *Place an identity label on the baby*

This helps in easy identification of the baby, avoiding any confusion. The label should be placed on the wrist or ankle.

10. *Encourage mother to initiate exclusive breastfeeding*

Breastfeeding should be initiated within half an hour of birth in all babies.

DEMONSTRATION

The facilitators will now conduct a demonstration on Immediate care of a normal newborn at the time of birth.

4. ENSURING WARMTH: 'WARM CHAIN'

A baby's skin temperature falls within seconds of being born. If the temperature continues to fall, the baby will become ill and may even die. This is why a baby MUST be dried immediately after birth and delivered onto a warm towel or piece of cloth, and loosely wrapped before being placed naked between the mother's breasts or over abdomen.

Keeping the baby between the mother's breasts ensures that the baby's temperature is kept at the correct level for as long as the skin contact continues. This first skin-to-skin contact should last uninterrupted for at least one hour after birth or until after the first breastfeed. The mother and baby should be covered with a warm and dry cloth, especially if the room temperature is lower than 25°C. The steps of prevention of heat loss are explained in the module on 'Thermal protection'.

For maintaining the temperature, it is important to understand the concept of 'Warm chain'. It means that the temperature maintenance should be a continuous process starting from the time of delivery and continued till the baby is discharged from the hospital. The components of warm chain are summarized below:

'WARM CHAIN'

1. At delivery

- Ensure the delivery room is warm (25° C), with no draughts of air
- Dry the baby immediately; remove the wet cloth
- Cover the baby with clean dry cloth
- Keep the baby in skin to skin contact with mother on chest or abdomen

- Postpone bathing/sponging for at least 6 hours or next day

2. After delivery

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

5. HELPING TO ESTABLISH NORMAL BREATHING

The baby's breathing should be assessed at the time of drying. If the baby is crying vigorously or breathing adequately (chest is rising smoothly at a rate of 40 to 60 times per minute), then no intervention is needed.

However, if the baby is not breathing or gasping, then skilled care in the form of initial steps, positive pressure ventilation etc. might be required. These steps are explained in the module on 'Basic resuscitation'.

6. INITIATING BREASTFEEDING

During the initial skin-to-skin contact position after birth, the baby should be kept between the mother's breasts; this would ensure early initiation of breastfeeding.

Initially, the baby might want to rest and would be asleep. This rest period may vary from a few minutes to 30 or 40 minutes before the baby shows signs of wanting to breastfeed. After this period (remember each baby is different and this period might vary), the baby will usually open his/her mouth and start to move the head from side to side; he may also begin to dribble. These signs indicate that the baby is ready to breastfeed. Baby may also try reaching the breast by making directed movements -called 'Breast Crawl'

The mother should be helped in feeding the baby once the baby shows these signs. Both the mother and the baby should be in a comfortable position. The baby will be put next to the mother's breasts with his mouth opposite the nipple and areola. The baby should attach to the breast by itself when it is ready. When the baby is breatfeeding, attachment and positioning should be checked. The mother should be helped to correct anything which is not quite right. If in the initial first feeding session baby does not latch , don't give any liquid other than breast milk (or colostrum) even if baby doesn't feed .

Most of the babies are ready to take feed with in 30min to one hour. The procedure of counseling and support for breastfeeding are explained in the module on 'Feeding of normal and low birth weight infants'.

7. PREVENTION OF INFECTIONS: 'CLEAN CHAIN'

Babies are secure placed in their mothers' womb. When they are born, they have to be protected from the adverse environment of the surroundings. 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 step to be emphasized to both family members and health care workers.

Similar to warm chain, 'Clean chain' has to be followed both at the time of delivery and then till the time of discharge to protect the infant from infections. The components of clean chain are summarized below:

'CLEAN CHAIN'

1. ***Clean delivery (WHO's 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 cover the baby
   - Clean cloth to cover the mother
2. ***After delivery***
   - All caregivers should wash hands before handling the baby
   - Feed only breast milk
   - Keep the cord clean and dry; do not apply anything
   - Use a clean absorbent cloth as a diaper/napkin
   - Wash your hands after changing diaper/napkin. Keep the baby clothed and wrapped with the head covered

SELF-EVALUATION

1. The four basic needs of a baby at the time of birth are:

   i. _____ ii. _____

   iii. _____ iv. _____

2. Where should be a baby kept immediately after a normal delivery?

   _____

   _____

3. How would you clamp and cut the umbilical cord after birth?

   _____

   _____

4. Enumerate the steps of 'Warm chain'.

At delivery	After delivery
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

5. Mention the benefits of initiating skin-to-skin care immediately after birth:

   i. _____

   _____

   ii. _____

   _____

6. Enumerate the 'Six cleans' one has to follow at the time of delivery:

   i. _____ ii. _____

   iii. _____ iv. _____

   v. _____ vi. _____

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

8. CORD AND EYE CARE

8.1 Cord care

The umbilical cord can be clamped-cut and tied (according to local custom) while the baby is on the mother's abdomen or on a warm, clean and dry surface.

The steps of clamping, cutting the cord and its care after cutting are summarized in the box below:

Care of the umbilical cord

1. Put the baby on mother's abdomen or chest or on a warm, clean and dry surface close to the mother.
2. Change gloves; if not possible, wash gloved hands.
3. Put ties (using a sterile tie) tightly around cord at 2 cm and 5 cm from the abdomen.
4. Cut between the ties with a sterile instrument (e.g. Blade).
5. Remove blood or meconium by wiping with clean cloth
6. Observe for oozing blood. If blood oozes, place a second tie between the skin and first tie.
7. DO NOT APPLY ANY SUBSTANCE TO THE STUMP.
8. Leave stump exposed and nothing should be placed on it.
9. If stump is soiled ,wash it with clean water and dry with a clean cloth

Note: Applying traditional remedies to the cord may lead to infections and tetanus.

8.2 Eye Care

Eye care is given to protect a baby's eyes from infection. In areas where sexually transmitted diseases are common, eye care is needed soon after delivery because infections such as gonorrhoea can be passed to the baby during the birthing process which can result in blindness.

A baby's eyes should be **wiped as soon as possible after birth.** Both eyes should be gently wiped with separate sterile swabs soaked in warm sterile water.

Eye drops (whenever indicated) or ointment should be given **within one hour of delivery**. This can be done after the baby has been dried or when he is being held by his mother.

After instilling the eye drops, care should be taken so that the drug is not washed away.

A baby's eyes should be wiped as soon as possible after birth

In areas where sexually transmitted diseases are common an anti-microbial eye medicine should be applied within one hour of birth

Eye care

Do's:

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

Don'ts:

- Do not apply anything else (e.g. Kajal) in the eyes

8. WEIGH THE BABY

Weighing helps identify babies at a higher risk of death.

- < 2500 grams may require special care to prevent low body temperature
- < 2000 grams should receive prolonged skin-to-skin
- < 1500 grams will need referral

Steps to weigh

Refer to section on common procedures

9. EXAMINE THE BABY

A complete examination should be performed within about 60 minutes after birth

- Count the number of breaths during one minute.
- Observe the movement of the limbs when awake, their position when not moving and their tone.
- Observe the skin color.
- Inspect the following body areas for abnormalities: head, face, mouth and palate, chest, abdomen, genitalia, anus, limbs and skin

A well baby should have

- Normal temperature , warm to touch, pink with Weight > 2.5 kg
- Breathe easily at 40-60 breathes/minute
- Move arms and legs equally when active and rest with limbs flexed

Explain to mother the examination findings to allay her concern. Document in case record and ask her to inform you , in case any other concerns develop subsequently.

10. GIVE VITAMIN K

Vitamin K will protect babies from serious bleeding.

- Give vitamin K by intramuscular (IM) injection 1.0 mg for every newborn (0.5 mg for <1000 gms).
- Encourage mothers to breastfeed their baby during the injection for comfort.

11.MONITORING THE BABY

During the first hour after delivery, the baby (and the mother) should be monitored every 15 minutes. Both of them should remain in the delivery room for the first hour to facilitate monitoring.

DO NOT leave the mother and baby alone, monitor every 15 minutes

The three most important parameters that need to be monitored are:

i. **Breathing**
ii. **Temperature** or warmth and
iii. **Color**

The health personnel should monitor these three parameters every 15 minutes in the first hour after birth of the baby. The signs to be looked for are given in the table below:

Table 1 : Monitoring the baby in the first hour after birth

Parameter	What to look for?
Breathing	Listen for grunting; Look for chest in-drawing and fast breathing
Warmth	Check to see if baby's feet are cold to touch (by using dorsum of your hands)
Color	Evaluate the color of the trunk and extremities

11. SPECIAL SITUATIONS

11.1 Caesarean section, instrumental delivery

Caesarean section, instrumental delivery and breech delivery, all carry increased risks to the mother and to the baby. Before delivery, preparation for newborn resuscitation should be made in all these cases, since the need for resuscitation might be more in them as compared to a normal delivery.

Delay between the time of birth and skin-to skin contact & the first breastfeed may happen in each of these special situations. Also, separation is common, leading to babies receiving pre-lacteal feeds in the first hours after birth. If a long delay between delivery and breastfeeding is expected, encourage the mother to express colostrum. If the mother is too ill to express herself, do it for her.

A mother who has delivered by caesarean section should **NOT** be routinely separated from her baby unless either the mother or the baby is sick and needs special care. The baby should be kept in the same room with mother.

Once the baby is born, monitoring every 15 minutes in the first hour will be particularly important.

A baby born by caesarean section or instrumental delivery should not be routinely separated from the mother; these babies need better readiness during delivery and more careful monitoring after birth.

Skin-to-skin contact and breastfeeding in difficult deliveries (caesarean section, instrumental and breech delivery):

- Breastfeeding can begin as soon as the mother is comfortable and able to respond to her baby. It does not have to be delayed
- A mother who was given a general anaesthetic agent should begin skin-to-skin contact as soon as she is able to respond to her baby. This may be initiated within one hour of birth
- A mother who has had an epidural (spinal) anaesthetia may be able to start skin-to-skin contact very soon after surgery
- These mothers will need additional assistance in positioning and attaching the baby comfortably. Breastfeeding in lying down position may be more comfortable in the first days

11.2. HIV and newborn care at birth

Whether a mother is HIV positive or not, follow standard safety precautions (while delivering must be observed and followed) Use HIV kit when needed as per national guidelines while delivering must always be observed and followed when delivering a baby. All HIV infected pregnant women should have PPTCT interventions provided early in pregnancy as far as possible.

Care of the baby at delivery should be no different from the care already described.

If the mother has decided to breastfeed, she should begin skin-to-skin contact as soon as possible after delivery and let her baby breastfeed when she is ready.

If the mother has decided not to breastfeed but has chosen replacement feeding, the first few feeds should be prepared for her. These feeds should be **given by cup NOT bottle.** Avoid mixed feeding**.**

The salient features of care in these infants are summarized in the box below:

Care of a baby born to HIV+ve mother

1. Standard safety precautions must be followed as with any other delivery.
2. Baby can have immediate skin-to-skin contact as any other mother and baby.
3. Exclusive breast feeding is the recommended feeding choice in their first 6 months, irrespective of the fact that the mother is on ART early (or) infant is provided with prophylaxis for 6 weeks.(preferably)*
4. If mother chooses replacement feeding, prepare formula for the first few feeds. Ensure it is safe ,affordable and sustainable for family.
5. All other care (including cord care and eye care) remains the same.
6. Give oral nevarapine for six weeks to the neonate as per national policy

Mother should be counseled regarding the mode of feeding before delivery and dangers of mixed feeding

SELF EVALUATION

1. During the first hour after birth babies need to be monitored every _____ _____minutes

2. Name the three most important parameters that need to be monitored in the first hour after birth:

   i. _____

   ii. _____

   iii. _____

3. Routine care of eyes at birth includes

   _____

   _____

   _____

   _____

4. Babies born by caesarean section should not be routinely_____ from mothers for initial hours after birth.

5. Enumerate the important steps involved in the case of a baby born to HIV+ve mother:

   _____

   _____

   _____

   _____

   _____

   _____

6. For baby born to HIV positive mother ----------oral is given for six weeks

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

II. POSTNATAL CARE OF NORMAL BABY

1. INTRODUCTION

All mothers need help, support, and advice in the initial few days after delivery to ensure proper care of their newly born babies. The care and help given to mothers and babies in the first few days after birth are critical in maintaining the normality and preventing any complications in them.

2. WHY DO MOTHERS NEED HELP IN THE INITIAL FEW DAYS OF DELIVERY?

Ideally, all pregnant women should be counseled regarding the care of the baby during the antenatal period itself. This would help them to be mentally prepared to take care of their babies after birth.

After delivery, majority of mothers usually stay for a very short time in the hospital. During this short period, they

- need time to get to know their babies
- need time to rest (since they are often tired and exhausted after delivery)
- In addition, they need to know what care has to be given to their baby and how to carry out the care; they also need to know what to do if their baby is not well

Therefore, it is very important for the health care providers to help the mothers (whether at a health facility or at home) in this crucial time period. First time mothers often need more help and support for the proper care of their infants.

3. CARE AFTER BIRTH

The care a mother and her baby need in the initial few days after delivery can be broadly grouped under the following headings:

3.1 The postnatal environment

A postnatal room should be kept warm with "no draughts of air" from open doors or windows. A temperature of atleast 25°C is required to keep a baby warm. Often, a radiant heater, blower or other devices for providing warmth are necessary to maintain the appropriate room temperature especially in winter months.

A mother and her baby should be kept together from birth (in bed or very near to each other). This helps the mother to get to know her baby and form an early close loving relationship (bonding); she can also respond quickly when her baby wants to feed, which helps establish breastfeeding.

In tropical countries, a bed net prevents a mother and baby becoming ill from diseases spread by mosquitoes and other insects (e.g. Malaria).

Postnatal environment

- Ensure that the room is warm with air currents
- Keep mother and baby close together in same room and same bed
- Provide bed nets to sleep

3.2 Every day care of the baby

Here, we shall discuss the every day care needed by ALL newborn babies until the time of discharge from the health facility. The needs are the same even for babies born at home; it is the duty of the health care provider to ensure that each baby receives appropriate care irrespective of the place of delivery.

The key areas of every day care include:

- **Breastfeeding**
- **Warmth**
- **Cord care**
- **Hygiene**

Breastfeeding and warmth (thermal protection) are covered in detail in separate modules; similarly, cord care is explained in earlier section of 'Care at birth'.

The key areas of every day care of a newborn baby include: breastfeeding, warmth, cord care, and hygiene.

3.2.1. Breastfeeding

To support mothers in breast feeding their babies, health workers must be both skilled and knowledgeable. They should know the key points of correct positioning and attachment of the baby to the breast. In addition to teaching about positioning and attachment, health workers must also be able to give mothers the correct information about infant feeding.

Mothers should be informed that in the first few days after birth, only a small amount of thick yellow milk (*Colostrum*) is secreted (if she needs to express at this time, only a teaspoonful can be expressed). They should be reassured that even this much is sufficient for a normal baby in the first 2 days and that the amount of milk secreted will gradually increase. The importance of giving colostrum should be emphasized and any doubts or false beliefs should be clarified.

The steps of breastfeeding counseling and support are covered in detail in the module on 'Feeding of normal and low birth weight babies.' Some important points are summarized below:

Every day care: Breastfeeding

1. Support exclusive breastfeeding **on demand** day and night.
2. Ask the mother to **get help** if there is a breastfeeding difficulty.
3. **Assess** breastfeeding in every baby **before** planning for **discharge**.
4. If the mother reports a breastfeeding difficulty, assess breastfeeding and help her with attachment and positioning.
5. DO NOT discharge the baby if breastfeeding is not established.

3.2.2. Warmth

The essential steps in preventing heat loss and maintaining the normal temperature in a newborn baby are discussed in detail in the module onThermal protection.

3.2.3. Cord care

Care of the umbilical cord at the time of birth has been explained in the earlier section of 'Care at birth'.

Routine cord care in the first few days of life (until the cord dries and falls off) is summarized below:

Every day care: Keeping the cord healthy

1. Wash hands before and after cord care.
2. Put NOTHING on the stump.
3. Fold nappy (diaper) below the level of the stump.
4. Keep cord stump loosely covered with clean clothes.
5. If stump is soiled, wash it with clean water and soap. Dry it thoroughly with clean cloth.
6. Look for signs of infection (daily)
   - Pus discharge from the cord stump
   - Redness around the cord especially if there is swelling
   - High temperature (more than 37.5°C) or other signs of infection
7. Explain to the mother that she should seek care if the umbilicus is red or draining pus or blood.

It is important to teach the mothers that the umbilical stump should be left dry; they SHOULD NOT APPLY ANYTHING on the stump. Health care providers should look for any possible sign(s) of infection of the umbilical stump (see above). Mother should be explained about these signs and advised to report if they are present.

3.2.4. Hygiene

The important aspects of personal hygiene such as washing, bathing are given in the box below:

Every day care: Ensuring hygiene

1. Wash the face, neck, and underarms of the baby daily.
2. Do not bathe the baby before 24 hours of age or if the baby is cold. In case of small babies, bathe only after the baby reaches a weight of 2000g.
3. If bath is given
   - Ensure room is warm and there is no draught while changing clothes, washing and bathing
   - Use warm water for bathing
   - Thoroughly dry the baby, dress and cover after bath
   - Take extra precautions if the baby is small
4. Wash the buttocks when soiled. Dry thoroughly.
5. Use cloth diaper on baby's bottom to collect stool. Dispose off the stool as for woman's pads. Wash hands after disposing.
6. Do not apply '*Kajal*' on eyes

3.3 Looking for danger signs and giving treatment

It is important that mothers, care givers and health workers are able to recognise the signs and symptoms which indicate that the baby is not well ('DANGER SIGNS'). Early recognition of the danger signs will help in identifying those babies who need urgent care and treatment.

The important danger signs are given in the box below:

DANGER SIGNS

1. Not feeding well
2. No movement
3. Fast breathing (more than 60 breaths per minute)
4. Moderate or severe chest in-drawing
6. Jaundice on day 1 or palms or sole stained yellow any age
7. Abnormal movements
9. Fever (temperature >37.5°C)
10. Temperature <35.5ºC or not rising after re-warming

3.4 Normal neonate: Preparing for discharge

3.4.1 Ensure immunization

All babies should receive the following 3 vaccines within the first week of life and preferably before discharge from the health facility:

- BCG,
- OPV-0,
- Hepatitis B (HB-0)

It is the duty of the health workers to ensure that the baby gets immunized before discharge. Mothers should also be given an 'Immunization card' (if available) and advised regarding the immunization schedule.

3.4.2 Check if the baby is fit for discharge

A baby can be discharged if the following criteria are fulfilled (see box):

Criteria for discharge from a health facility

1. Feeding well (suckling effectively) at least 8 times in 24 hours
2. No danger signs
3. Mother is confident to take care of baby
4. Understands the need for follow up and danger signs when to report early
5. For small baby below 2500gms: feeding well and gaining weight adequately (see module on 'Feeding of normal and low birth weight babies')

Advise on essential care for neonate at discharge

Feed breast milk

- Breast milk is the best and is the only food baby needs for first six months
- Mother needs to breastfeed day and night, at least eight times in 24 hours
- Mothers need to take nutritious meals and should drink lots of clean water
- For a small baby who finds difficult to suckle , express breast milk and collect in a clean cup to feed the baby with a paladai, cup or spoon

Keep clean

- Wash your hands with clean water and soap before every feed and after visiting toilet and handling baby's faeces / urine.
- Keep the surroundings clean
- Keep the cord stump clean , do not apply anything on cord

Keep warm

- Keep the baby well wrapped in a clean dry cloth or blanket (in cold season)
- Cover baby's head with part of cloth / blanket or put a cap on the head
- Keep the room warm avoid direct draught of air
- Keep next to mother for warmth; it promotes lactation and mother-baby bonding
- Encourage KMC for Low birth weight babies

Counsel and educate the mother and family

- Build confidence of the family in taking care of baby at home
- Ensure that the family understands importance of administering prescribed medicines for the whole duration
- Educate mother when to report for follow up after discharge
- Educate mother when to report early if there is worsening of condition at any time after discharge
- Educate mother for signs of well baby feeds on breast, active behavior, pink extremities and trunk & extremities are warm to touch
- Ensure baby is gaining weight on follow up
- Advise for timely immunization

THERMAL PROTECTION

The thermal protection module is designed to complement pre-service and in-service education of nursing personnel involved in care of newborns.

LEARNING OBJECTIVES

After going through this module, participants will be able to:

- **Enlist the factors which contribute to heat loss and know, how they can be prevented**
- **Teach the mother how to keep her baby warm after birth and at home**
- **Plan appropriate nursing interventions for a baby experiencing hypothermia**
- **Explain what is hyperthermia and how to prevent it**

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 thermo regulation.
- ***Oral drill:*** You will learn assessment of temperature in normal and hypothermic baby and steps to be undertaken as a nurse caring for the baby to maintain temperature.
- ***Role-play:*** Observe steps to keep baby warm in postnatal ward. Participants will also be provided with *an* opportunity to *do* role play.
- ***Self-evaluation:*** At the end of text, self evaluation based on what has been learnt is included. If you need to recapitulate ,feel free to refer to text material.

1. IMPORTANCE OF TEMPERATURE REGULATION

Warmth is one of the basic needs of a newborn baby. It is critical for the baby's survival and wellbeing. Unlike adults, newborn babies are often not able to keep themselves warm especially if the environmental temperature is low. This results in low body temperature or hypothermia.

Even normal, well babies need care to avoid becoming too cold or too hot. A sick or preterm newborn infant is more likely to die if she is hypothermic

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. In addition, Low Birth Weight (LBW) babies have decreased thermal insulation due to less subcutaneous fat and decreased heat production due to lack of energy brown fat.

Brown fat is the site of heat production. It is localized around the adrenal glands, kidneys, nape of neck, interscapular 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 generation.

Why are newborn prone to develop hypothermia?

- *Larger surface area*
- *Decreased thermal insulation due to lack of subcutaneous fat*
- *Less amount of brown fat*

3. CONSEQUENCES OF HYPOTHERMIA

The body cannot function well when it is cold. Being too cold means that the baby has to use a lot of energy to keep himself warm. A cold baby:

- is less active
- does not breastfeed well
- has a weak cry
- has respiratory distress

A small preterm baby who is cold (hypothermic) is also at increased risk of becoming hypoglycemic. If the baby continues to be cold, these symptoms become more severe and eventually the baby might die.

4. MECHANISM OF HEAT LOSS AND HEAT GAIN

It is very easy for a baby to get cold especially at the time of delivery when the baby is wet with amniotic fluid. The temperature inside the mother's womb is 38°C; once the baby is born it is in a much colder environment and hence starts to lose heat immediately.

Baby's temperature is influenced by the surrounding environment. Baby gains heat in a warm environment and looses heat in a cold environment. Baby can loose warmth when baby is wet *(by evaporation)*, lying on cold surface *(by conduction)*, is exposed to draught of cold air *(by convection)* or is surrounded by cold surfaces like walls *(by radiation)*. Similarly baby can gain heat when lying on warm surface *(by conduction)*, is surrounded by warm circulating air as in an incubator *(by convection)* or lying under a warm heat source of radiant warmer *(by radiation)*.

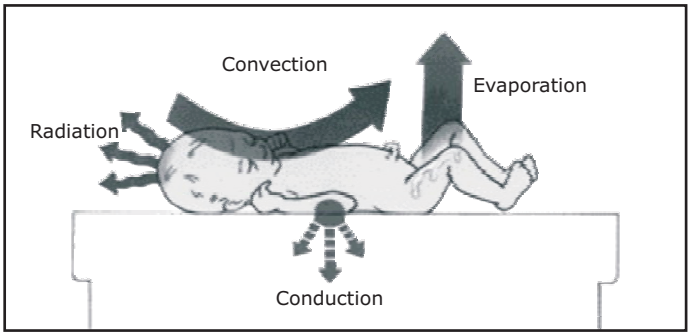


Figure 1: Mechanisms of heat loss

Prevention of heat loss

Continue initial skin-to-skin care for at least one hour after birth whenever possible

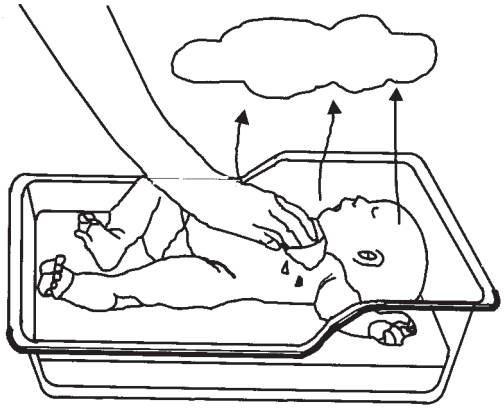
Avoid exposure of cold air and contact with wet or cold surfaces.

Maintain normal temperature when skin-to-skin care is not being used

Clothe and wrap in a clean, dry blanket, and cover the head.

The steps of prevention of heat loss are summarized in Figure 2.

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

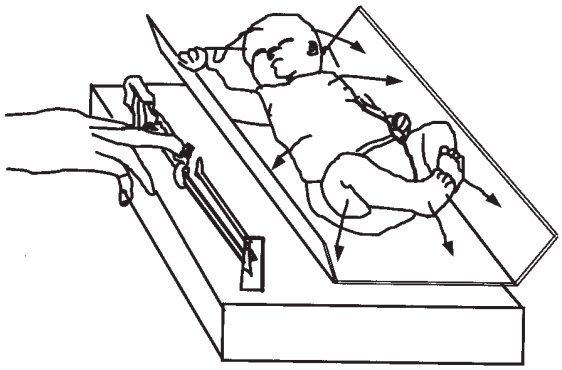


DRYING AT BIRTH

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.

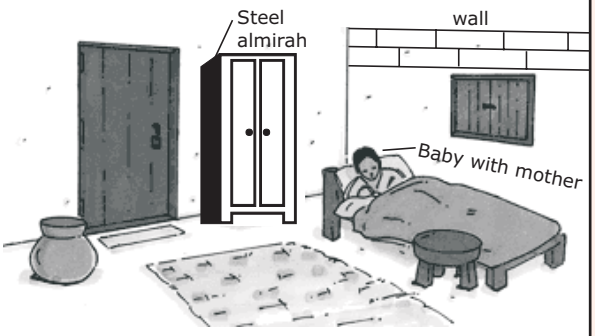


WEIGHING AT BIRTH

Nursing implication

- Put the baby on prewarmed sheet
- Cover weighing 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.

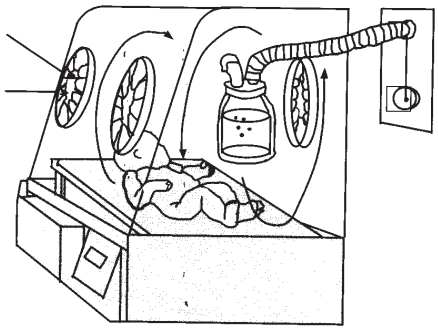


BABY INSIDE THE ROOM

Nursing implication

- Keep baby cot away from cold outside walls, almirah
- Maintain room temperature at 25° C
- 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 in newborn care unit

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

Figure 2: Prevention of heat loss in newborn

DEMONSTRATION

Place a naked wet doll on the table. Discuss the four ways a baby can lose heat and demonstrate how to prevent them.

5. TEMPERATURE RECORDING

Normal temperature in a newborn is 36.5ºC-37.5°C.

Accurate temperature recording is needed if a baby is:

- Preterm/low birth weight or sick
- Admitted to hospital for any reason
- Suspected of being either hypothermic or hyperthermic (too hot)
- Being re-warmed during the management of hypothermia
- Being cooled down during the management of hyperthermia

A temperature taken in the axilla (under the arm in the arm pit) is one of the safest methods of taking a baby's temperature. Using a thermometer to measure temperature is more exact than feeling the skin to estimate if a baby is too hot or too cold.

5.1 Axillary temperature

Axillary temperature is as good as rectal temperature but much 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.

The steps of axillary temperature recording are summarized in the box below. When using an electronic thermometer temperature is read when beep is sounded.

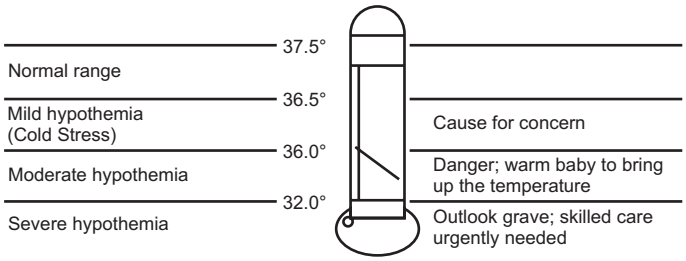


Figure 3: Axillary temperature in newborns

Recording the axillary temperature

Steps:

1. Wash your hands before taking a baby's temperature
2. Keep the baby warm throughout the procedure. He/she does not need to be in a special position for the temperature to be taken
3. Make sure that the thermometer is clean.
4. Shake mercury thermometer, so that it reads less than 35°C.
5. Place the silver/red/bulb end of the thermometer under the baby's arm in the middle of the armpit after drying.
6. Gently hold the baby's arm against the body.
7. Keep the thermometer in place for 3 minutes.
8. Remove the thermometer and read the temperature. DO NOT add 0.5ºC or 1°C to this.
9. Keep thermometer in a sterile dry container after cleaning from stem to bulb with spirit
10. Record the temperature in the baby's case notes.

DEMONSTRATION

The facilitator will conduct a demonstration on 'Recording the axillary temperature with a thermometer'.

VIDEO

The facilitator will conduct a demonstration on 'Recording the axillary temperature with a thermometer'.

5.2 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 minutes.

Rectal temperature is not recorded as a routine procedure in neonates; record rectal temperature only for a sick hypothermic newborn

The difference in rectal and axillary temperatures is not significant.

5.3 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.

5.4 Using digital thermometer

This is used using same steps as mercury thermometer except that

(i) remember to ON the thermometer prior to placing the same in axilla

(Ii) read the temperature when the beep is sounded.

6. ASSESSMENT OF TEMPERATURE BY TOUCH

Baby's temperature can be assessed with reasonable precision by touching his/her abdomen, hands, and feet with the dorsum of your hand. Mother's can be trained to identify, when her baby is at risk of hypothermia by touching the extremities.

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

7. 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) and during transportation 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.

7.1 Common situations where cold stress can occur

i. At birth
ii. During and 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

7.2 Steps to prevent heat loss in labor room

i. Keep delivery room warm (25°C)
ii. Newborn care corner temperature to be maintained at 28°C-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
v. Ensure baby is kept on mother's chest or abdomen , well covered with cloth and head covered with cap

7.3 Steps to prevent heat loss in postnatal ward

i. Promote breast feeding
ii. Appropriate clothing, cover head and extremities
iii. Keep mother and baby together
iv. Keep the room warm 25°C-28°C
v. Avoid giving bath in hospital (never before 24 hours), use moist clean cloth to ensure hygiene.

Use a wall-mounted room thermometer to ensure that room temperature is maintained at 25°C

7.4 How to keep baby warm?*

i. Use dry, warm towel to hold the baby at birth. Remove wet towel after cleaning
ii. Adequate and appropriate clothing
Iii. Promote skin-to-skin contact or keep next to mother (Rooming-in)
iv. Use radiant warmer in nursery
v. Keep the room temperature of baby care area >25°C.

7.5 How to keep room warm?

i. Avoid setting air conditioner temperature less than 25°C. If baby is low birth weight or preterm air conditioner can be avoided
ii. Don't use ceiling fan especially at high speed
iii. Keep windows and doors closed in winter
iv. Warm the room by convector/heater (ensure these devices are away from baby)

***Using a 200 watt bulb may not be sufficient to keep the baby warm. There is also a risk of breakage of bulb**

नवजात शिशुओं में ठंडापन (हाइपोथरमिया)

ठंडापन क्या है?

जब शिशु के शरीर का तापमान 36.5 °C से कम हो जाता है, तो ऐसी अवस्था को ठंडापन कहते हैं

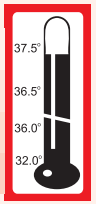
आप तीन मिनट के लिए बगल के ऊपरी हिस्से में थर्मामीटर लगाकर शिशु का तापमान माप सकते हैं।

ठंडापन क्यों महत्त्वपूर्ण है?

1. कम वजन वाले शिशु में ठंडापन मौत का कारण हो सकता है।
2. ठंडापन का बीमार शिशु में रोगों का हमला जल्दी होता है।
3. ठंडापन एक कम वजन वाले बच्चे के शारीरिक विकास को कम करता है।

ठंडेपन की गंभीरता

सामान्य श्रेणी	(36.5°C to 37.5°C)
कुछ ठंडापन	(36.0°C to 36.4°C)
ज्यादा ठंडापन	(32.0°C to 35.9°C)
गंभीर ठंडापन	(<32.0°C)



ठंडापन क्यों होता है?

1. जब प्रसूति कक्ष बहुत ठंडा होता है।
2. शिशु को जन्म के बाद तुरंत सुखाया नहीं जाता है।
3. शिशु को माँ से दूर रखा जाता है।
4. शिशु को पर्याप्त कपड़े नहीं पहनाए गए हों।
5. नहलाने के दौरान पानी या कमरा उचित गर्म न हो।

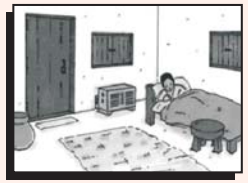
कौन से बच्चों में ठंडापन होने की संभावना होती है?

1. कम वजन वाले शिशु
2. बीमार शिशु
3. जन्म के तुरन्त बाद

नवजात शिशु को उचित गर्मी कैसे दें

- जन्म के समय उष्मा की हानि की रोकथाम
  - प्रसूति कक्ष का तापमान कम से कम 25°C रखें।
  - शिशु को तत्काल सुखाएं, एक गरम तौलिए में लपेटें।
  - शिशु को छाती के सम्पर्क में रखें; स्तनपान प्रारम्भ करें।
- शिशु को नहलाना
  - अगले दिन तक के लिए स्थगित करें।
  - बीमार शिशु को न नहलाएं।
  - जब तक कम वजन वाले बच्चें में नाल न गिर जाए, नहीं नहलायें।
  - शिशु को एक गरम कमरे में गरम पानी से नहलाएं। तत्काल सुखा लें और सूखे गरम तौलिए में लपेट लें। शिशु के सिर को ढक लें। माँ के पास लिटा दें
- नवजात शिशु को कई ढ़ीले कपड़े पहनाएं तथा तापमान पर नज़र रखें
- माँ और नवजात शिशु को एक साथ गरम कमरे में रखें

कम वजन वाले शिशु को घर पर किस तरह गर्म रख सकते हैं


कमरे को गरम रखें

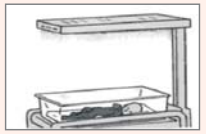

शिशु को गर्म कपड़े में लपेट कर रखें


शिशु को स्तनपान करायें


कँगारू माता देखभाल प्रदान करें

सुविधा में एक बीमार/कम जन्म-भार वाले शिशु को कैसे गरम रखते हैं

1. शिशु को तापक (warmer) के नीचे अथवा इन्क्यूबेटर में रखें



2. शिशु को कँगारू माता देखभाल दें

3. यदि तापक/इन्क्यूबेटर उपलब्ध नहीं है तो नर्सरी को गरम रखें

जन्म भार (कि.ग्रा.)	नर्सरी तापमान
1.0-1.5	30-33°C
1.5-2.0	28-30°C
2.0-2.5	26-28°C

ठंडेपन से ग्रसित शिशु को दुबारा कैसे गरम करें

- गरम कमरा सुनिश्चित करें।
- गीले-ठण्डे कपड़े हटा दें, और गरम कपड़े पहना दें।
- तत्काल छाती-से छाती चिपकाकर शिशु को गरम करें और/अथवा रेड़ीयन्ट हीटर अथवा इन्क्यूबेटर का प्रयोग करें।
- स्तनपान जारी रखें।
- समय-समय पर तापमान की जाँच करते रहें।
- यदि ठंडापन बना रहता है तो संक्रमण रोग की संभावना के लिये देखें।

www. newbornwhocc.org

Hypothermia in Newborns

What is hypothermia?

Hypothermia is defined when baby's body temperature falls below36.5°C

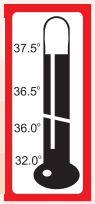
You can measure temperature of a baby by keeping thermometer in roof of axilla for three minutes

Why it is important ?

1. Hypothermia decreases chances of survival of a low birth weight baby
2. Hypothermia aggravates the illness severity in a sick baby
3. Hypothermia decreases growth of a low birth weight baby

Severity of hypothermia

Normal range	(36.5°C to 37.5°C)
Cold stress	(36.0°C to 36.4°C)
Moderate hypothermia	(32.0°C to 35.9°C)
Severe hypothermia	(<32.0°C)



Why does it occur?

1. When delivery room is too cold
2. Baby is not dried immediately after birth
3. Baby is kept away from mother
4. Baby has inadequate clothing
5. Exposure during bathing

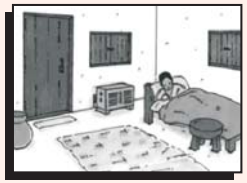
Which babies are at highest risk?

1. Low birth weight babies
2. Sick babies
3. Babies immediately after birth

Prevent heat loss: The warm chain

- **Prevent heat loss at birth**
  - Keep delivery room temperature at least 25°C
  - Dry immediately; wrap in a warm towel
  - Provide skin-to-skin contact, initiate breastfeeding
- **Bathing the infant**
  - Avoid till baby is 2 kg
  - Do not bathe a sick baby
  - Avoid till cord falls in LBW baby
  - Bathe using warm water in a warm room. Dry immediately. Wrap in dry warm towel, cover head. Place near mother.
- **Dress newborns with several layers of loose clothing and monitor temperature**
- **Keep mother and newborn together in a warm room**

How to keep a LBW baby warm at home


Keep the room warm

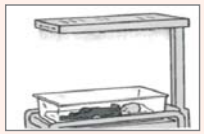

Keep baby wrapped in warm clothes

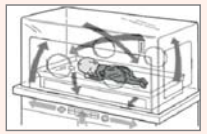

Keep baby on exclusive breast feeding


Provide Kangaroo Mother Care

How to keep a sick/LBW baby warm in facility

1. **Keep baby under radiant warmer or inside an incubator**





2. **Provide Kangaroo Mother Care**

3. **If radiant warmer/incubator not available keep the nursery warm**

Birth weight (kg)	Ideal nursery temperature
1.0-1.5	30-33°C
1.5-2.0	28-30°C
2.0-2.5	26-28°C

How to rewarm a hypothermic baby

- **Ensure a warm room**
- **Remove wet cold clothes, replace with warm clothes**
- **Rewarm quickly by skin-to-skin contact and/or a heating device such as radiant heater or incubator**
- **Continue breast-feeding**
- **Monitor temperature at regular intervals**
- **Assess for infection if hypothermia persists**

www. newbornwhocc.org

Division of Neonatology, Department of Pediatrics, All India Institute of Medical Sciences, New Delhi

ORAL DRILL

There will be an oral drill by the facilitator on **'ASSESSMENT OF TEMPERATURE AND MANAGEMENT OF HYPOTHERMIA'.**

The assessment, clinical features and management of hypothermia are summarized in the following table:

Category	Temp. range	Feel by touch	Clinical features	Action
Normal	36.5 to 37.5°C	Warm abdomen Warm extremities	Normal baby	o Cover adequately with cloth o Keep the baby next to mother o Encourage breast feeding
Mild hypothermia (Cold stress)	36 to 36.4°C	Warm abdomen Cold extremities	Extremities bluish and cold Lethargy Poor weight gain if chronic cold stress	o Skin-to-skin contact o Cover adequately o Ensure room is warm o Encourage breast feeding
Moderate hypothermia	32 to 35.9°C	Cold abdomen Cold extremities	Poor sucking Lethargy Weak cry Fast breathing	o Provide warmth-ensure room temperature 25-28°C, use warm linen , skin to skin care or warmer/bulb o Vitamin K (if not given earlier) o Monitor blood sugar o Reassess every 15 minutes till temperature is normal, subsequently every 30 minutes o Encourage breast feeding
Severe hypothermia	Less than 32°C	Cold abdomen Cold extremities	Lethargic Poor perfusion/mottling Fast or slow breathing Slow heart rate Hardening of skin with redness and edema Bleeding Low blood sugar	o Rapid re-warming till baby is 34°C and then slow re-warming o Give oxygen to maintain SpO2 o IV fluids - Dextrose (monitor blood sugar) o Inj-vitamin K o Reassess every 15 minutes; if temperature doesn't improve, provide additional heat o Once temperature normalizes monitor vitals every 30 minutes.

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 as this can cause skin burns***
- ***Use warm clothes to cover the baby for providing extra warmth; in places where electricity is not available use a tawa to warm the clothes***
- ***During transportation to another hospital, the baby is kept warm by keeping the baby in direct skin-to-skin contact with the mother or another relative***

SELF EVALUATION

1. Newborn baby is prone to develop hypothermia due to

   _____

   _____

   _____

2. Enumerate four mechanisms of heat loss in neonates:

   i _____

   ii _____

   iii _____

   iv _____

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

In labor room		In postnatal ward	
i.	_____	i.	_____
ii.	_____	ii.	_____
iii.	_____	iii.	_____
iv.	_____	iv.	_____
v.	_____	v.	_____

4. Routine temperature should be recorded by _____ route.

5. Normal axillary temperature range is_____to_____

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

   _____

7. A baby with cold stress will have warm abdomen and _____ soles/palms.

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

GROUP DISCUSSION - CASE STUDY

You are posted in postnatal ward. A recently delivered mother complains that her baby is lethargic. On examination you find a 6 hr old, 2.2 kg baby lying away from mother. The baby has not been dressed in any clothes and only wrapped in a hospital cotton sheet. Heart rate is 140/minute, RR 56/minute. Extremities are cold to touch and bluish while abdomen is warm to touch. You record axillary temperature which is 36.1°C. The room temperature is 22°C.

Q1. What is the problem with this baby?

_____

_____

_____

Q2. What are the adverse effects of this condition?

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

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

_____

_____

_____

Q.5 What type of thermometers are available in your hospital? Do they measure temperature below 35.5°C?

_____

_____

_____

ROLE PLAY

You will observe the 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 a baby warm in postnatal ward.

Checklist for the demonstration role play

A (Ask)

_____

_____

L (Listen)

_____

_____

P (Praise)

_____

_____

A (Advise)

_____

_____

C (Check understanding)

_____

_____

Checklist for role play by the participants

A (Ask)

_____

_____

L (Listen)

_____

_____

P (Praise)

_____

_____

A (Advise)

_____

_____

C (Check understanding)

_____

_____

8. KEEPING RADIANT WARMER OR INCUBATOR READY TO RECEIVE A BABY

Prepare a bed at least 20-30 minutes before the baby arrives in the nursery to ensure the baby is received in warm, comfortable environment.

Keeping radiant warmer ready*

1. Clean the radiant warmer properly before use.
2. Switch on the mains.
3. Put the baby sheet on the bed. Arrange all the necessary items near the bed.
4. Put the radiant warmer on the manual mode with 100% heater output for atleast 20 minutes so that the temperature of all items likely to come in contact with baby are warm.
5. Cover the head and feet of the baby, while under radiant warmer.
6. Ensure skin probe is applied to baby in servo with desired setting 36.5°C.

Keeping incubator ready*

1. Clean the incubator properly before use.
2. Switch on the mains.
3. Put the baby sheet on the bed. Arrange all the necessary items near the bed.
4. Put the incubator ON in air mode with 33°C for at least 30 minutes before
6. Shift to skin servo mode with temperature set at 36.5°C.
7. Manage via portholes and combine various activities.

** For more details refer to module on equipments*

9. HYPERTHERMIA/HIGH TEMPERATURE

9.1 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 layers of clothes
- The baby has an infection.
- Baby has dehydration due to low intake of breastmilk

9.2 How to prevent high temperature?

- Keep the baby away from sources of heat (warmer, hearter, etc.), direct sunlight
- If the baby feels hot, remove a layer of clothing
- If the baby has been under a radiant warmer
  - 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.
  - Ensure the temperature probe is properly secured .

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

The steps are summarized below:

Treatment of hyperthermia due to overheating

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

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.

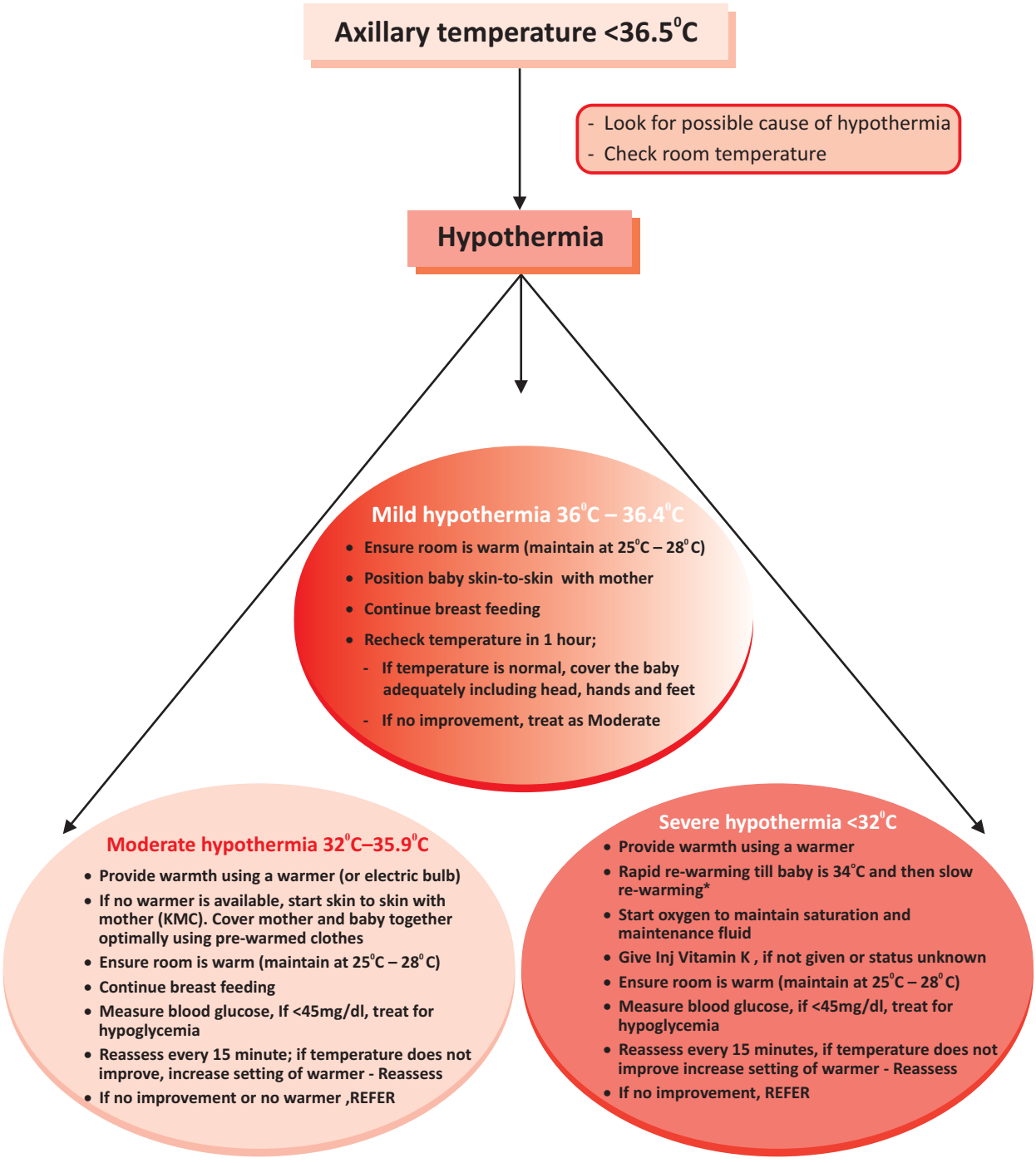
A temperature below 35.5°C is a danger sign. A temperature above 37.5°C not due to excess warming is a danger sign.

Avoid ice cold water or ice for sponging. Use tap warm water

Recommended reading

- Thermal Protection of the Newborn: A Practical Guide WHO WHO/RHT/MSM/97.2
- Teaching Aids NNF, Publication of National Neonatology Forum of India 2005, 3rd Ed., Deorari AK (Ed)

Hypothermia



*Hypothermia can be a sign of infection

* Initially use high setting of the warmer and if the baby's temperature has been increasing at least 0.5°C per hour over the last 3 hours, rewarming is successful, shift to lower setting of warmer and continue measuring the baby's temperature every 2 hours

Hyperthermia

Axillary temperature >37.5°C

↓

Hyperthermia

↓

- Look for possible cause
- Check room temperature (maintain at 25-28°C)
- Look for signs of infection
- Look for signs of dehydration*

↓

- Keep baby away from source of heat (warmer, heater, sunlight)
- Remove extra clothes
- Decrease environmental temperature (if needed)
- Recheck baby's temperature every 1 hour till normal
- If >39°C, sponge the baby with luke warm water
- Treat underlying cause
- Ensure adequate feeding or fluids
- Treat dehydration* by supplementing extra feeds or fluids
- Measure blood glucose; if <45mg, treat for hypoglycemia
- **Do not give antipyretic**

* **Signs of dehydration in a newborn**

- Sunken eyes, or
- Depressed fontanelle, or
- Loss of skin elasticity, or
- Dry tongue and mucous membrane

Hyperthermia can be a sign of infection

KANGAROO MOTHER CARE

This module on Kangaroo Mother Care is designed to complement pre-sevice and in-service education of nursing personnel involved in care of newborn babies.

LEARNING OBJECTIVES

After learning through this module participants will be able to :

- **Distinguish between kangaroo mother care (KMC) and skin-to-skin care at birth**
- **List the components and prerequisite of KMC**
- **Enumerate the benefits of KMC and describe the procedure**
- **Discuss how to counsel a mother for KMC initiation**

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.
- ***Clinical skills:*** Practising skills of initiation and supporting KMC in actual case scenarios in a hospital setting.
- ***Demonstration:*** There will be a demonstration on practice and procedure of KMC using a poster.
- ***Video Film:*** Learn how to initiate KMC. Listen to the views of mothers, family members, and health professionals regarding KMC.
- ***Role-play:*** Observe steps of counseling a mother for initiation of KMC. Participants will also be provided with an opportunity to do role play.
- ***Self-evaluation:*** At the end of text, self evaluation based on what has been learnt is included. If you need to recapitulate, feel free to refer to text material.

1. WHAT IS KANGAROO MOTHER CARE?

Kangaroo mother care (KMC) is a simple method of care for low birth weight babies .This includes early, prolonged and continuous skin-to-skin contact with the mother (or any caregiver) and exclusive and frequent breastfeeding (optimal feeding). This natural form of humane care stabilises body temperature, promotes breastfeeding and prevents infection. KMC is initiated in the hospital and continued at home as long as the baby needs and likes it.

KMC must not be confused with routine early skin-to-skin care at birth. The World Health Organization (WHO) recommends skin-to-skin care immediately after birth for every newborn to ensure that all babies stay warm in the first hours of life helps in early initiation of breastfeeding . This intervention for all newborns, irrespective of weight, promotes newborn transition and promotes exclusive breastfeeding

1.1 The two components of KMC are:

i. Skin-to-skin contact

Early, continuous and prolonged skin-to-skin contact between the mother and her baby is the basic component of KMC. The infant is placed on her mother's chest between the breasts.

ii. Exclusive breastfeeding

The baby on KMC is breastfed exclusively. Skin-to-skin contact promotes lactation and thus facilitates exclusive breastfeeding.

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

1.2 The two pre-requisites of KMC are:

i. Support to the mother in hospital and at home

A mother needs counseling, support, and supervision from healthcare providers for initiating KMC in the hospital. She also requires assistance and cooperation from her family members for continuing KMC at home.

ii. Post discharge follow-up

KMC is continued at home after early discharge from the hospital. A regular follow up and access to healthcare providers for solving problems, if any, are crucial to ensure safe and successful KMC at home.

Components of KMC

- *Skin-to-skin contact*
- *Exclusive breastfeeding*

Pre-requisites of KMC

- *Support to the mother in hospital and at home*
- *Post-discharge follow up*

2. BENEFITS OF KMC

i. Breastfeeding

Studies have revealed that KMC results in increased breastfeeding rates as well as duration of breastfeeding. Even if initiated late and practiced for a limited duration, KMC has still been shown to exert a beneficial effect on breastfeeding.

ii. Thermal control

Prolonged skin-to-skin contact between the mother and her preterm/ LBW infant stabilizes the baby's body temperature with a reduced risk of hypothermia. For stable babies, KMC is nearly equivalent to incubator care in terms of safety and thermal protection.

iii. Early discharge

Studies have shown that KMC cared LBW infants could be discharged from the hospital earlier than the conventionally managed babies. The babies gain more weight on KMC than on conventional care. At least a minimum of 6-8 hours per day and at least more than one hour per sitting should be practiced to get maximum benefit.

iv. Less morbidity and mortality

Babies receiving KMC have more regular breathing and less predisposition to apnea. KMC protects against nosocomial infections. Even after discharge from the hospital, the morbidity amongst babies managed by KMC is less. KMC is associated with reduced incidence of severe illness including pneumonia during infancy. Studies have shown that KMC leads to a significant reduction of neonatal mortality when compared to conventionally cared babies.

v. *Other effects*

KMC helps both infants and parents. Mothers are less stressed during kangaroo care as compared with a baby kept in incubator. Mothers prefer skin-to-skin contact to conventional care. They report a stronger bonding with the baby, increased confidence, and a deep satisfaction that they were able to do something special for their babies. Fathers felt more relaxed, comfortable and better bonded while providing kangaroo care.

Benefits of KMC: *Effective thermal control, increased breastfeeding rates, early discharge, decreased neonatal mortality, less morbidities such as apnea and infection, less stress, and better infant bonding.*

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

3. REQUIREMENTS FOR KMC IMPLEMENTATION

- Training of nurses, physicians and other staff involved in the care of the mother and the baby
- Educational material such as information sheets, posters and video films on KMC in local language should be available to the mothers, families and community
- If possible, reclining chairs in the nursery and postnatal wards, and beds with adjustable back rest should be arranged. Mother can provide KMC sitting on any comfortable chair/sofa or in a semi-reclining posture on a bed with the help of pillows

- ***Once KMC is implemented, health professionals recognise importance of KMC. Health benefit of KMC to babies and emotional satisfaction to mothers helps in its scaling up in health facilities.***
- ***KMC does not require extra staff or expensive articles.***
- ***KMC can be provided by anyone (who is motivated), anywhere and anytime.***
- ***Do not wait for written order of the physician. KMC can be initiated once the baby is stable.***

DEMONSTRATION

Facilitator will conduct a demonstration on KMC using a poster

कंगारू माता देखभाल

(कंगारू मदर केयर : के.एम.सी)

कंगारू माता देखभाल (के.एम.सी.) क्या होती है?

इस विधि में माँ अपने शिशु को अपनी नग्न छाती से चिपका कर रखती है

के.एम.सी. से गर्मी मिलती है, स्तनपान को बेहतर करती है व साँस ठीक से लेने में सहायता करती है।

के.एम.सी. कैसे दी जाती है?

माँ बैठी हुई अथवा आधी लेटी हुई अवस्था में होनी चाहिए।

जितना समय तक संभव हो, के.एम.सी. दें।

किन शिशुओं को के.एम.सी. की जरूरत होती है?

2.5 कि.ग्रा. से कम जन्म-भार वाले सभी शिशुओं को के.एम.सी. की आवश्यकता होती है।

सभी कम जन्म-भार वाले शिशुओं को के.एम.सी. से लाभ होता है।

के.एम.सी. कहाँ पर दी जा सकती है?

नर्सरी अथवा प्रसवोत्तर वार्ड

कब तक के.एम.सी. देते रहना चाहिए?

घर पर भी जारी रखनी चाहिए

माँ के अलावा और कौन के.एम.सी. दे सकता है?

परिवार का कोई भी सदस्य जैसे दादी, नानी, दादा, पिता के.एम.सी. दे सकता है।

के.एम.सी. की घटक क्या हैं?

माँ का अपनी छाती के साथ शिशु को चिपकाए रखना

स्तन-पान

के.एम.सी. देने के लिए आवश्यकताएं

माँ की मदद करना और अस्पताल से छुट्टी के बाद उपचार प्रदान करना

लाभ :

- शिशु उचित गर्म रहता है।
- स्तन-पान को बढ़ावा देती है।
- शिशु के मानसिक व शारीरिक विकास में सुधार करती है।
- अस्पताल से जल्दी छुट्टी होती है।
- शिशु में होने वाले रोगों की संभावना को कम करती है।
- शिशु-माँ के आपसी बंधन को बढ़ावा देती है।

कंगारू माता देखभाल
शिशु का अधिकार माँ का प्यार

आप किस लिए इन्तजार कर रहे हैं?

के.एम.सी. एक आसान, कम-खर्च तथा अति प्रभावी उपचार है जो कम जन्म-भार वाले शिशुओं को फायदा पहुँचाती है।

- शिशुओं तथा उनकी माताओं को के.एम.सी. अच्छी लगती है
- आप भी अपनी यूनिट में के.एम.सी. को बढ़ावा दे सकते हैं
  चाहें तो आज से ही शुरू कर सकते हैं
- सभी कम जन्म-भार वाले शिशुओं के लिए के.एम.सी. सुनिश्चित कीजिए।

AIIMS, New Delhi · ICG, Chennai · KEM, Mumbai · KGMU, Lucknow · PGI, Chandigarh

KMC India Network

Save the Children® USA

कृपया और अधिक जानकारी के लिए हमारी वेबसाईट www.kmcindia.org पर लॉग ऑन करें।

KANGAROO MOTHER CARE

Kangaroo Mother Care India Network

What is Kangaroo Mother Care (KMC)?

Skin to skin contact between baby and mother's chest

Provides warmth, prevents apnea stimulates breathing

How to provide KMC?

Mother should be in sitting or semi reclined position

Provide KMC for as long as possible

Which babies need KMC

All stable LBW babies are eligible for KMC

All LBW babies benefit from KMC

Where can KMC be provided?

Nursery or postnatal ward

How long should KMC be practiced?

Should be continued at home

Who else can provide KMC?

Any family member can provide KMC

What are the components of KMC?

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

Exclusive breast feeding

Pre-requisites of KMC

Support to mother & post-discharge follow-up

Benefits

- *Provides warmth to the baby*
- *Promotes exclusive breast feeding*
- *Improves weight gain & growth*
- *Reduces hospital stay*
- *Reduces infection*
- *Promotes baby-mother bonding*

What are you waiting for ?

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...*
- *Ensure KMC for all stable LBW babies*

KMC India Network

Save the Children® USA

For more information visit www.kmcindia.org

4. ELIGIBILITY CRITERIA

4.1. Baby

All stable LBW babies are eligible for KMC. However, very sick babies needing special care should be cared under radiant warmer initially. KMC should be started after the baby is hemodynamically stable. Guidelines for practicing KMC include:

i. ***Birth weight ≥1800 g:*** These babies are generally stable at birth. Therefore, in most of them KMC can be initiated soon after birth.

ii. ***Birth weight 1200-1799 g:*** Many babies of this group have significant problems in neonatal period. It might take a few days before KMC can be initiated. If such a baby is born in a place where neonatal care services are inadequate, baby should be transferred to a proper facility after initial stabilization. One of the best ways of transporting small babies is by keeping them in continuous skin-to-skin contact with the mother / family member.

iii. ***Birth weight <1200 g:*** Frequently, these babies develop serious prematurity-related morbidities often starting soon after birth. They benefit the most from in-utero transfer to the institutions 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 may still be on intravenous fluids, tube feeding and/or oxygen and even on CPAP***

4.2 Mother

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

i. ***Willingness:*** The mother must be willing to provide KMC. Healthcare providers should counsel and motivate her. Once the mother realizes the benefits of KMC for her baby, she will learn and undertake KMC.

ii. ***General health and nutrition:*** The mother should be free from serious illness to be able to provide KMC. She should receive adequate diet as recommended by her physician.

iii. ***Hygiene:*** The mother should maintain good hygiene - daily bath/sponge, change of clothes, hand washing, and short and clean finger nails.

iv. ***Supportive family:*** Apart from supporting the mother, family members should also be encouraged to provide KMC when mother wishes to take rest or she is too sick to provide KMC. Mother would need family's cooperation to deal with the daily household chores while the baby is requiring KMC.

v. ***Supportive community:*** Community awareness about the benefits should be created. This is particularly important when there are social, economic or family constraints.

5. PREPARING FOR KMC

5.1 Counseling

When the baby is ready for KMC, arrange a time that is convenient to the mother and her baby. The first few sessions are important and require extended interaction. Demonstrate her the KMC procedure in a caring and gentle manner. Answer her queries patiently and allay her anxieties. Encourage her to bring her mother/mother-in-law/husband or any other member of the family. It helps in building positive attitude of the family and ensuring family support to the mother which is particularly crucial for post-discharge home-based KMC. It is helpful if the mother starting KMC interacts with someone who is already practicing KMC.

5.2 Mother's clothing

KMC can be provided using any front-open, light dress as per the local culture. KMC works well with blouse and sari, gown, front open kurta, shirt or shawl. A suitable dress that can retain the baby for extended period of time can be adapted locally.

5.3 Baby's clothing

Baby is dressed with cap, socks, nappy, and front-open sleeveless shirt or 'jhabala'.

6. TIME OF INITIATION

KMC can be started as soon as the baby is stable. Babies with severe illnesses or requiring special treatment should be managed according to the unit protocol. Short KMC sessions can be initiated during recovery with ongoing medical treatment (IV fluids, oxygen therapy). KMC can be provided while the baby is being fed via orogastric tube or on nasal cannula oxygen.

7. THE KMC PROCEDURE

7.1 Kangaroo positioning

- Baby should be placed between the mother's breasts in an upright position
- Head should be turned to one side and in a slightly extended position. This slightly extended head position keeps the airway open and allows eye to eye contact between the mother and her baby
- Hips should be flexed and abducted in a "frog" position; the arms should also be flexed
- Baby's abdomen should be at the level of the mother's epigastrium. Mother's breathing stimulates the baby thus reducing the occurrence of apnea
- Support the baby's bottom with a sling/binder

Kangaroo positioning

Baby upright between mother's breasts

7.2 Monitoring

Babies receiving KMC should be monitored carefully especially during the initial days. Nursing staff should make sure that baby's neck position is neither too flexed nor too extended, airway is clear, breathing is regular, color is pink and baby is maintaining temperature. Mother should be involved in observing the baby during KMC so that she can continue monitoring at home.

Ensure that baby's neck is not too flexed or too extended, breathing is normal, and feet and hands are warm during KMC

7.3 Feeding

Mother should be explained how to breastfeed while the baby is in KMC position. Holding the baby near the breast stimulates milk production. She may express milk while the baby is still in KMC position. The baby could be fed with paladai, spoon or tube depending on the condition of the baby.

7.4 Privacy

KMC unavoidably leads to some exposure on the part of the mother. This can make her nervous and could be de-motivating. The staff must respect mother's sensitivities in this regard and ensure culturally acceptable privacy standards in the nursery and the wards where KMC is practiced.

8. DURATION OF KMC

- Skin-to-skin contact should start gradually in the nursery with a smooth transition from conventional care to continuous KMC
- Sessions that last less than one hour should be avoided because frequent handling may be stressful for the baby
- The length of skin-to-skin contacts should be gradually increased up to 24 hours a day, interrupted only for changing diapers. Minimum duration of 6-8 hours should be practiced.
- When the baby does not require specialised care, she should be transferred to the postnatal ward where KMC should be continued

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

A comfortable chair with adjustable back may be useful to provide KMC during sleep and rest. In the KMC ward or at home, the mother can sleep with the baby in kangaroo position in a reclined or semirecumbent position, about 45º from above the ground. This can be achieved with an adjustable bed or with several pillows on an ordinary bed. It has been observed that this position decreases the risk of apnea in the baby. A supporting garment to carry the baby in kangaroo position will allow the mother, the father or the relatives to sleep with the baby in that position.

Father providing KMC

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

10. FROM HOSPITAL TO HOME

10.1 Criteria to transfer the baby from nursery to the ward

Standard criteria of the unit for transferring baby from the nursery to the postnatal ward should be as follows:

- Stable baby
- Gaining weight
- Mother confident to look after the baby

10.2 Discharge criteria

The standard policy of the unit for discharge from the hospital should be followed. Generally the following criteria are accepted at most centers:

- Baby's general health is good and no evidence of infection
- Feeding well and receiving exclusively or predominantly breast milk
- Gaining weight (at least 15-20 gm/kg/day for at least three consecutive days)
- Maintaining body temperature satisfactorily for at least three consecutive days at room temperature.
- The mother and family members are confident about giving KMC and are willing to come for follow-up visits regularly

11. WHEN SHOULD KMC BE DISCONTINUED?

If the mother and baby are comfortable, KMC can be continued for as long as possible initially in the hospital and then at home. Often this is desirable until the baby's gestation reaches term or the weight is around 2500g. The baby starts wriggling to show that she is uncomfortable, pulls her limbs out, cries and fusses every time the mother tries to put her in skin-to-skin position. This is the time to wean the baby from KMC. Mothers can provide skin-to-skin contact occasionally after giving the baby a bath and during cold nights.

12. POST-DISCHARGE FOLLOW UP

Close follow up is a fundamental pre-requisite of KMC practice. Each unit should formulate its own policy for follow up of these small babies undergoing KMC.

In general, a baby is followed up once or twice a week until 37-40 weeks of post conceptional age or the baby reaches 2.5-3.0 kg of weight (smaller babies discharged earlier would need more frequent follow-up visits). Thereafter, a follow-up once in two weeks may be enough till 3 months of age. Later the baby should be seen at an interval of 1-2 months during first year of life.

The baby should gain adequate weight (15-20 gm/kg/day up to 40 weeks of post conceptional age and 10 gm/kg/day subsequently). More frequent visits should be planned if the baby is not growing well.

References

- World Health Organization. Kangaroo mother care: a practical guide. Department of Reproductive Health and Research, WHO, Geneva.2003
- Udani RH, Nanavati RN. Training manual on Kangaroo Mother Care. Published by the Department of Neonatology, KEM Hospital and Seth GS Medical College, Mumbai. September 2004
- Website of KMC India Network . Guidelines for parents and health providers are available online at *www.kmcindia.org*
- Government of India. Guidelines for for operationalisation of Kangroo Mother Care 2014.

SELF EVALUATION

1. Components of KMC include

   a._____ b. _____

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. Can she provide KMC during the night while she is sleeping?

   _____

7. Mention the discharge criteria of a baby receiving KMC.

   _____

   _____

   _____

   _____

8. Can KMC be provided in the following scenarios:

   i. Baby on OG tube feed Yes/No

   ii. Baby receiving in IV fluids Yes/No

   iii. Baby receiving free flow O_2 Yes/No

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

VIDEO

There will be a video demonstration on initiation and procedure of KMC. This will be followed by discussion.

1. Following aspects of KMC were shown

   i. _____

   ii. _____

   iii. _____

   iv. _____

   v. _____

2. Comments on Video

Good aspects	Needs improvement
_____	_____
_____	_____
_____	_____

3. Video covered

Demonstrated procedure of KMC	Yes/No
Precautions to be taken while practicing KMC	Yes/No
Benefits of KMC	Yes/No
Views of mothers and nurses	Yes/No

ROLE PLAY

There will be a role-play on 'motivating and counselling a mother for providing KMC'.

Checklist for demonstration role play

A (Ask)

L (Listen)

P (Praise)

A (Advise)

C (Check understanding)

Checklist for role play by participants

A (Ask)

L (Listen)

P (Praise)

A (Advise)

C (Check understanding)

FEEDING OF NORMAL AND LOW BIRTH WEIGHT BABIES

The module is designed to complement in-service and pre-service education and orientation of nursing personnel involved in care of newborns.

LEARNING OBJECTIVES

The participants will learn about:

- **Enteral feeding of normal birth weight and low birth weight babies**
- **Breastfeeding counseling and support**
- **Managing common problems encountered during breastfeeding**
- **Feeding by *paladai* and intra-gastric tube**

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.
- ***Demonstration:*** Observing steps involved in successful breast feeding in a hospital setting.
- ***Role play:*** There will be a role play on "initiation of breastfeeding".
- ***Video film:*** Learning positioning, attachment, and effective sucking by baby on breast.
- ***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.

I. FEEDING OF NORMAL BIRTH WEIGHT BABIES

1. INTRODUCTION

The best milk for a newborn baby is unquestionably the breast milk. All healthy normal weight babies ($\geq$ 2500g) must be exclusively breastfed till the age of 6 months. Health professionals must have adequate knowledge and skills in order to support and help mothers in establishing breastfeeding successfully.

2. BREASTFEEDING

It is essential to help the mothers of healthy newborn babies to establish breastfeeding as soon as possible after delivery. Health workers should know about the advantages of breast milk, the anatomy of breast and physiology of lactation so that they can teach and counsel the mothers with confidence. All newborns without any complications should be kept in skin to skin contact with their mothers during the first hour after birth to promote breast feeding & to prevent hypothermia.

Exclusive breastfeeding should be given for the first six months of life; complementary food should be started after six months of age.

2.1 Advantages of breastfeeding

Exclusively breast fed babies are at decreased risk of

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

The advantages of breast feeding are summarized in Figure 1.

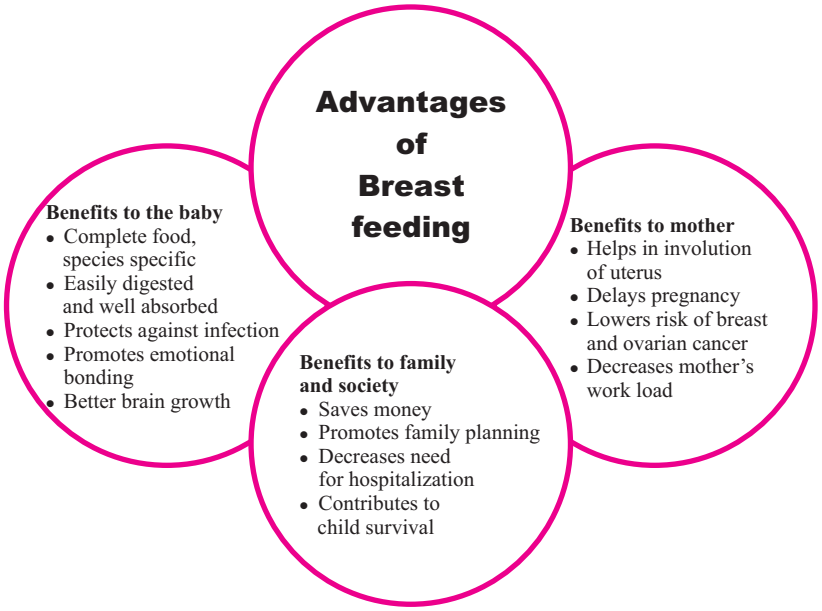


Figure 1: Advantages of breast feeding

2.2 Anatomy and physiology

The breast consists of glandular tissue, 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 beneath the areola. They open out on to the nipple through lactiferous ducts. A thin layer of muscle (myo-epithelium) surrounds each gland. The contraction of these muscles causes ejection of milk from the glands (see Figure 2).

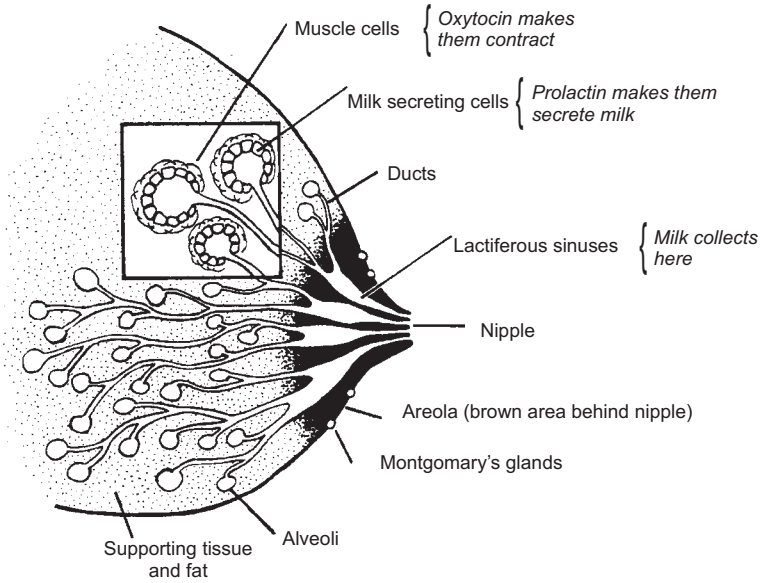


Figure 2: Anatomy of breast

2.3 Milk secretion and ejection

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.

a. 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 information to the anterior pituitary gland 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 mothers to feed baby early and frequently and ensure complete emptying of the breasts at each feed. Since prolactin reflex is active at night, night feeding (or expression of milk) helps to improve milk production.

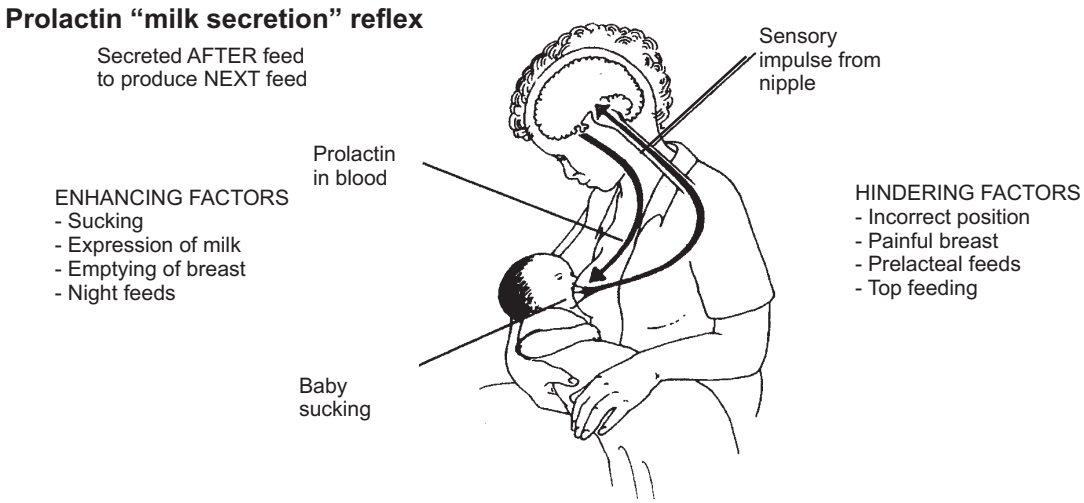


Figure 3: Prolactin reflex

b. Oxytocin reflex

Oxytocin is a hormone produced by the posterior pituitary gland. It is responsible for contraction of the myo-epithelium around the glands leading to ejection of the milk from the glands into the lactiferous sinuses and the lacteal ducts.

This hormone is produced in response to stimulation of 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.

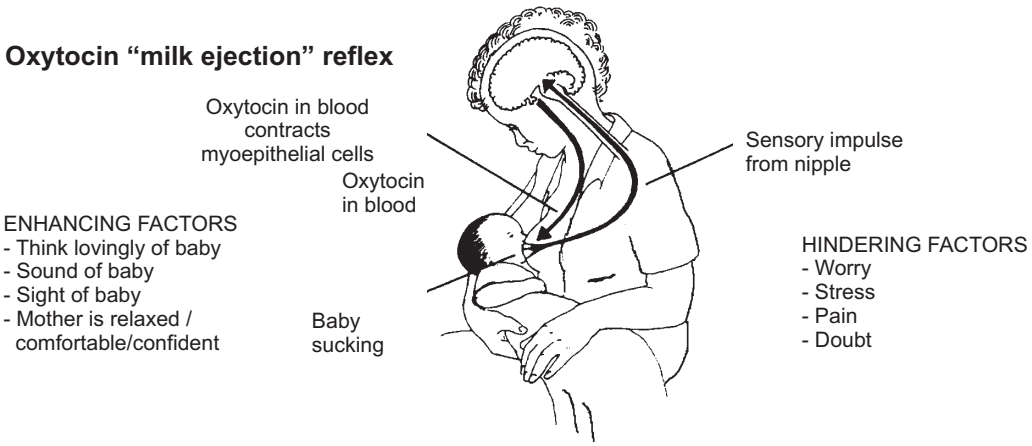


Figure 4: Oxytocin reflex

Sucking by the baby is the most important stimulus for production and secretion of milk in the mother

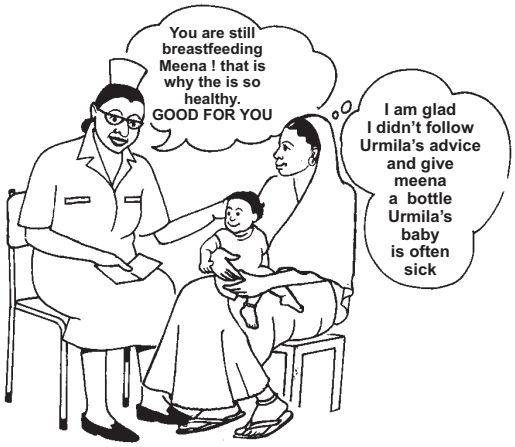
DEMONSTRATION

There will be demonstration using Wall Charts by the facilitators on 'Anatomy of breast and physiology of lactation'.

2.4 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 the milk of a mother who has delivered a full term baby.

1. ***Colostrum*** is the milk secreted during the first week after delivery. It is yellow, thick and contains 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, and 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, 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 fully before offering the other one. Baby receiving predominant foremilk may cry excessively.



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

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 (let down) is 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.

3. HELPING A MOTHER TO BREASTFEED

All mothers, particularly the first-time mothers would require some help to initiate breastfeeding. Hence it is important for the health care providers to help them to breastfeed their babies. The steps are summarized below.

Step 1: Preparing the infant and the mother

- Ensure that the infant is clinically stable
- Ensure that the infant is alert
- Make sure that the mother is comfortable and relaxed
- Make her sit down in a comfortable and convenient position

Step 2: Demonstrate various positions for breastfeeding a baby

Underarm position

Using the opposite arm

Mother in lying down position

A mother can feed the infant in various positions as shown above. Whatever the position, it is important to remember that the baby has to be fully **supported** with her forearm and the hands.

Step 3: Demonstrate the four key points in position

The **four key points** in proper **positioning**:

- Baby's head in line with the body
- Whole body well supported
- Baby turned towards the mother
- Baby's abdomen touching mother's abdomen

Step 4: Show the mother how to support her breast with the other hand

Explain the mother that she should

- put her fingers below her breast
- use her first finger to support the breast
- put her thumb above the areola helping to shape the breast
- not keep her fingers near the nipple

Step 5: Showing the mother how to help the baby to attach

Ask the mother to

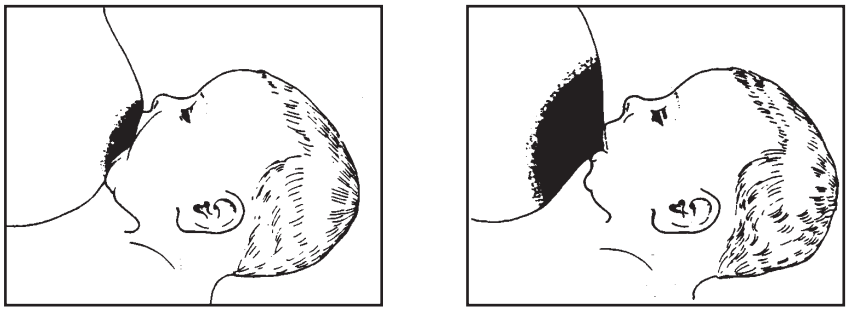
- express a little milk on to her nipple
- touch the baby's lips with her nipple
- wait until the baby's mouth is opening wide, and the tongue is down and forward
- move the baby quickly onto her breast, aiming the nipple towards the baby's palate and his lower lip well below the nipple

Step 6: Look for signs of good attachment

The four key signs of good attachment are:

- More areola is visible above the baby's mouth than below it
- Baby's mouth is wide open
- Baby's lower lip is turned outwards
- Baby's chin is touching the breast

Examples of good and poor attachment are shown in Figure 5



Good attachment **Poor attachment**

Figure 5: A well attached and poorly attached infant

The causes of poor attachment include:

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

Hence it is very important NOT TO INTRODUCE BOTTLE FEEDS at any point of time. Poor attachment usually leads to problems such as:

- Pain or damage to nipple or sore nipple
- Breast engorgement as milk is not removed effectively
- Hungry and irritable baby because of poor milk supply
- Poor weight gain of the baby

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

For an infant who shows signs of good attachment, the next step would be to assess if he/she suckles and swallows effectively:

Step 7: Assess if the infant is suckling and swallowing effectively

Effective sucking	Ineffective sucking
Infant takes several slow deep sucks followed by swallowing, and then pauses	Infant suckles for a short time but tires out and is unable to continue for long enough.

If an infant is not able to attach and suckle effectively at the breast, or is not able to suckle for long enough to complete a feed, he or she will need to be fed with a spoon or paladai until effective feeding ability develops.

4. HELP MOTHER RECOGNIZE WHEN THE BABY IS READY TO BREASTFEED

A normal newborn baby will show one or more of the following signs when he is ready to breastfeed:

- Opens eyes
- Seeks breast
- Head back slightly
- Tongue down and forward
- Mouth wide open
- Licks and saliva drips

5. HOW FREQUENTLY A MOTHER HAS TO BREASTFEED HER BABY?

A healthy newborn baby can be breastfeed ON DEMAND i.e. whenever the baby cries for feeds. The usual time interval between each feed is about 2 to 3 hours. Mothers should be advised that they should feed their babies AT LEAST 8-10 times in 24 hours and importantly they should not omit any night feeds.

6. ASSESSING THE ADEQUACY OF BREASTFEEDING

After the mother has been counseled and helped in establishing breastfeeding successfully, ensure that the infant is getting enough breast milk. Often, mothers would be worried about the amount of milk secreted and whether it is sufficient for their babies. It is the duty of health personnel to assess and then reassure about the adequacy of breastfeeding.

Breastfeeding is considered adequate if it results in softening of breast after feeding and the baby

1. Sleeps well in between feeds
2. Passes urine at least 6-8 times in a day
3. Crosses birth weight by 2 weeks
4. Gains weight at least @ 25-30 g/day after initial 7-10 days

Breastfeeding is considered adequate if the infant passes urine 6-8 times in 24 hours, sleeps for 2-3 hrs after feeds, and gains weight adequately

7. EXTRA NUTRITION FOR MOTHER

The energy requirements of women are increased by pregnancy (+350 Kcal) and lactation (+600Kcal daily during first 6 months and +520Kcal during next 6 months) over and above their normal requirements. This is to provide for the extra energy needs associated with the deposition of tissues or the secretion of milk with good health.

8. PROMOTING EXCLUSIVE BREASTFEEDING

It is the duty of the health personnel to ensure exclusive breastfeeding in the postnatal wards and nurseries. All mothers should be helped and supported in establishing breastfeeding. If there are any problems, they must be attended to. Mothers should also be counseled regarding exclusive breastfeeding at the time of discharge.

9. EARLY BREASTFEEDING

- Helps establish successful and exclusive breastfeeding
- Helps the uterus contract to decrease bleeding after birth
- Encourages maternal-baby bonding

To encourage early breastfeeding, position the baby near the mother's breasts, where the baby can attach when ready to feed. Though a baby may not feed successfully during the first hour after birth, it is important to encourage breastfeeding during this time. To encourage early breastfeeding, keep mother and baby together unless a problem separates them. Babies are often alert immediately after birth and will move and turn toward the mother's breast .

Key messages to promote exclusive breast feeding

1. Promote skin to skin contact at birth and put baby to breast as soon as possible after birth. This is important for the mother, baby, and for milk production
2. On the first day, breast milk is thick and yellowish (known as colostrum). Feeding this milk provides nutrition and prevents infections. Some babies will not latch during first feeding session. Give no liquids other than breast milk (or colostrum) even if the baby does not feed. DO NOT DISCARD COLOSTRUM
3. Keep baby close to mother. It is safe for baby to sleep with mother
4. Mother may lie down, sit on a bed, chair or floor to breast feed her baby
5. Breast feed during day and at night for at least eight to ten times and whenever baby cries with hunger
6. The more the baby sucks at breast, more milk the breast will produce and healthier the baby becomes
7. 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
8. Give baby only breast milk for the first six months
9. Don't give baby ghutti water, gripe water, honey, animal or powdered milk
10. NEVER use bottles or pacifier

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. _____

   iiii. _____

2. Comments on video

Good aspects	Need improvement
_____	_____
_____	_____
_____	_____

3. Video covered

   i. Preparing the baby and mother for breast feeding: Yes/No

   i. Four signs of good attachment: Yes/No

   ii. Four signs of good positioning: Yes/No

   iii. Signs of effective sucking: Yes/No

7. ISSUES IN BREAST FEEDING

7.1 Inverted / flat nipples

Flat or short nipples which protract well (become prominent or pull out easily) do not cause difficulty in breast feeding. Only 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. To improve attachment in inverted nipple stimulate nipple before feeding and shaping breast by supporting underneath with the fingers and pressing above with the thumb. A plastic syringe is used to draw out the nipple and the baby is then put to the breast.

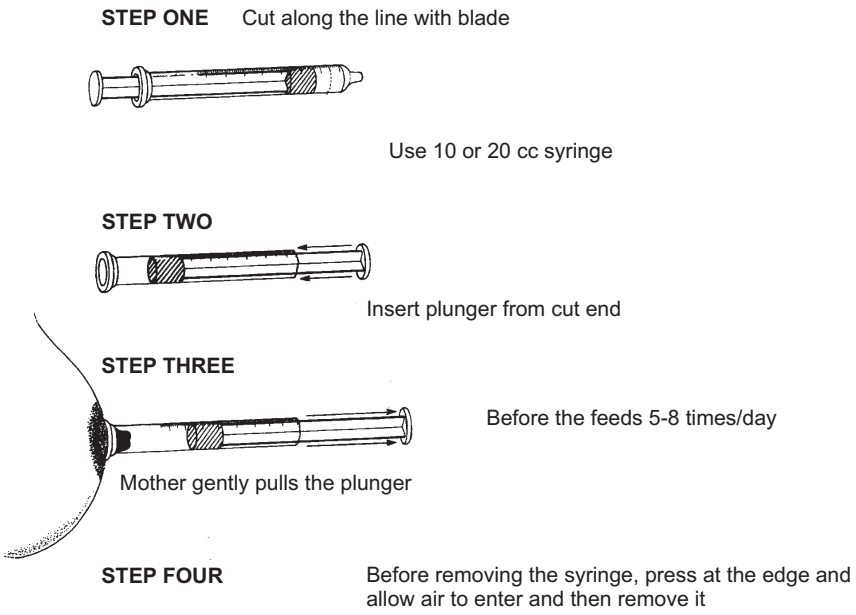


Figure 6: Management of inverted nipple using syringe

7.2 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. This results in pain during feeding and fissures or cracks on nipple. Frequent washing with soap and water and pulling the baby off the breast while he is still sucking may also result in sore nipple. Fungal infection may cause sore nipple after the first few weeks.

Treatment consists of ensuring 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

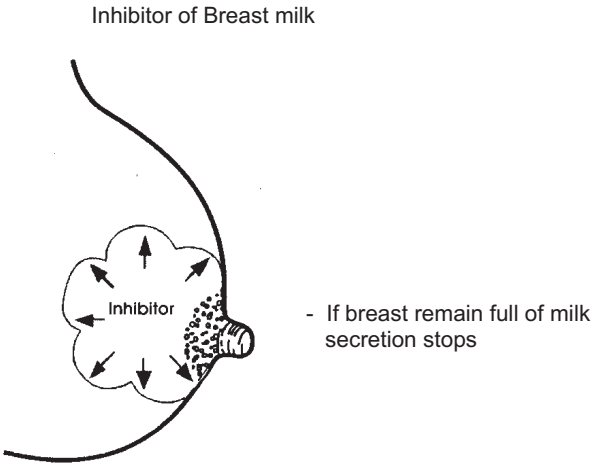
- Incorrect attachment: Nipple sucking
- Frequent use of soap and water
- Fungal infection of nipple (especially after the first week of life)

Treatment

- Continue breast feeding and change position. Attach baby to the areola while feeding
- Apply hind milk to the nipple after breast feed
- Expose the nipple to air between feeds. Do not wash each time before and after feed
- Use local antifungal medication when indicated

7.3 Breast engorgement

Milk production increases during the second and third day after delivery. If feeding is delayed, 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 often mother feels ill 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 for not more than 15 minutes. 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.

7.4 Breast abscess

If conditions like engorged breast, cracked nipple, blocked duct or mastitis are not treated early, then breast abscess may develop. 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.

7.5 Not enough milk

Mothers often complain that they do not have enough milk. One has to make sure that her perception about adequacy of milk is true. Only 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.

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

Figure 7: A helper rubbing a mother's back to release her stress

Back massages are helpful in relaxation of mother which stimulates 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

8. CONTRAINDICATIONS TO BREAST FEEDING

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

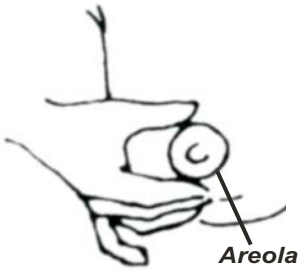
1. ***Mother on antimetabolite/anticancer/radioactive drug:*** In these situations, breastfeeding should be withheld for the period the mother is on the drug. Meanwhile she can express and discard the milk so as to maintain lactation. Mother can resume breast feeding after a certain period of cessation of the medication.
2. ***Inborn error of metabolism:*** Inborn errors of metabolism like galactosemia and phenylketonuria. Infants with some IEM should not be breast fed. It is ideal to consult an expert in Genetics before deciding to stop breastfeeding.
3. ***HIV :*** Exposed infants <6 months of age, exclusive breastfeeding is the preferred feeding option. If breastfeeding may not be possible, for example in situations of maternal death and severe maternal illness replacement Exclusive feeding should be done only when AFASS (Available, Feasible, Affordable, Safe, Sustainable) criteria are fulfilled. More details on module on 'Care of Normal Newborn'

EXPRESSION OF BREAST MILK

1 Wash your hands well with soap and water

2 Place a clean container below your breast to collect milk

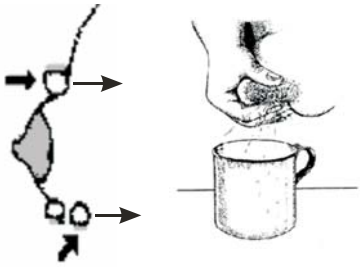
3 Massage the breast gently towards the nipple



4 Place your thumb and index finger opposite each other just outside the areola

(Areola is the dark soft circle around the nipple)

5 Now press back towards your chest, then gently squeeze to express milk



6 Repeat step 5 at different positions around the areola

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Division of Neonatology, Department of Pediatrics, All India Institute of Medical Sciences

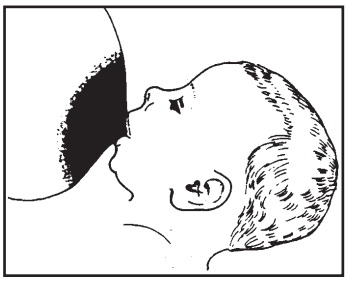
SELF-EVALUATION

1. Can a mother feed baby in lying position? Yes/No
2. Enumerate the four key points of positioning of baby for breast feeding:
   i. _____ iii. _____
   ii. _____ iv. _____
3. Signs of good attachment are
   i. _____ iii. _____
   ii. _____ iv. _____
4. What differences do you see?

   Baby sucking on _____ Baby sucking on _____

   1

   2



6. Enumerate the problems caused by poor attachment:

   _____

   _____
7. How will you assess the adequacy of breastfeeding?

   _____

   _____
8. How many times should a baby be breastfed in a day?

   _____
9. Can mother skip one or two night feeds? Yes/No
10. What advice will you give to a mother who develops heaviness and pain in breast on third day after delivery?

    _____

    _____
11. How you will manage a mother with sore nipple?

    _____

    _____

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

ROLE PLAY

Issues: Not enough breast 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 role-play

A (Ask)

L (Listen)

P (Praise)

A (Advise)

C (Check understanding)

Checklist for role play by participants

A (Ask)

L (Listen)

P (Praise)

A (Advise)

C (Check understanding)

II. FEEDING OF HEALTHY LOW BIRTH WEIGHT BABIES

1. INTRODUCTION

Feeding of low birth weight (LBW <2500gms) babies differs from that of normal birth weight babies. These babies (especially those <1800 gm) often have difficulty in taking milk directly from breast and may require more help and ongoing monitoring. They also require more calories and protein.

2. METHODS OF FEEDING

LBW babies are often born prematurely (before 37 weeks). Unlike term normal birth weight babies, these preterm LBW babies have some limitations that would make breastfeeding difficult. The limitations include:

- Inability to suck effectively
- Inability to co-ordinate sucking and swallowing
- Inability to co-ordinate swallowing and breathing

Because of these limitations, some LBW babies cannot be given any oral feeds, while some might require gavage feeding.

After birth, all low birth weight babies gradually develop the ability to breastfeed directly. Till that time, they have to be fed by some alternative methods such as orogastic tube feeding or by using spoon, cup or paladai.

The best way to determine the correct method of feeding for each baby is by observing the infant during feeding. Depending upon the ability and behavior of the baby while breastfeeding or spoon/paladai feeding, one can decide the most appropriate method of feeding.

Though this is the 'ideal' method, we can also use **birth weight** as a guide to decide the method of feeding. This is only a rough guide, since not all babies with a particular birth weight would behave in the same way. Preferred methods of feeding for different birth weight categories are given below:

Birth weight	Preferred method of feeding
<1200 gm	Baby may need IV fluids initially. Then initiate oro-gastric tube (gavage) feeding gradually.
1201-1500 gm	Most would need spoon/paladai feeds, while some need oro-gastric tube (gavage) feeding initially.
1501-2000 gm	Most babies would accept breastfeeding while some might need paladai feeds.
>2000 gm	Breastfeed as normal birth weight babies but with monitoring.

For babies who are less than 1200 gm, intravenous (IV) fluids might be needed initially. Once they are stable, gavage feeding can be introduced slowly.

Most babies who are less than 1500 gm and stable can be fed by spoon/paladai. Some might require feeding by oro-gastric tube. Give ONLY expressed breast milk by either spoon or by tube. For babies on intra gastric tube feeds, one can try cup or spoon feeds once or twice a day. If he accepts well, one can reduce the number of tube feeds. The mother can also let baby suck on her breast after she expresses milk to stimulate her lactation.

Babies between 1500-2000 gm are usually able to accept breastfeeding while some may require feeds by paladai. Mother should be involved in the care of baby and should be trained and supervised for paladai feeding.

Babies more than 1800-2000 gms are usually able to feed on the breast. Let the mother put her baby to breast as soon as she is well enough. Continue to follow-up and weigh them regularly to make sure that they are getting enough breast milk .

3. WHAT TO FEED?

LBW babies who are not able to breastfeed directly have to be given **EXPRESSED BREAST MILK** either by orogastric tube or by spoon/paladai.

Expression of breast milk

The method of expression is explained in the module on 'Common procedures'.

4. HOW TO FEED?

4.1 Paladai feeding

A paladai is a small bowl with a long pointed tip traditionally used for feeding LBW infants in some cultures.

The advantages of this feeding method are that it is usually faster than spoon or cup feeding and that there is less spillage. The disadvantage is that the caregiver has to be very careful to avoid pouring large amounts of milk into the infant's mouth.

Figure 8: Paladai/spoon feeding

Steps of paladia/spoon feeding

1. The infant should be awake and held sitting semi-upright on the caregiver's lap, and wrapped to provide support and to keep the arms out of the way
2. Put a measured amount of milk in the paladai
3. Hold the paladai so that the pointed tip rests lightly on the infant's lower lip
4. Tilt the paladai to pour a small amount of milk into the infant's mouth
5. Feed the infant slowly
6. Make sure that the infant has swallowed the milk already taken before giving any more
7. When the infant has had enough, he or she will close his or her mouth and will not take any more. Do not force-feed the infant
8. To estimate the amount of milk taken, subtract the milk left in the cup from the original amount. Also subtract the estimated spillage, if any
9. Wash the spoon /paladai with soap and water .Then put in boiling water for 20 minutes to sterilze before next use

4.2 Oro-gastric tube feeding

Intra-gastric tube feeding is appropriate for an infant who is clinically stable but cannot accept oral feeds fully.

Intra-gastric tube feeding can be given by two routes, **naso-gastric or oro-gastric:**

1. Naso-gastric tubes have the advantage that they are more easily fixed in place.
2. Oro-gastric tubes are useful for very preterm babies, particularly those with respiratory distress.

Naso-gastric tubes, by blocking one nostril, might increase the airway resistance and the work of breathing in preterm infants. This may lead to increased incidence of desaturation and apnea.

Intra-gastric tube feeding can be given by two routes: naso-gastric or oro-gastric; Oro-gastric tube feeding is preferred in very preterm infants

The procedure of insertion of oro-gastric tube and giving a gastric tube feed are explained in the module on "Common Procedures'.

DEMONSTRATION

Facilitator will conduct a demonstration on 'Intra-gastric tube feeding' and "Expression of breast milk" using a breast model.

VIDEO

Video on Expression of breast milk , intragastric & paladai feeding

There will be video demonstration on expression of breast milk intra-gastric feeding, paladai feeding. The video demonstration will be followed by discussion.

_____

_____

स्तन से दूध निकालने की विधि

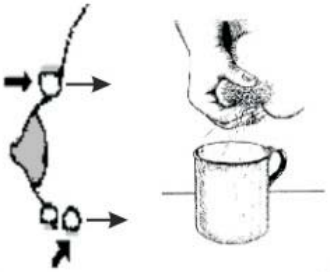
1 अपने हाथों को साबुन और पानी से अच्छी तरह धोएं

दूध इकट्ठा करने के लिए अपने स्तन के नीचे एक साफ व चोड़े मुँह का बर्तन रखें 2

3 स्तन की हल्के हाथ से निपल की तरफ मालिश करें

अपने अंगूठे और तर्जनी अंगुली को एक-दूसरे के विपरीत स्तन के काले भाग के बाहर लगाएं 4

5 अब स्तन को पसलियों की ओर दबाते हुए अंगूठे और अंगुली से दूध निकालें



इस प्रक्रिया को स्तन के काले भाग के चारों तरफ दोहराएं 6

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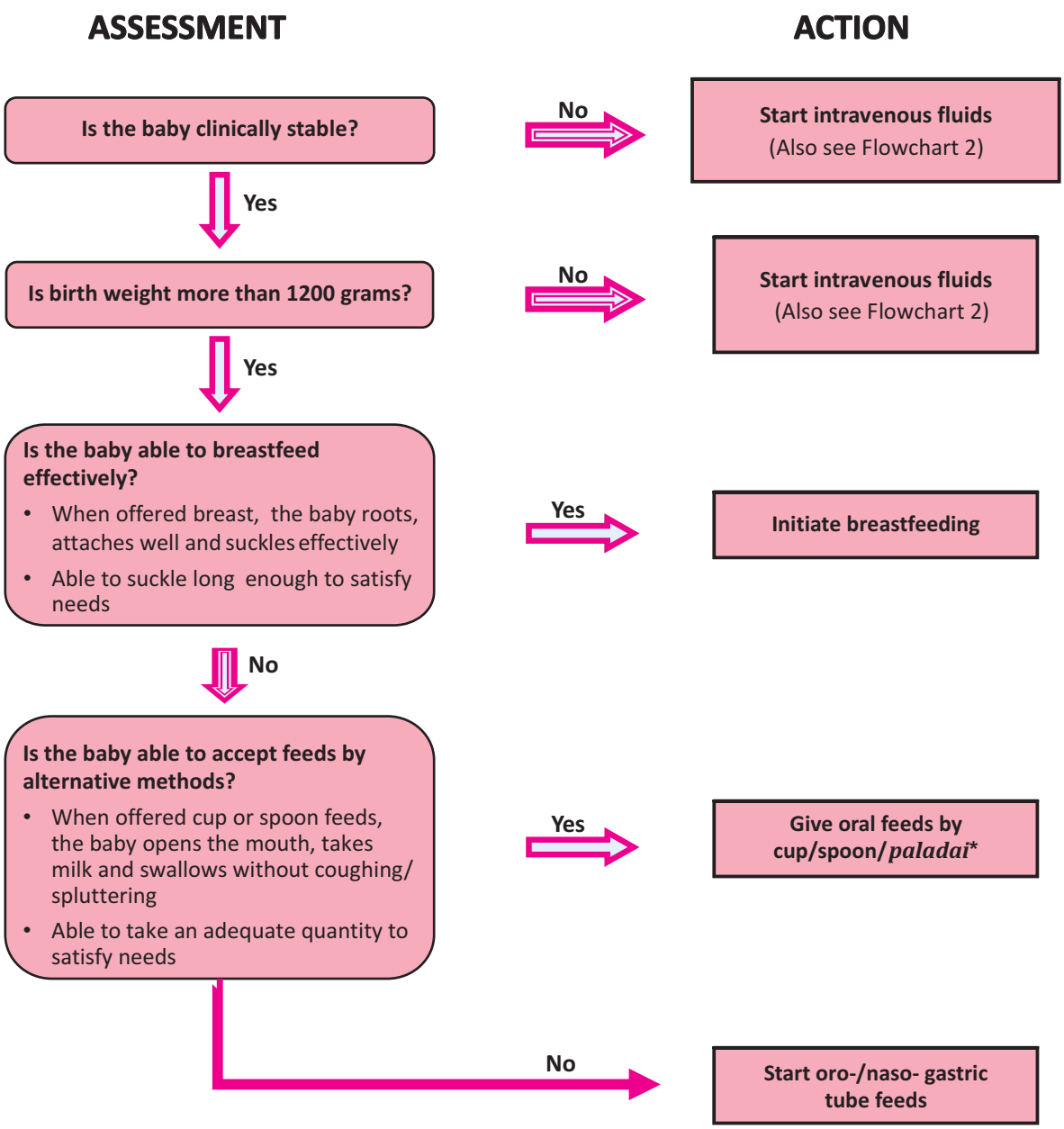
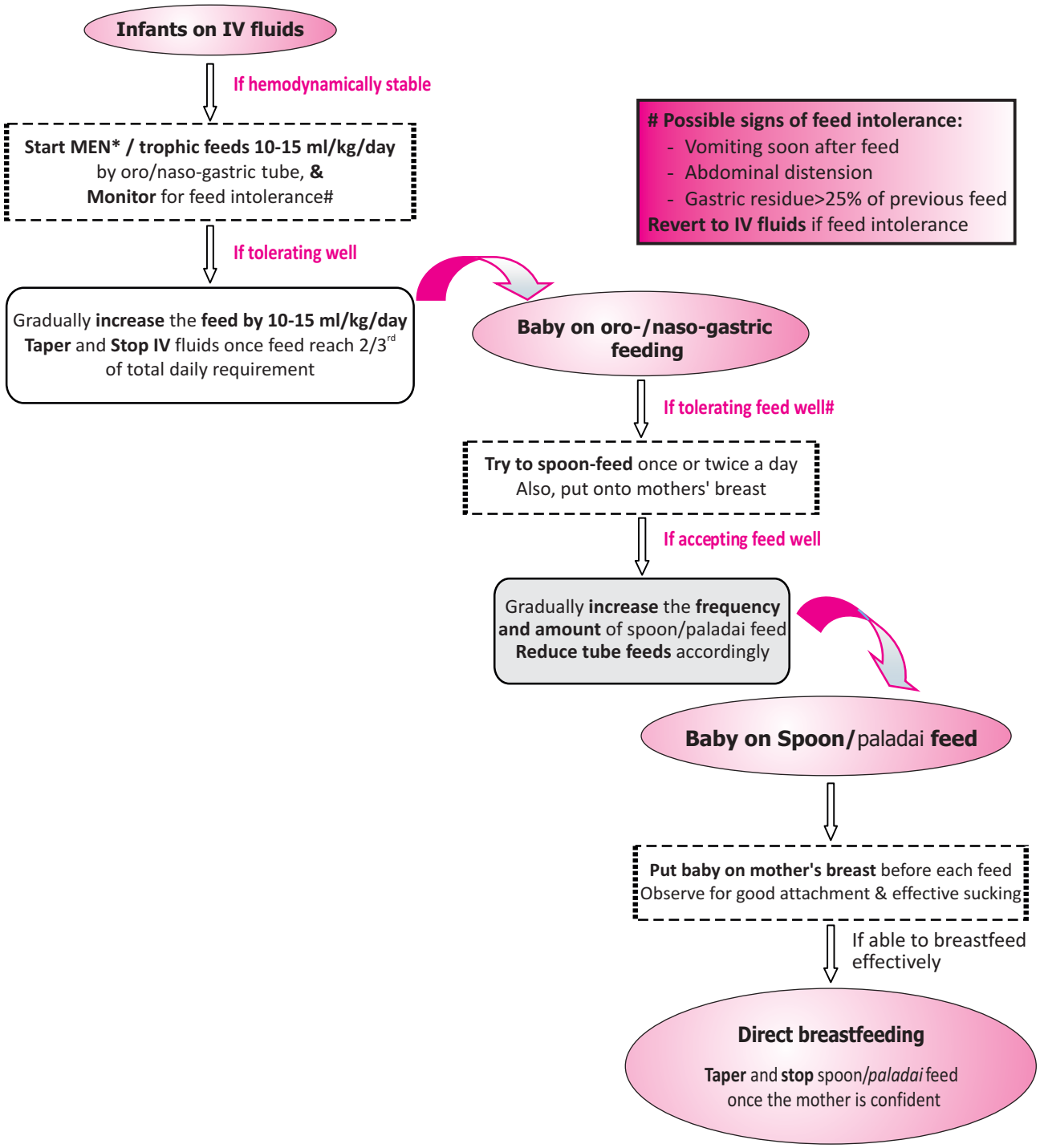
Feeding of low birth weight and sick newborns

Flowchart 1 : Deciding the initial feeding method



Paladai is a small cup with a beak

Flowchart 2 : Babies on IV fluids: Progression to oral feeds



* Minimal Enteral Nutrition

SELF EVALUATION

Let me check what I have learnt

1. Describe the best method of feeding in following babies.

   1080 gm: _____

   1460 gm: _____

   1996 gm: _____

2. When should we start feeds in a baby who is born with birth weight of 1180 gm?

   _____

3. The best milk to be given by oro-gastric tube feeding is

   _____

4. Advantages of paladai feeding include

   _____

   _____

5. Preterm LBW babies often are not able to breastfeed. The reason (limitations) include

   _____

   _____

   _____

6. Two criteria which decide initial method of feeding are

   _____

   _____

6. Minimal enteral nutrition using expressed breast milk is initiated in a stable LBW baby at rate of_____ml/kg/day.

7. A baby weighs 1350 grams and she is stable . What next step you will assess to decide choice of feeding method ?

   _____

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

RESUSCITATION OF THE NEWBORN BABY

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

LEARNING OBJECTIVES

At the end of this session, participants will be able to:

- **Assess a newborn baby at birth**
- **Perform resuscitation of a newborn baby using standard equipment if needed**
- **Provide aftercare if a baby requires help with its breathing at the time of birth**

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.
- ***Demonstration:*** Observing steps of resuscitation on the mannequin.
- ***Webinar:*** You will learn though a virtual classroom lecture.
- ***Self-evaluation:*** At the end of you will be evaluated by MCQ examination.
- ***Video film:*** Steps of basic resuscitation upto bag & mask ventilation will be shown.

1. INTRODUCTION

Spontaneous breathing after birth is not a problem for most babies. However, one in twenty babies might require help with breathing at birth. It is not always possible to know in advance which babies will need this help since up to half of them (who require resuscitation) have no identifiable risk factors before birth. Hence, resuscitation must be anticipated at each birth.

2. IMPORTANCE OF RESUSCITATION

Oxygen is important for every part of the human body. Without it, the cells that make up organs - brain and other body parts- will die. Before birth, the fetus receives oxygen from the placenta. After birth, the umbilical cord is clamped and cut which stops the delivery of oxygen from the placenta. If the baby does not start breathing immediately after birth, s(he) may even die due to lack of oxygen. A proper resuscitation helps the baby to attain normal breathing. Therefore, all health care providers should develop basic resuscitation skills.

An increased risk of breathing problems may occur in babies who are:

- preterm
- born after long traumatic labor
- born to mothers who received sedation during the late stages of labor

However, it should be kept in mind that any baby may have breathing difficulty at birth. Therefore, it is important to be prepared for resuscitation in all deliveries.

Any baby can have breathing difficulty at birth. It is important to anticipate and be prepared for this eventuality in all deliveries

3. KEY TO SUCCESSFUL RESUSCITATION

All health professionals who attend the mother at birth must be skilled at resuscitation and know how to recognise babies at risk. They must:

- anticipate
- be prepared
- know what to do (be gentle & fast)
- in what order
- be able to work quickly in coordination
- document/record
- maintain hygiene
- focus on mother needs

4. PREPARATION IN THE DELIVERY ROOM

When a baby has asphyxia, resuscitation must be started right away. If supplies are not prepared, much time can be lost before starting resuscitation. With this lost time a baby can become worse.

Preparations should include having warm, corner to do the resuscitation, equipment and supplies. These are summarized in the box below:

PREPARING FOR BIRTH

Essential

1. A draught free, warm room with temperature >25°C
2. A clean, dry and warm delivery surface
3. A radiant heater
4. Two clean, warm towels/clothes, with cord clamps or threads/tie
5. A folded piece of cloth (Shoulder roll) (1/2 to 1 inch thickness) to position the baby
6. Neonatal resuscitation bag (250-500 ml) with oxygen reservoir
7. Face masks, term (1) and pre-term (0) sizes
8. Suction devices & catheters, No. 12FG, 14 FG (oral suction),or a mucous extractor (Single use)
9. A Feeding tube with the 20 ml syringe in case prolonged ventilation is needed
10. Oxygen with flow meter and tubing (if available)
11. Oxygen air blender (if available)
12. Pulse oximeter (if available)
13. A clock with seconds hand
14. Stethoscope for evaluation
15. Medications: Epinephrine, normal saline
16. Identification band

Important points about the equipment used for resuscitation

- Equipment must be cleaned and checked after each delivery and checked again before the next delivery to ensure it is ready for use.
- Broken equipment is dangerous and should be replaced.
- Equipment must be of the appropriate size. Pediatric and adult bag and masks cannot be used on newborn babies who have small and fragile lungs.
- The volume of the bag should not be more than 240-500 mL; it should be able to generate a pressure of at least 35 cm of water.
- If a mucus extractor is used the trap should be big enough (20 mL) to prevent aspirated fluid

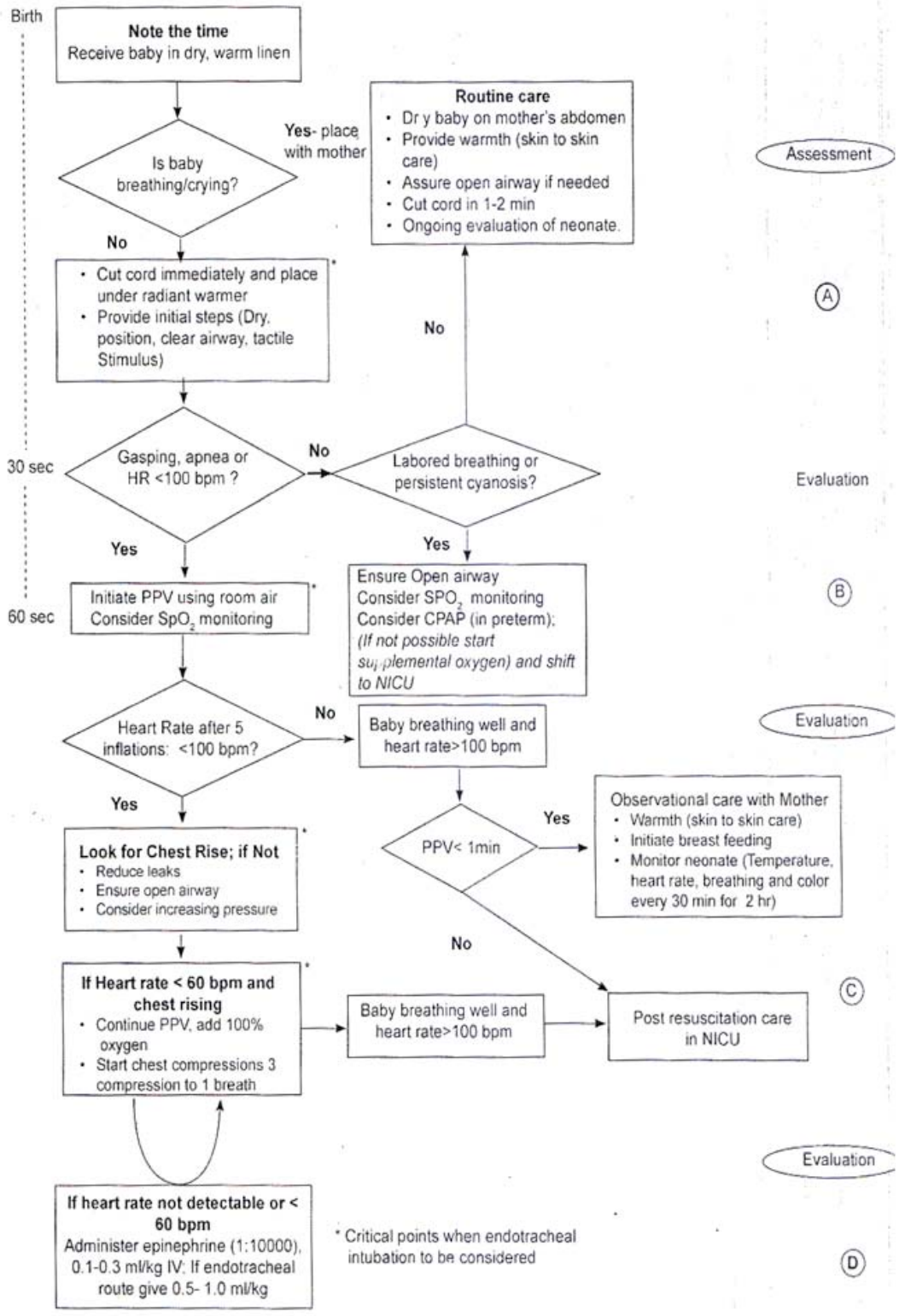
going into the resuscitator's mouth.

- A reusable mucus extractor with a bulb is NOT recommended because they are difficult to clean and might act as a source of cross infection if reused.
- Suction should not exceed a negative pressure of 100 mm Hg or 130 cm water.
- Resuscitation can be done without having piped oxygen available.
- Start the resuscitation with the room air. The oxygen can be used if required
- In preterm babies it is desirable to use air oxygen blender to deliver starting FiO_2 between 30 to 90 percent. This can be later titrated depending on saturation.

GROUP DISCUSSION

Preparation in the delivery room: raise a discussion about what the participants practice at the time of birth

Resuscitation Flow Diagram (NRP-India)



5. ASSESSING THE NEED OF RESUSCITATION AT BIRTH

The steps to be taken at the time of birth are given below:

- Note the time of birth
- Receive baby in dry warm linen

  Is baby breathing (The chest should move equally on both sides with no difficulty between 30 to 60 times in a minute) or crying?

- If yes provide routine care.
- If NO the baby will require Resuscitation starting with initial steps

Hence, the first question to be asked at birth is " Does the baby need help with its breathing?"

This baby is crying, so does not need help for breathing?

IF BABY IS BREATHING

6. ROUTINE CARE

The steps of routine care include:

- Dry the baby on mother's abdomen
- Provide warmth by skin to skin contact
- Cut cord in 1-2 minutes
- Evaluate respiration and heart rate

6.1 Dry the baby on mother's abdomen

A new born baby should be dried on his mother's abdomen or chest with a warm towel. After drying, the wet towels or clothes should be replaced and the baby loosely wrapped in clean, dry and warm towels.

Drying the baby and wiping its eyes will take about 30 seconds; discarding the wet cloth and replacing it with a warm cloth will take about 10 seconds.

6.2 Provide warmth by skin to skin contact

Keeping a baby warm at birth is a priority. Provide warmth to the baby by direct skin to skin contact with mother

Breathing and warmth go together and breathing should be assessed whilst drying the baby. Drying itself often provides sufficient stimulation for breathing to start in mildly depressed newborn babies.

6.3 Cut cord in 1-2 minutes

Clamp and cut the cord in 1-2 minutes.There are research evidence to prove that delayed cord clamping results in healthier blood and iron levels in babies, and this benefit outweighs the slightly higher risk of developing jaundice.

6.4 Ongoing evaluation of neonate

Evaluate respiration and heart rate of the baby.

IF BABY IS NOT BREATHING/CRYING

Begin initial steps of resuscitation. Provide initial care (refer to algorithm) cut cord immediately and place under radiant warmer and provide initial steps (dry, position, clear airway and tactile stimulus)

7. INITIAL STEPS

1. Cut the cord immediately and place the baby under radiant warmer
2. Provide initial steps
   a. Dry
   b. Position
   c. Clear airway as necessary (it may involve suctioning the trachea to remove meconium)
   d. Tactile stimulus to stimulate the baby to breathe, reposition the head to maintain an open airway.
   e. Evaluate respiration and heart rate of the baby after 30 seconds of initial steps.

The initial steps of resuscitation are discussed below:

7.1 Dry

Dry the baby thoroughly under the radiant warmer and remove wet linen.

7.2 Position

Place the baby on its back

Position the head so that it is slightly extended (to open the airway)

Place a folded piece of cloth under the baby's shoulders to help maintain this position (the folded cloth should not be too thick or thin-this may cause over extension or flexion which will close the airway)

7.3 Clear airway as necessary (it may involve suctioning the trachea to remove meconium)

- Suction first the mouth and than the nose(Remember 'M' comes before 'N')
- Do this by gently introducing a suction tube 5 cms into the baby's mouth until the '5 cms' mark is at the baby's lips
- Use suction while withdrawing the tube
- Next introduce the suction tube upto 3 cms into each nostril
- Use suction while withdrawing the tube
- Repeat suction if there is lot of mucus, amnioitic fluid or meconium but not more than two times or for a duration exceeding 20 seconds

In case of meconium and baby if non vigorous (any of the following if abnormal, i.e. heart rate > 100, good breathing, good tone)

- After inserting a laryngoscope, use a 12 FG or 14 FG suction catheter to clear the mouth and posterior pharynx so that glottis can be visualized
- Insert an endotracheal tube into the trachea and attach a suction source to the endotracheal tube through a special aspirator device.
- Apply suction for several seconds when the tube is in trachea and continue suction while withdrawing
- In case bradycardia is encountered the resuscitation should take priority over suction of trachea

7.4 Tactile stimulus to stimulate the baby to breathe, reposition the head to maintain an open airway.

The safe and appropriate methods of providing tactile stimulation are:

- Gently flicking or slapping the soles
- Gently rubbing the back, trunk and the extremities of the baby

Any form of stimulation will initiate breathing, if baby is in primary apnoea. Therefore 1 or 2 flicks or slaps to the sole or gently rubbing the back once or twice is sufficient.

7.5 Evaluate respiration and heart rate of the baby after 30 seconds of initial steps

Evaluate the newborn during the above mentioned first interventions and this should not take more than 30 seconds to complete.

What to do if the heart rate or respiration is abnormal?

On evaluation of breathing and heart rate after initial steps, if baby is apneic or has gasping respiration or heart rate less than 100, one should proceed to provide positive pressure ventilation (PPV).

If baby is breathing well and heart rate is above 100 but respirations are labored or you think that the baby is persistently cyanotic, such baby needs additional respiratory support (especially if pre-term) and tailored optimal oxygen delivery. If the CPAP machine for respiratory support and the blender with pulse oxmeter for optimal oxygen delivery are not available, one can consider starting supplemental oxygen and shifting baby immediately to NICU.

1 min: 60-65%
2 min: 65-70%
3 min: 70-75%
4 min: 75-80%
5 min: 80-85%
10min: 85-90%

Free-flow Oxygen

Free flow of oxygen can be provided by:

- Oxygen mask held over the baby's face
- Flow inflating bag and mask
- Oxygen tubing cupped closely over the baby's mouth and nose
- T piece resuscitator

If the central cyanosis persists, it would be ideal to attach a pulse oximetry probe to determine if the baby's oxygenation is in the abnormal range. If the levels are below the

saturation targets established for a normal baby during transition and are not increasing, we may have to think providing supplemental oxygen.

Saturation targets for a normal baby are given above.

8. IF THE BABY IS NOT BREATHING: PROIVDE POSITIVE PRESSURE VENTILATION

PPV is initiated if:

- The infant is apneic or gasping, or
- the heart rate is less than 100 bpm even with breathing, and/or

8.1. Equipments available for PPV in newborns

It is important equipment to be used is a self inflating bag . You should become completely familiar with this equipment.

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. It 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 can not 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%.

Most resuscitation bags used in neonatal resuscitation have a safety mechanismin the form of a pressure release valve to guard against in advertent transmission of excess pressure to the baby's lungs. Pressure release valves are generally set to release at 30 to 40 cm H2O. If pressures greater than this are generated, the valve opens, limiting the pressure being transmitted to the lungs of infant. The ideal size of the bag for neonates is 240 to 500 mL capacity.

Resuscitation masks

Masks come in a variety of shapes, sizes and materials. Resuscitation masks should have cushioned rim to prevent injury to the face. The rim conforms more easily to the shape of the infant's face, making it easier to form 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 both small, premature infants as well as for larger term infants should be available for use. An appropriate size mask will cover the tip of chin, mouth, and the nose but not the eyes.

8.2 ASSEMBLING EQUIPMENT

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

8.3 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 your hand?

Can you force the pressure-release valve open?

Is the valve assembly present and moving well? If not check

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:

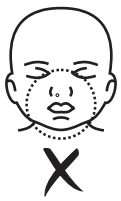
Does the bag re-inflate quickly when you release your grip?

8.4 HOW TO VENTILATE THE BABY:

1. Re-check the baby's position.
2. Reposition the baby so that the neck is slightly extended.
3. Put the folded piece of cloth under the baby's shoulders at this time.
4. Place the correct sized mask on the baby's face so that it covers the baby's chin, mouth and the nose.

Size 1 for a normal weight baby and size 0 for a small baby

A mask that is too large covers the eyes, and extends over the tip of the chin:



A mask that is too small does not cover the nose and does not cover the mouth effectively:

5. Make a seal between the mask and the baby's face.
6. Hold the mask in place gently but firmly. Keep the head in position.
7. Squeeze the bag attached to the mask with the thumb and two fingers so as to cause adequate chest rise.
8. Squeeze and release the bag two or three times.
9. Watch the baby's chest as the bag is squeezed. Does it rise as the bag is squeezed?

10. If the baby's chest is rising, the ventilation pressure is probably adequate.
11. If the baby's chest is NOT rising, there can be one of the problems given below, do the following steps:

	Problem	Remedial Steps
M	Inadequate seal	**M**ask adjusted to ensure airtight seal
R	Inappropriate position	**R**epostion the head in sniffing position
SO	Blocked airway	**S**uction the airway **O**pen bay's mouth and ventilate
P	Inadequate pressure	Increase **P**ressure by squeezing the bag with more pressure till a chest rise is Visible
T	No improvement with above steps	Consider endo**T**racheal intubation

12. Use oxygen if available (preferabely through air oxygen blender),if not use room air.
13. Ventilate at a rate of 40 breaths per minute. Squeeze the bag(ventilate) at 40 times a minute until the baby starts crying or breathing.

    Provide uninterrupted effective ventilation for 30 seconds and assess for spontaneous breathing and heart rate. If spontaneous breathing present and heart rate is 100 or more, then gradually discontinue PPV.

Effective ventilation will promote increase in heart rate and spontaneous breathing, improvement in color and muscle tone.

Count out loud. **An easy way to count is to:**

SQUEEZE-count a loud' one hundred and one, SQUEEZE one hundred and two, SQUEEZE one hundred and three, SQUEEZE……..'and continue until you reach 'One hundred and twenty'(i.e. For 30 seconds).

14. After 30 seconds of bag and mask ventilation, reassess respiratory efforts, heart rate every 30 seconds (oxygen saturation may be monitored continuously if available) and look for the following signs of improvement:

    i. Is the baby crying?-If yes, STOP ventilation

    ii. Is the baby breathing regularly at >30 breaths per minute?- If yes, STOP ventilation

    iii. Does the baby have 'in-drawing' of the chest wall(skin between the ribs' sucked' in wards making the ribs very prominent)?- If NO, then STOP ventilation (chest in-drawing indicates that the baby is still having difficulty in breathing and hence need support for breathing), can continue with CPAP or free flow of oxygen.

    The other signs of improvement are improving color and muscle tone.

When to stop ventilation?

1. **Baby is breathing or crying**
2. **Baby is breathing more than 30 times in a minute**
3. **NO chest in-drawing during breathing**

15. What is to be done if there is no improvement after 30 seconds?

    i. If **NO** facilities/manpower are available: **continue to do bag and mask ventilation;** reassess after every 30 seconds until the baby is breathing spontaneously. In the mean time, shout for help and also arrange for referral to a higher centre.

    ii. If PPV is prolonged over several minutes place an oro-gastric tube to prevent distention of stomach with air which may interfere with ventilation

    iii. During transport, ensure that the baby's temperature is maintained and breathing is supported by bag and mask ventilation (with or without oxygen).

    iv. The procedure of bag and mask ventilation should be continued until the baby establishes spontaneous breathing; however, if there are no signs of life(breathing/heartrate) even after 20 minutes of birth, ventilation may be stopped.

    v. If facilities and/or man-power are available: **continue to do bag and mask ventilation and assess the need for chest compressions**. The need for chest compressions is decided on the basis of the baby's heart rate as shown below:

Problem	Remedial Steps
Above 100	STOP ventilation if spontaneous respirations are present; If gasping or not breathing, continue ventilation
60 to 100	Continue bag and mask ventilation
Below 60	Begin chest compressions; Continue to ventilate

Remember: Ventilation is more important during resuscitation than any other step - hence it SHOULD BE continued even while administering chest compressions. This might require atleast two persons with the necessary Demonstration skills.

9. CHEST COMPRESSIONS

The heart circulates blood through out 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. Ventilation must be performed to ensure that the blood being circulated during chest compressions gets oxygenated.

After 30-45 seconds of chest compressions, the baby's heart rate should be re-assessed. If heart rate is still less than 60 per minute, chest compressions should be continue (after administering Inj. adrenaline); if heart rate is >60/min, stop chest compressions.

Coordinating ventilation and chest compression

Chest compression is accompanied by PPV. For every 3 compressions 1 breath is delivered (in a minute 90 compressions and 30 breaths are given)

Frequency

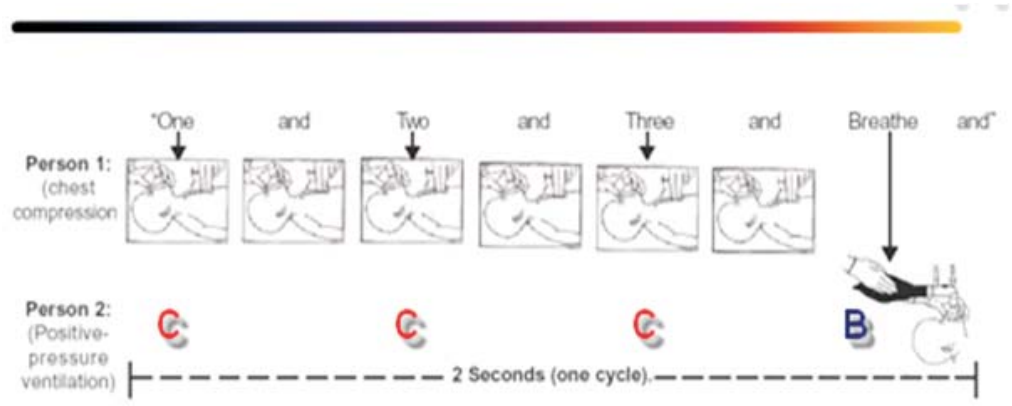


Figure 8.2: Coordinating ventilation and chest compression

10. MEDICATIONS

Medications like adrenaline and volume expanders (saline, ringer lactate) should be administered during resuscitation when in spite of adequate ventilation and cardiac compression, together for more than 45 seconds to 1 minute, the heart rate remains < 60/min and is not improving or if there is initial asystole after 30 sec of BMV.

Establishing intravenous access in newborn during resuscitation

Umbilical vein is the quickest venous access for neonatal resuscitation.

What to do in case no improvement?

If the baby is severely compromised but all resuscitation efforts have gone smoothly. Baby's heart rate continues to remain below 60 bpm, you may consider mechanical causes of poor response such as air way malformation, pneumothorax, diaphragmatic hernia or congenital heart disease.

Babies requiring chest compressions, intubation and medications often need presence of as killed health care provider (Doctor).

11. FOLLOW ON CARE AFTER SUCCESSFUL RESUSCITATION

Follow up care after successful resuscitation can be observational care or post resuscitation care.

11.1 Observational care at mother's bedside

Newborns that have required PPV for less than 1 minute should be provided Observational care includes:

- Provide warmth
- Initiate breast feeding
- Monitor newborn (temperature, heart rate, breathing, and color every 30 minutes for 2 hours).

11.2 Post resuscitation care

Babies who have received PPV for more than 1 minute or more extensive resuscitation like intubation, chest compression are at high risk of further deterioration. These babies should be managed in special care newborn unit.

12. RECORD THE EVENTS OF BABY BEFORE DISCHARGE

Record what has happened as soon as possible after the baby is stable. Keeping records of events which occur at the time of delivery and in the immediate period after wards can be vital. The information is important if a baby needs to be referred or becomes sick in the next few days.

13. EXAMINE THE BABY BEFORE DISCHARGE

The baby should be thoroughly examined before (he) is discharged from the delivery room. Tell parents that although the possibility of complications is low, there is still a small probability that the baby may have problems such as feeding difficulty or convulsions in the first few days.

Instruct them to take the baby to the nearest hospital if these problems occur. Encourage the mother to maintain skin-to-skin contact as much as possible in the next few days.

RECOMMENDED READING

- Basic Newborn Resuscitation: A practical guide.WHO/RHT/ MSM/98.1
- WHO essential newborn care course based on pregnancy, postpartum and newborn case guide for essential practice www.who.int/making_pregnancy_safer/publications/en.
- Neonatal resuscitation: India. Text Book .1st Edition.www.nnfi.org.

COMMON PROCEDURES

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

LEARNING OBJECTIVES

The objectives of this module are to learn about:

- **The proper technique of intramuscular injection**
- **Preparation of common medications**
- **Recording the weight and temperature of newborn babies**
- **Initiating oxygen therapy and establishing intravenous access**
- **Insertion of feeding tube and checking its position**
- **Development supportive care - pain**
- **Care of baby on CPAP**
- **Oxygen monitoring**
- **Screening for ROP**
- **How to organize emergency triaging and safe transport of sick neonates**

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.
- ***Demonstration:*** The facilitator will demonstrate the procedures described.
- ***Video Film:*** Learn steps while performing common nursing procedures.

I. INTRAMUSCULAR INJECTION

PURPOSE

For administration of vitamin K, vaccines, and IM antibiotics.

POINTS TO REMEMBER

- Intramuscular injections are always given in the **antero-lateral aspect of thigh** in newborns
- DO NOT USE GLUTEAL REGION for intramuscular injections in newborns because unlike older children the risk of inadvertent injury to sciatic nerve resulting in paralysis of the limb is high in newborn babies. Morever gluteal muscles are under developed leading to poor absorption of medications in them

DO NOT give IM injection in the gluteal region in newborns

EQUIPMENT

1. Disposable syringe with needle size 26 G
2. Cotton swabs
3. Alcohol/spirit
4. Sterile gloves

PROCEDURE

The steps are given in the box below:

Intramuscular injection

FOLLOW ASEPSIS ROUTINE AND STANDARD PRACTICE

1. While observing the three checks -check the drug while taking out from shelf , before loading and before replacement. Load the required dose in a syringe attached with needle.
2. Attach a fresh needle use 1 ml syringe with 26 or 27 gauge needle for vitamin K.
3. Ask the mother to breastfeed or use oral sucrose to decrease pain.
4. restrain the baby.
5. Expose the thigh and identify injection site (lateral side of the thigh) and extend the leg to make muscle prominent.
6. Cleanse the site with isopropyl alcohol; let it dry.
7. 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
8. 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).
9. Inject the required amount of medication.
10. Withdraw the needle.
11. Press with dry cotton, don't rub.
12. Dispose needle and syringe as per biomedical waste disposal policy
13. Document the medication administered

DEMONSTRATION

The facilitator would demonstrate the procedure of **IM injection of vitamin K 1 mg** on a mannequin. After demonstration, one of the **participants** would be asked to **demonstrate** the same procedure.

VIDEO

There will be a video demonstration on the procedure of intramuscular injection in newborns. This will be followed by discussion.

II. ADMINISTRATION OF COMMONLY USED MEDICATIONS

PURPOSE

To learn the proper procedure of preparation and administration of the common medications used in the newborn nursery.

POINTS TO REMEMBER

- Administer only those medications which you have prepared or verified.
- Give medications from legibly labeled 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.
- 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.

EQUIPMENT

1. Disposable syringe with needle size 24 or 26 G
2. Cotton swabs
3. Alcohol / spirit
4. Syringe Pump
5. Pressure monitoring line
6. Sterile Gloves

PROCEDURE

The steps are given in the box below:

Administering common medications

FOLLOW ASEPSIS ROUTINE AND STANDARD PRACTICE

1. Check for the written instruction of the physician.
2. Observe the six rights for administering medications:
   - Right patient
   - Right drug
   - Right dose
   - Right route
   - Right time
   - Right documentation
3. Read the label of the medication carefully before loading the drug and confirm once again.
4. Use disposable syringe and needles for administering drugs.
5. Give intramuscular injection as described above (section I of this module). Attach needle and load syringe with the required dose.
6. For giving intravenous (IV) injection*, clean the port of IV cannula with squeezed spirit swab let it dry. Follow it up with betadine and again with spirit in a similar manner.
7. Slowly administer the drug, once drug is administered,
8. Document in the chart once drug is administered, push 0.5 ml of 0.9% saline and replace the cap.
9. Discard the waste as per the policy
10. Wash hands, document in the record.

preferably as an infusion over 30 minutes (duration differs more for some drugs for each drug).

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 is given below:

$$\frac{\text{Desired strength of the drug}}{\text{Actual strength of drug}} \times \text{quantity} = \text{amount}$$

	I. Adrenaline (Epinephrine)
Presentation	1 mg/ml (1:1000 concentration)
Dosage	0.1-0.3 ml/kg/dose of 1:10,000 concentration, repeat every 3-5 minutes, if necessary May be given via endotracheal route using higher doses; upto 0.1 mg/kg (100 microgram/ kg) followed immediately by normal saline.
Route	Intravenous or endotracheal route
Directions for use	Take 0.1 ml in tuberculin syringe. Dilute it with 0.9 ml of sterile water for injection to make it 1 ml or 1ml to be diluted in 9 ml. (10 times dilution). The resultant concentration is 1:10,000 solution.

	II. Aminophylline
Presentation	Injection 250 mg in 10ml ampoules or 1ml to be diluted in 9ml
Uses	Apnea of prematurity
Dosage	Loading dose: 5.0-8.0 mg/kg IV Maintenance: 1-2.5 mg/kg/dose q 8 hourly IV, PO
Route	Intravenous or oral route
Directions for use	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 by intramuscular route

	III. Ampicillin
Presentation	Injection 100, 250 & 500mg vials; oral amoxycillin syrup 25mg /ml
Uses	Sepsis, pneumonia, meningitis etc.
Dosage	Sepsis/pneumonia: 50-100 mg/kg/day divided q 8-12 hourly IV, IM Meningitis: 100-200 mg/kg/day divided q 6-8 hourly IV
Directions for use	250 mg vial : Add 5.0 ml water for injection Resultant concentration 50 mg/ml. Administer the required quantity IV slowly
Compatible	Normal saline, ringer lactate
Incompatible	Dextrose solution, sodium bicarbonate
Stability	Use prepared solutions within 4 hours

	IV. Calcium gluconate
Presentation	9 mg/ml ampoules
Uses	Treatment of low blood calcium level
Dosage	1-2 ml/kg/dose every 6-8 hourly
Route	Intravenous route only
Directions for use	To be diluted in equal amount of sterile water for injection. Inject very slowly while MONITORING HEART RATE. If there is bradycardia, discontinue the injection.
Incompatible	Sodium bicarbonate
Caution	Take care to avoid extravasation, if being given as in infusion - as it may cause sloughing of skin.

	V. Gentamicin
Presentation	Injection 80 mg, 40 mg and 20 mg/2 ml
Uses	Sepsis, pneumonia, meningitis etc.
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
Route	Intravenous, intramuscular routes
Directions for use	20 mg/1 ml (40 mg/2ml) ampoule: 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

	VI. Phenobarbitone
Presentation	Injection 200 mg/ml 1 ml ampoules :syrup 5 mg/ml
Uses	Neonatal seizures
Dosage	Loading dose: 15-20 mg/kg IV Maintenance: 3-5 mg/kg/day IV, PO in 1-2 divided doses
Route	Intravenous or oral route compatibility Normal saline only
Directions for use	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

	VII. Phenytoin
Presentation	Injection 100 mg/2 ml; syrup dilantin 25mg/ml; eptoin 6mg/ml
Uses	Neonatal seizures
Dosage	Loading dose 15-20 mg/kg IV
Route	Intravenous route only
Directions for use	Dilute in normal saline Give slowly at a rate 1 mg/kg/min infusion over 15-20 minutes.
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

The facilitator would demonstrate how to prepare the required concentration of one of the discussed medications. Show how to infuse using a syringe pump.

After demonstration, one of the **participants** would be asked to **demonstrate** the procedure for some other medication while other participants would observe.

III. INTRAVENOUS CANNULATION

PURPOSE

For

- Administration of fluid therapy
- Stabilization of sick newborn
- Administering intravenous medications
- Infusion of blood products

EQUIPMENTS

- Scalp vein set / cannula 24G
- Syringe
- Normal saline
- Cotton
- Alcohol, betadine/ povidone iodine
- Splint
- Tape, scissors
- Sterile gloves

POINTS TO REMEMBER

- Intravenous access may be initiated by physician or a neonatal nurse practioner. the nurse is also 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.

PROCEDURE

The steps are given in the box below:

Insertion and Fixation of intravenous (IV) cannula / Scalp vein set

FOLLOW ASEPSIS ROUTINE AND STANDARD PRACTICE

1. Wash hands and assist by physician by holding the extremity and making the vein prominently visible and easy to cannulate.
2. Identify the appropriate site, clean the site as per the unit policy. Once the skin is prepared, no tapping/ or touching over the site.
3. Secure cannula after insertion with tapes/ transparent tape. Keep visibility of cannula tip area above skin insertion. This allows early detection of extravasation.
4. Use splint to immobilize joint.
5. Attach intravenous infusion line.
6. Document timing of intravenous access and medications given.
7. **Monitoring**
   - Infusion flow rate
   - Leaking from cannula site / connection
   - Extravasation (swelling, redness)

- Blockage (non-passage of fluid / medication)

8. **Saline locking**
   (To keep the patency of the canula)
   - Wipe the canula cap with spirit/70% iso propyl alcohol. Remove the cap
   - Keep it on sterile area
   - Flush 0.5 ml normal saline to ensure patency
   - Replace cap
   - Discard the used article as per biomedical waste management policy .Wash hands.

DEMONSTRATION

The facilitator would demonstrate how to fix an intravenous cannula using a model.

VIDEO

These will be a video demonstration on how to do insertion and fixation of intra venous cannula and provide oxygen therapy by hood. This will be followed by discussion.

IV. OXYGEN THERAPY

Oxygen is one of the most commonly administered drugs in the neonatal intensive care unit. While administering oxygen the main goal should be to deliver adequate amount of oxygen to the tissues without causing oxygen toxicity. Use a pulse oximeter to document saturation.

INDICATION:

1. Hypoxemia (O2 saturation <90 % in room air)
2. Respiratory distress
   - Respiratory rate >60/min
   - Intercostal retractions
   - Grunt
   - Cyanosis in room air

SOURCE OF OXYGEN

- Oxygen concentrators
- Compressed gas cylinders
- Centralized piped gas supply

DEVICES FOR OXYGEN ADMINISTRATION

- Oxygen hoods
- Nasal cannulas / prongs
- Closed incubators

PROCEDURE

- **Oxygen therapy by head box/oxygen hood**

  Equipments needed

  - Flow meter
  - Tubing
  - Oxygen hood
  - Humidification device (desired)

  Procedure

  - Initiate minimum oxygen flow based on severity of distress
  - Place the neonate's head inside the hood /head box
  - Monitor the baby for signs of improvement (respiratory rate, distress i.e. intercostalrecession, grunt, colour)
  - Observe all infection control strategies.

- **Oxygen therapy by nasal prongs**

  Equipments needed

  - Flow meter
  - Tubing
  - Nasal prongs

- Humidification device (desired)

Procedure

- Initiate minimum oxygen flow as per need
- Secure the nasal prongs
- Monitor the baby for signs of improvement (respiratory rate, distress i.e. intercostal recession, grunt, colour)
- Observe all infection control strategies.

WHO Classification of respiratory distress

Classification	Respiratory Rate (bpm)	Grunting or Chest indrawing	Requirement of oxygen		
			By hood	Nasal catheter	Nasal prongs
Severe	More than 90 Less than 30	Present	>5L/min	>1 L/min	3-5 L/min
Moderate	More than 90	Absent	3-5 L/min	0.5-1.0 L/min	0.5-1.0 L/min
Moderate	60 – 90	Present	3-5 L/min	0.5-1.0 L/min	0.5-1.0 L/min
Mild	60 – 90	Absent	<3 L/min	<0.5 L/min	<0.5 L/min

POINTS TO REMEMBER

- Avoid using nasopharyngeal catheters, partial-rebreathing masks and non-rebreathing masks in neonates.
- To reduce the incidence of retinopathy of prematurity and other complications we need to titre the oxygen flow to maintain the saturation between 90-95% with continuous pulse oximetry (for details refer to pulse oximeter in common equipment module)

Video

These will be a video demonstration on how to provide oxygen therapy by using cannula, oxygen hood. This will be followed by discussion.

V. INSERTION OF OROGASTRIC TUBE & ORO-GASTRIC TUBE FEEDING

PURPOSE

1. Insertion of feeding tube: For infants who
   - Require gastric decompression
   - Require gastric lavage
2. Oro-Gastric tube feeding: For infants who
   - Are unable to feed orally and need continuous or intermittent gavage feeding

INDICATIONS

1. Neonates who cannot feed orally e.g. preterm LBW infants, neurologically depressed.
2. Neonates with surgical conditions
3. Neonate on CPAP

EQUIPMENT

1. Feeding tube
   a. 6 FG for babies >2000g
   b. 5 FG for babies <2000g
2. Appropriate size syringe
3. Stethoscope
4. Scissors, tape

PROCEDURE

The procedure of insertion of feeding tube and oro-gastric tube feeding are given below:

Insertion of feeding tube

1. Wash hands thoroughly.
2. Position baby on right side or in supine position with head elevated. Baby may also be held in a sitting position in mother's or nurse's arms.
3. Measure the length required for insertion:
   - 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 tip of xiphoid process
   - Mark the tube with tape or maintain measurement with thumb and finger
4. To insert an oro 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 expressed breast milk (EBM) to lubricate the tube before insertion. Do not use oil or paraffin to lubricate the tube.
5. 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 the contents. The aspiration would look like curdled milk, if the tube is in stomach

- Disconnect syringe from the feeding tube and draw up 1-2 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

6. Observe baby for choking, gasping or cyanosis during insertion of tube. Withdraw tube immediately if baby appears to be in any distress.
7. Tape the tube in place at angle of mouth.

Procedure for giving oro-gastric tube feeding

1. Wash hand remove the plunger of a 10, 20 or 50 ml sterile syringe.
2. Connect the barrel of the syringe to the end of the gastric tube.
3. Fill the barrel with the required volume of milk.
4. Let the milk run from the syringe through the gastric tube by gravity.
   DO NOT force milk through the gastric tube by using the plunger.
5. Hold the syringe 5-10 cm above the infant until the syringe is empty.
6. It should take about 10-15 minutes for the milk to flow into the infant's stomach. Changing the height of the syringe will also affect the speed of milk flow. Lowering the syringe slows the milk flow, raising the syringe makes the milk flow faster.
7. Observe the infant during the entire gastric tube feed. Do not leave the infant unattended. Stop the tube feed if the infant shows any of the following signs:
   a. Breathing difficulty
   b. Changes colour, looks blue
   c. Becomes floppy
   d. Vomits
8. Cap the end of the gastric tube between feeds. Keep open the tube end after 30 minutes of feed if baby on CPAP.
9. Document the feed amount on the clinical monitoring chart.

POINTS TO EMPHASIZE

- 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 the syringe
- Feed slowly
- Pinch the tube during removal

DEMONSTRATION

The facilitator would demonstrate how to insert a feeding tube using a mannequin.

After demonstration, one of the **participants** would be asked to **demonstrate** the procedure while other participants would observe.

VI. EXPRESSION OF BREASTMILK

PURPOSE

To teach, demonstrate and help mothers in expression of breast milk.

INDICATIONS FOR EXPRESSION OF BREASTMILK

For women whose infants cannot breastfeed effectively but are able to accept oral feeds by spoon/paladai or by oro-gastric tube.

METHODS OF EXPRESSION OF BREASTMILK

- By using hands - **preferred method**
- By using pumps:
  - Manually operated
  - Electrical pumps

POINTS TO EMPHASIZE

- **Hand expression is the most useful method** to express milk. It needs no appliance, so a woman can do it anywhere at any time
- It is easy to express milk when the breasts are soft. It becomes 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 breast milk**. The breasts are easily hurt if another person tries to do so
- If you are showing a mother how to express, show it on a breast model. If you need to touch her to show her exactly where to press breasts, get consent and **be very gentle**

EQUIPMENT

1. Clean, wide-mouthed container.
2. Mechanical or electrically operated pumps (if expression is done using pumps).

HOW OFTEN A MOTHER SHOULD EXPRESS MILK?

It depends on the reason for expressing the milk, but usually as often as the baby would breastfeed (at least 8 to 10 times / day)

- 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
  - She should express as often as her baby would breastfeed. Hence it should be done at least **every 3 hours,** including the night hours. If she expresses 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 the baby while she is out at work:
  - Express as much as possible before she goes to work. It is also important to express while at work to help keep up her supply
- To relieve symptoms such as engorgement, of breasts:
  - Express only as much as is necessary

PROCEDURE

The steps are given in the box below:

Expression of breastmilk

Step 1: Preparation of container

1. Choose a cup, glass, or jar with a wide mouth.
2. Wash the cup with soap and water.
3. Pour boiling water into the cup, and leave it for a few minutes. Boiling water will kill most of the germs.
4. When ready to express milk, pour the water out of the cup.

Step 2: Massaging the breast before expression

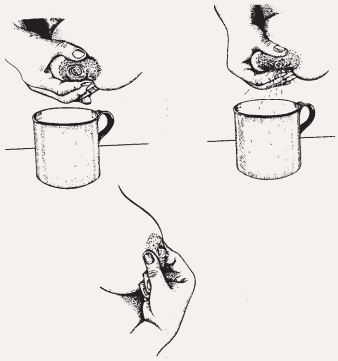
It is helpful to do simple massage before expression of milk.

1. Take a wet warm towel and wrap it around the breast. Let it be there for 5 min.
2. 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.
3. Provide massage for 5-10 minutes on each breast before expression of milk.

Step 3: Expression of breast milk

1. The mother should wash her hands thoroughly.
2. She shall sit or stand comfortably and hold the container near her breast.
3. She should think lovingly of the baby or look at a picture of her baby.
4. Ask her to put her thumb ABOVE the nipple and areola, and her first finger BELOW the nipple and areola opposite the thumb. She supports the breast with her other fingers.
5. Ask her to 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.
6. Press her breast behind the nipple and areola between her fingers 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.

7. Press and release, press and release. This should not hurt-if it hurts, the technique is wrong.



8. 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.
9. Press the areola in the same way from the SIDES, to make sure that milk is expressed from all segments of the breast.
10. Avoid rubbing or sliding her fingers along the skin. The movement of the fingers should be more like rolling.
11. 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.
12. 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.
13. Explain that adequate expression of breast milk takes 20-30 minutes, especially in the first few days when only a little milk is produced. It is important not to try to express in a shorter time.

Storage of expressed breast milk

After expression, breast milk can be stored either at room temperature or in the refrigerator.

Storage of expressed breast milk

Stored at	Can be stored for
At room temperature	6 hours
In refrigerator	24 hours
In freezer **at -4°C** **at -20°C**	 2 weeks 3 months

DEMONSTRATION

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

VIDEO

There will be a video demonstration on 'Expression of breast milk'.

VII. TEMPERATURE RECORDING

PURPOSE

To accurately record the temperature in newborn babies. Neonates are more prone for low body temperature (hypothermia); they grow better if their core body temperature stays in normal range (36.5 - 37.5° C).

INDICATIONS

- All new admissions to nursery
- Sick newborn and LBW babies
- To diagnose hypothermia / hyperthermia

METHODS OF TEMPERATURE RECORDING

- ***Skin temperature***
  - Axillary: using ordinary clinical thermometer - **preferred method**
  - Abdominal: using skin probes of the incubator / radiant warmer
- ***Rectal temperature***
  - Using rectal thermometer

EQUIPMENTS

1. Clinical thermometer - ordinary or rectal
2. Skin probe of the incubator / radiant warmer

POINTS TO EMPHASIZE

- Axillary temperature should be checked at least **once in every 6-8 hours** to see that it coincides with the temperature shown on the panel of the warmer or incubator
- Babies under the warmer 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

PROCEDURE

The steps of recording skin temperature in the axilla are covered in the module on "Thermal protection."

The steps of temperature recording using the skin probes of radiant warmer and rectal thermometer are described below:

Recording abdominal skin temperature using skin probes

1. Clean the probe with spirit.
2. 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.
3. Record the temperature shown in the display panel of the radiant warmer/ incubator.
4. Continuously monitor the temperature while the baby is under warmer or incubator. Make sure the probe is properly sticked to the site(not loose).

Recording rectal temperature using rectal thermometer *

1. Take clean rectal thermometer. Lubricate it with saline or xylocaine jelly.
2. Hold the lower limbs of the baby off the couch.
3. Insert the thermometer backwards and upwards for 2 cm in a preterm and 3 cm in a term baby.
4. Hold both the buttocks together for 2 min.
5. Take out the thermometer and clean it with dry cotton (from stem to bulb) and take the reading.
6. Clean thermometer again thoroughly first using soap swab then dry and clean again using spirit swab.

**** Use only for sick hypothermic babies***

VIDEO

These will be a video demonstration on temperature recording in newborns. This will be followed by discussion.

VIII. WEIGHT RECORDING ON A DIGITAL MACHINE

PURPOSE

- Recording of weight at birth helps in identifying the level of care required for the baby
- Recording weight daily is also essential to monitor the adequacy of nutrition as well as fluid balance. This is important for the management of VLBW babies

OBJECTIVE

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

EQUIPMENTS

1. Weighing scale with accuracy of ± 5 g
2. Clean, warm linen

POINTS OF EMPHASIS

- Record weight prior to feeding
- Resume skin-to-skin care or ask the mother to dress the baby promptly after weighing.
- Accurate daily weighing would be helpful in avoiding complications 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

PROCEDURE

The steps of weight recording are described below:

Weight recording

1. Put the weighing scale on a flat, stable surface preferably bring the scale near the baby.
2. Put a clean warm towel/cloth on the scale pan. Zero the scale if the machine has the facility. If zero facility is not available, record the weight of the towel.
3. Detach as many tubes/equipment as possible.
4. 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.
5. Keep baby in middle of scale pan. Record weight while the baby is not moving.
6. Use separate sterile towel for each baby.
7. If using pre-weighed splint, reduce the weight of splint from the baby's weight.
8. Document the weight in case record for quality assurance, check accuracy of weighing scale with standard known weights every 2 weeks.

Note

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

DEMONSTRATION

Facilitator will demonstrate weight recording using a mannequin and an electronic weighing scale.

VIDEO

There will be a video demonstration on 'Weight recording'.

IX. OROPHARYNGEAL SUCTION

PURPOSE

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

OBJECTIVES

The learner will be able to:

- Enlist the indications for suctioning of a non-intubated neonate
- State the important points one need to keep in mind while undertaking suctioning

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

EQUIPMENTS

1. Suction catheter with thumb control or Y connector:
   - FG 5 or 6 for preterm
   - FG 8 for term babies
2. Portable suction machine or wall suctioning with tubing.
3. Gloves.
4. Distilled/boiled cool water.

POINTS TO EMPHASIZE

- Avoid suctioning for 30 minutes to 1 hour after feeding, unless it is necessary to establish a patent airway
- Suction only when necessary. Vigorous suctioning increases risk of vaso-vagal response which can lead to bradycardia and apnea. Routine suction to be avoided
- 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

PROCEDURE

The steps of oropharyngeal suction are described below:

Oropharyngeal suctioning

1. Wash hands and wear clean gloves.(standard practice)
2. Attach appropriate size catheter to suction tubing and insert catheter into sterile water.
3. Occlude catheter completely and set pressure on suction machine at 100 mm of Hg (130 cm of water).
4. Estimate length of the catheter to be inserted by measuring from the tip of the nose to the tip of the ear lobe.
5. Gently insert catheter to the measured distance from the mouth. During insertion keep catheter pinched or keep suction off.
6. Apply suction only upon withdrawal of catheter. Limit attempts to 3-5 seconds or less.
7. Rinse catheter in sterile water before applying suction and between suction attempts.
8. Gently insert catheter into one nare and apply suction. Then repeat on other side.
9. 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.
10. After suctioning, reposition the infant.
11. Discard catheter after single use as per policy.

VIDEO

There will be a video demonstration on how to do oral and oropharyngeal suctioning in newborn babdies. This will be followed by discussion.

X. GLUCOSE MONITORING BY HEEL-PRICK

PURPOSE

To monitor blood sugar and to detect hypoglycemia (defined as blood glucose level of less than 45 mg/dL with or without any symptoms)

OBJECTIVES

The learner will be able to:

- Identify the appropriate site for heel-prick and
- Perform the procedure correctly

INDICATIONS

- Premature and term LBW neonates especially those weighing less than 2.0 kg
- Infants born to diabetic mothers
- Sick neonate (asphyxia, hypothermia, poor &/or delayed feeding, sepsis, shock, respiratory distress)

EQUIPMENTS

1. Alcohol for skin preparation , cotton swabs
2. 26 gauge needle or lancets
3. Glucometer and test strips (Dextrostix)

POINTS TO EMPHASIZE

- DO NOT use povidone / betadine as specimen contamination may elevate blood sugar results
- Avoid the middle portion of heel and avoid making deep punctures
- Symptoms of hypoglycemia are very nonspecific and can mimic any illness (usual features include lethargy, weak cry and poor suck, temperature instability, jitteriness, apnea and rarely convulsions). Hence it is important to monitor blood sugar in babies who are at risk

PROCEDURE

The steps of dextrostix estimation of blood sugar are described below:

Estimation of blood sugar by heel-prick method

1. Giving breast feeding or 2 ml expressed breast milk will reduce pain. Warm by using water at 42° -43° C or warm steamed towel, if required. Follow the aseptic technique and standard precautions.
2. Prepare the site with 70% isopropyl alcohol/spirit, using a scrubbing/circular motion.
3. Do NOT use povidone/betadine, as specimen contamination may elevate some results.
4. Allow spirit to dry. Failure to allow spirit to dry may contaminate the specimen and give fallacious results.
5. Make a needle stick puncture on the **postero-lateral aspect of heel.** AVOID the MIDDLE PORTION of heel and avoid making deep punctures.
6. Allow a drop of blood to form and to fall on the strip.
7. Do not rub the strip against the skin.
8. Follow the instruction on the dextrostix bottle or glucometer.
9. If blood sugar / dextrostix value is less than 45 mg/dl, inform physician; the baby may require boluses of dextrose and/or IV dextrose infusion.
10. Discard the needle and swabs as per policy.
11. Do the documentation.

VIDEO

There will be a video demonstration on the heel-prick method for estimation of blood sugar.

XI. DEVELOPMENTAL SUPPORTIVE CARE AND PAIN MANAGEMENT IN NEWBORNS

Developmental care refers to interventions that support the behavioural organisation of the individual infant, enhance physiological stability, protect sleep rhythms and promote growth and maturation.

PURPOSE

- To reduce harmful environment stimuli in the NICU to the lowest possible level.
- To provide opportunity for optimal physical and neuro-behavioural development of neonate.
- To create a baby friendly womb like ambience and ecology in the NICU to stimulate in utero environment.

Procedure

Nursery Environment

Environment

- Baby should be nursed in thermo-neutral environment
- The number of visitors should be restricted, parents may be allowed
- The stressed infants should be kept away from areas with high unit traffic.

Noise

- Noise level should not exceed 40-45 decibels.
- Avoid unnecessary talking at bedside; teaching rounds should be away from bedside.
- Close incubators portholes/cabinet doors gently
- Remove water bubbling in oxygen and ventilator tubing
- Avoid putting bottles and equipment directly on the incubator
- Avoid writing on top of the incubator
- Reduce the volume of monitor noises (syringe pump, pulse oximeter)
- Keep telephone volume at a minimum
- Excess noise such as music should be avoided
- Reduce use of metal trash cans and running water near incubator
- Avoid tapping fingers on the incubator.

Light

- Turn off unnecessary light and dim the other lights at night to promote development of diurnal cycles (day and night).
- Lighting should be adjustable - the range of 100-600 lux is recommended.
- Blankets may be used to avoid direct light exposure to infants.
- Spot lights for examination should be directed away from baby's head and eyes should be covered when using such lights and phototherapy.

Parenteral involvement

- Parents should be involved in decisions about interventions where possible. This promotes their understanding of their infant's behaviour and allows them also to practice cue based care. This allows them to experience positive interactions with their baby and empowers them to recognize behavioural cues and become more confident in caring for their baby.

Nursery practices

Boundaries

- Use covering,swaddling or cloth rolls around the infant to provide containment/ boundaries
- Place 2cm thick shoulder roll below the shoulder to provide slightly extended posture to facilitate breathing.
- Infants should be provided with neutral alignment to facilitate hand to mouth activities which are self soothing. The hands of the baby should be left free so that he can set them on his face to suck in or just touch his face
- Avoid sudden changes in the infants' position; rough handling may lead to hypoxemia and sudden elevation of blood pressure with risk of development of intraventricular hemorrhage.

Touch

- The baby should be positioned in such a way so that he is able to suck his fingers or hand or is able to touch his face.
- Gentle maternal touch should be promoted.
- Adopt minimal handling protocols for babies <1500g and fragile infants.
- Before touching, talk to infants so as to awaken the baby gently.
- For stable babies, monitoring of vital signs should be left for when the baby is awake and be coordinated with other care activities for the baby.

Stimulation

- The gauze pad or cotton ball soaked in mother's milk can be kept inside the incubator to stimulate olfactory system.
- Provide skin to skin contact.
- Lack of stimulation and overstimulation are equally bad for preterm babies.
- Stable babies should be picked up and encouraged to develop an eye to eye contact.

Cue based care and clustering of cares

- This involves caring for the infant while recognising the behavioural cues or stress responses and providing an appropriate strategy such as timeout or modification of care as appropriate.
- Clustering of cares encourages a minimum handling approach and protects periods of deep sleep by minimising the number of times an infant needs to be woken up or disturbed.

- The health provider should follow the infant's cues and pace the feeds, according to the infant's capacity to organize sucking, swallowing and breathing.

Stressful or painful procedures

- Minimize painful procedures and provide appropriate pain relief measures. During these procedures the use of some comforting techniques can reduce stress responses.
- Comforting techniques include:
  - Non-nutritive sucking (dummy, cotton bud with breast milk or sucrose)
  - Containment of infant's arms and or legs (swaddle or gently holding hands together on chest and/or hold legs tucked up)
  - Grasping a finger
  - Pain reduction
  - Breastfeed the infant at time of injection if appropriate.
  - Oral sucrose may be given for relief of distress with parental consent.
- Introduce touch slowly and allow time for the infant to respond and adjust to a change in position.

Kangaroo care

- Provide opportunities for kangaroo care when possible.
- Kangaroo care is early, prolonged and continuous skin to skin contact between a parent and a low birth weight infant. (Refer to module 3)

Noxious stimuli

- Minimize the infant's exposure to noxious stimuli such as strong fragrances, open alcohol swabs outside the incubator, clinical procedures and adhere to lighting and noise guidelines.

XII. NURSING CARE OF BABY ON CPAP

PURPOSE

To provide continuous positive airway pressure so that alveoli remain open at the end of expiration.

Indications

Common indications

1. Respiratory Distress Syndrome
2. Apnoea of prematurity
3. Post extubation in preterm VLBW infants
4. Transient tachypnea of newborn/delayed adaptation

Other indications

1. Pneumonia
2. Meconium aspiration/other aspiration syndrome
3. Pulmonary edema/Pulmonary hemorrhage
4. Laryngomalacia/tracheomalacia/bronchomalacia

Requirements of CPAP

- CPAP circuit, bubble chamber (for bubble CPAP only) and machine
- Nasal prongs and appropriate size CPAP cap
- Orogastric tube
- Tegaderm
- Setting of pressure, FiO and Flow flowmeter

Points to remember

- Ensure correct position and fixation of the nasal prongs
- Clean the nostrils with saline drops, suction the secretions when required and ensure patency of prongs
- Prevent injury to the nasal septum by applying a small tegaderm over the columella and keep a distance of 2mm between columella and interface
- Ensure that nasal skin is not blanched and there is no columella/septal redness or excoriation
- Always keep orogastric tube in situ and end open
- There should be no condensation in the Inspiratory circuit; this can be ensured by appropriate heating of the gases.
- Fill the humidification chamber up to the mark and ensure that the gas reaching baby should be at 37°C celcius and at 100% relative humidity
- Fill the bubble chamber with distilled water and it is always bubbling
- Remember to keep the tubing below the patient level
- Record the depth of immersion of the expiratory limb in the bubble chamber
- Initiate with a flow of 5 litre/min; titrate the flow in bubble CPAP to ensure visible bubbling in inspiration and expiration

PROCEDURE

- Warm and humidify the gases to 37°C celcius
- Use appropriate sized prongs. Size of the CPAP cannula is decided based on the type of nasal interface(Weight of the baby for Argyle prongs/Hudson's/ Respicare prongs and size of nostril/ columella for Fisher and Paykel prongs)
- Connect cannula to the circuit of the CPAP machine or ventilator. If ventilator is used switch to CPAP mode.
- Stabilize the head of the baby by suitable padding, ensure that there is no undue pressure on the soft tissues. Pass cotton tapes through the holes in the CPAP cannula and fix the cotton tapes in the sticky ends of the leucoplast.
- Adjust CPAP to desired level, usually 4-5 cm of water at start.
- Ensure that there is no blockage in prongs by periodic observation
- Suction the oral cavity, if there are secretions.
- In order to decompress the swallowed air, pass orogastric catheter and keep the proximal end open
- Look for blockage of the nares, gentle suction may be required. Instill a drop of normal saline into the nares every 1-3 hours as necessary.
- Change CPAP prongs/circuit every 3 days.

MONITORING

Baby

- Continuous monitoring of respiratory rate, heart rate, SpO2
- Serial monitoring of severity of respiratory distress by using Silverman score
- Perfusion-CFT, BP, Peripheral pulses, urine output.
- Abdominal girth
- Observe the baby is comfortable
- Keep the oro-gastric tube in situ with proximal end kept open .

Interface

- Ensure an appropriate size cap, prongs and interface length
- Do regular but gentle nasal suction to clear the mucous 4 hourly or as and when required.
- Clean the nasal cannula and check the patency atleast once per shift
- Change the infant's position & check the skin condition of the nose 24 Hourly
- Ensure correct position and fixation of nasal prongs
- Prevent injury to the nasal septum by ensuring a gap between nasal prongs and columella

Machine

- Remove condensed water in the inspiratory circuit
- Ensure the gas delivered should be at 37°C and at 100% relative humidity
- Observe for the bubbles throughout the respiratory cycle (bubble CPAP)
- Fill the bubble chamber with distilled water
- Record the depth of immersion of the expiratory limb in the bubble chamber
- Monitor pressure and FiO2

XIII. SCREENING FOR RETINOPATHY OF PREMATURITY

Retinopathy of prematurity (ROP) is a vaso-proliferative disorder of the retina among preterm infants. Normally, neonates born at less than 32 weeks of gestation are at risk of developing ROP. However preterm infants born at 32 weeks or later can also develop severe ROP if they had turbulent NICU course or required prolonged oxygen therapy. Timely screening and treatment of ROP can prevent blindness and minimize vision abnormalities.

PURPOSE

- The aim of the screening program is to detect ROP early.
- Follow it up closely during its evolution
- Treat if it assumes potentially serious severity level

INDICATIONS

- Babies with birth weight <1500gms
- Babies born at <32 wks of gestation

- Selected preterm infant with a birth weight between 1500-2000gms or gestation more than 32 wks with sickness like cardio respiratory instability, prolonged oxygen therapy, repeated episodes of apnea of prematurity, anaemia needing blood transfusion, neonatal sepsis, poor weight gain, hypotension or infants believed by their attending pediatrician or neonatologist to be at high risk.

When to screen

- First screening examination should be carried out at 32 weeks of post menstrual age (PMA) or 4 weeks of postnatal age, whichever is earlier.

Points to remember

- Practice hand hygiene.
- Keep the examination as brief as possible as it has effect on heart rate, BP, respiratory function of the premature baby
- Minimizes the discomfort by administering oral sucrose just before the examination and proper swaddling
- Should not have fed just before the examination
- Neonates are best examined in the neonatal unit itself under the supervision of attending pediatrician
- For prevention use antenatal steroids, monitor oxygen therapy, avoid unnecessary blood transfusion.
- For quality improvement, units caring for babies at risk should have written protocol.

Equipment required for eye examination

Tray containing

- 2 Bowls
  - 1st bowl-normal saline
  - 2nd bowl-savlon
- Eye speculum
- Retractor
- Tropicamide 1%
- Phenylephrine 2.5%
- Proparacaine just before examination

PROCEDURE

- Pupils are dilated with phenylephrine 2.5% and tropicamide 1%.
- One drop of tropicamide is instilled every 10-15 minutes up to four times starting one hour before the schedule time for examination.
- This is followed by phenylephrine 2.5% just one drop before the examination.
- Phenylephrine is available in 10% concentration. It should be diluted 4 times before use in neonate.
- Avoid repeated instillation of phenylephrine to prevent hypertension.
- Support the baby throughout the procedure.
- Use sucrose soaked swabs to soothen the baby.

- Ensure baby is not fed one hour prior before and after the procedure
- Record zone, stage and extent in terms of clock hours, presence of any plus or preplus disease.
- ROP examination should be followed by instillation of antibiotic eye drops 6 hourly for 3 days.
- Monitor baby for apnea.
- Advice follow up examination as necessary.

XIV. EMERGENCY TRIAGE ASSESSMENT AND TREATMENT

Triage is the process of rapidly screening sick neonates when they arrive at the hospital and categorizing them in one of the following groups:

1. Emergency Cases

- Severe hypothermia (temp<32°C)
- Apnea or gasping respiration
- Severe respiratory distress (rate>60/min, severe retractions, grunt)
- Bleeding
- Shock (cold periphery, Capillary Filling Time >3secs, weak & fast pulse)
- Seizures, Coma or encephalopathy

These neonates with emergency signs are at high risk and require urgent intervention and emergency measures

2. Priority signs

- Small neonate (<2000gms)
- Cold stress/moderate hypothermia
- Respiratory distress (rate>60/min, no retractions)
- Irritable/restless/Jittery
- Refusal to feed
- Abdominal distension
- Severe jaundice (yellow palms & soles)
- Severe pallor
- Major congenital malformations

The neonates with priority signs are sick and would need urgent assessment. They should be attended to on a priority basis

3. Non urgent cases

- Jaundice
- Developmental peculiarities
- Superficial infections
- Transitional stools
- Minor birth trauma
- Minor malformations
- All cases not categorized as Emergency/Priority

Triaging Neonates: Where and How?

The reception and resuscitation area or the emergency room of the hospital managing sick neonates should be the triaging area. In other places, the site at the facility where a neonate is first brought should be the triaging area.

The staff involved in the initial management of a child should all be trained in the triaging process. The most experienced doctor who is trained in neonatal care should undertake the responsibility of emergency treatment and management of the neonate.

After emergency treatment the neonate is assessed to establish a diagnosis and appropriate management done.

Process of triaging

Assess for emergency signs

- Assess for severe hypothermia. If present, arrange for rapid re-warming of the baby
- Check for severe respiratory problem and if present arrange to oxygenate the baby
- Determine if the baby is in shock or has encephalopathy or convulsions and if so initiate urgent steps to manage

Assessment of emergency and priority signs

- Temperature assessment
  - Assess temperature and look for hypothermia
  - If the temperature is <32°C, the baby has severe hypothermia and is seriously sick. If this temperature is above 38°C, the baby has hyperthermia and is suggestive of sepsis if environmental condition has been ruled out
- Assess airway and breathing
  - Is the baby apneic or has gasping respiration? It could be due to apneic spells or aspiration or blockage of airway
  - Does the baby have severe respiratory distress? (RR more than 60/min, retractions or grunting)
- Assess circulation
  - Look for evidence of shock
    - ❖ The hands and feet are cold
    - ❖ Look for CFT by pressing the front of chest or forehead and blanching the skin. If the area becomes pink again in more than 3 secs, it is suggestive of prolonged CFT
    - ❖ Check for the pulse. If the baby has tachycardia (HR>160/mt) and the pulse is weak and rapid, it is suggestive of shock
- Assess for convulsions, encephalopathy and coma.
  - Is the baby in coma or encephalopathy? Assess on the APU scale. A. Awake, P. response to pain and U. unresponsive

After assessment, give emergency treatment:

- Manage temperature
- Maintain the airway
- Support circulation
- After initiating emergency measures proceed to investigate the neonate with emergency investigations (blood glucose, oxygen saturation, sepsis screen, chest X-ray, Hb etc)
- Based on the clinical exam and the investigations, proceed to treat the baby for underlying disorder

Rapid Assessment and immediate management of emergencies

SHEET-A

Look for EMERGENCY Signs

Evaluate all neonates for emergency signs afterwards refer to Sheet B

Not breathing at all (even when stimulated) OR gasping respiration OR respiratory rate less than 20/minute → APNEA OR GASPING RESPIRATION → • Start PPV • Continue Oxygen

Weak and fast pulse(HR>160/mt) AND Extremities cold to touch AND Capillary Refill Time > 3 sec, with or without pallor, or lethargy or unconscious → SHOCK

If bleeding is the likely cause of shock:

- Infuse normal saline 10ml/kg body weight over 10 minutes with maximum of three boluses over one hour
- Give blood transfusion
- Stop external bleeding
- Give Vit K IV

If bleeding is not the likely cause of shock:

- Give 10 ml/kg normal saline over 10 minutes with maximum of three boluses over one hour

Bleeding → BLEEDING

Seizures → SEIZURES → Manage Airways, Check and manage Low Blood Glucose, check Calcium, give Anticonvulsants

Blood glucose less than 45 mg/dl → HYPOGLYCEMIA → Treat Hypoglycemia (Follow STP)

Temperature <36° C → MODERATE TO SEVERE HYPOTHERMIA → Keep under warmer Rapid re-warm if temp. <32° upto 34° C and then gradual rewarming (Follow STP)

Make sure newborn is warm; manage airways; start oxygen if saturation <90%; insert IV; measure blood glucose; correct low blood glucose

Assessment for specific conditions

SHEET-B

(AFTER EMERGENCY MANAGEMENT OR IF EMERGENCY SIGNS ARE ABSENT)

ASK

NEONATAL HISTORY

- Age of the neonate and the birth weight if available.
- Was the baby born term? If not, then at what gestation?
- Delayed Cry/ not breathing at birth/ requirement of BMV at birth
- Is the baby having any other problem in feeding/ choking/ vomiting?
- When did the problem start?
- Has the baby worsened?

MATERNAL HISTORY

- Medical, obstetric, social history,
- ***Pregnancy:*** Duration, chronic diseases, HIV, any complications, history of maternal fever
- ***Labour:*** Any complications, duration of rupture of membranes, any complication-fetal distress, prolonged labor, caesarean section, color and smell of amniotic fluid, instrumental delivery, vaginal delivery, malposition, malpresentation, any other complications

LOOK

EXAMINATION

- Recheck Temperature*
- Recheck Heart rate*
- Recheck Respiratory rate*
- Severe chest indrawing, grunting, central cyanosis.
- Abdominal distention and/or vomiting
- Seizure
- Lethargy
- Jaundice
- Any other obvious abnormalitymalpresentation, any other complications

*If taken more than 30 minutes before

Newborn with Hypothermia → **Follow STP**

Preterm → **Follow STP for Feeding low birth weight/ sick newborn**

Newborn with Seizure → **Follow STP**

Neonate with Breathing Difficulty → **Follow STP**

Newborn with Birth Asphyxia

- Requiring bag and mask ventilation/ intubation/ drug at birth

→ **Follow STP**

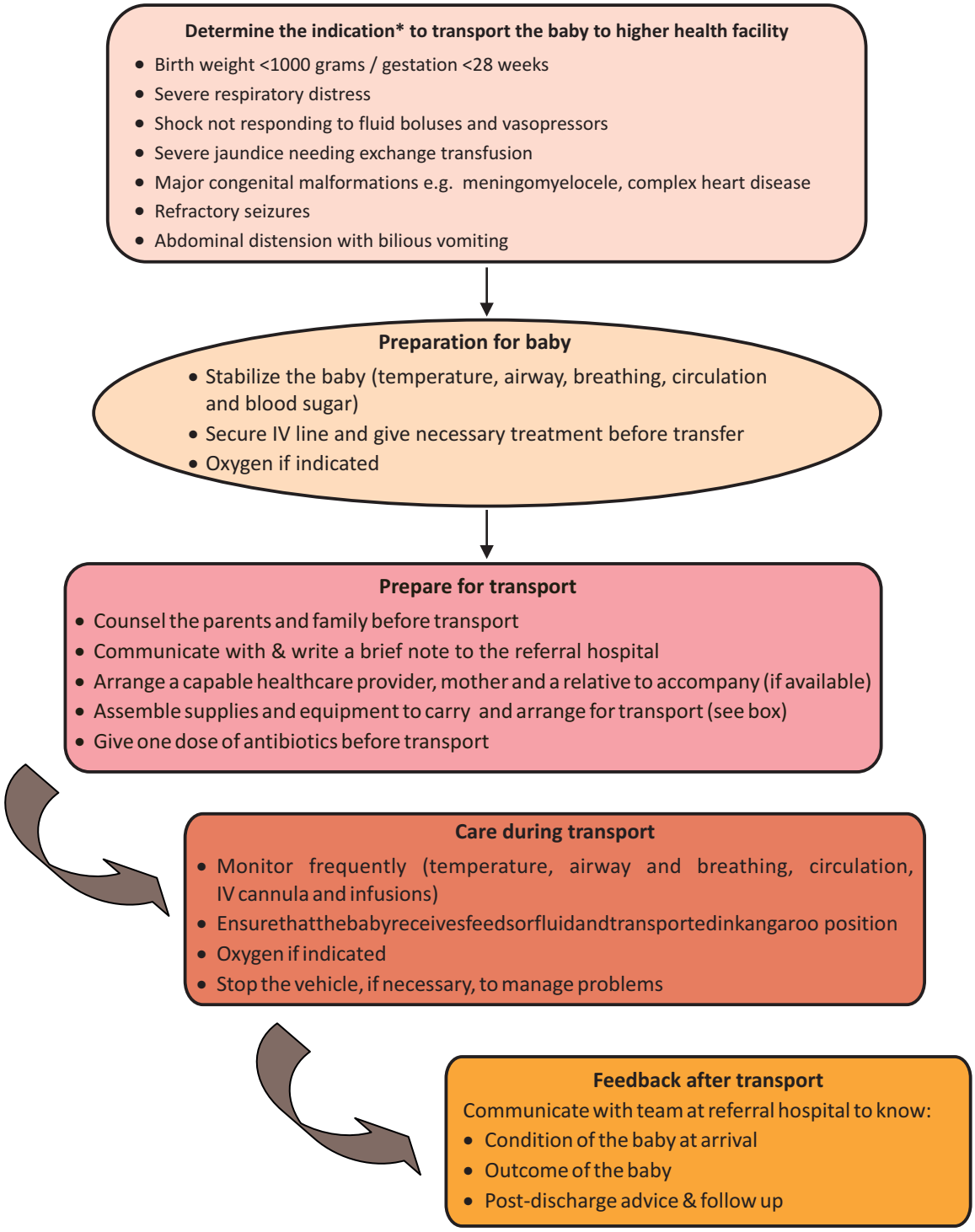
Newborn with Sepsis
Suspect if any of following signs are present
Breathing difficulty, abnormal movements, unconscious or lethargic, not feeding or poor feeding, abdominal distension, or vomiting
or
Maternal risk factors for sepsis present

→ **Follow STP**

Neonate with Jaundice → **Follow STP**

Baby may have more than one condition to treat; so look for all conditions

XIV. TRANSPORT OF A SICK BABY



Indications have to be individualized for each facility depending upon capabilities and infrastructure of referring and referral facilities

Annexure: Supplies and equipment to carry

Equipment and supplies		Drugs & fluids
• Cover adequately-socks, cap • Source of warmth, blanket • Resuscitation equipment: o bag o appropriate sized mask o suction apparatus o oxygen cylinder with flow meter o nasal catheter, or head box • Stethoscope, thermometer	• Fluids & feeds: o Expressed breast milk o Oro gastric tube to feed o IV infusion set o Butterfly set or IV set • Syringes and needles (various sizes and types) • Adhesive tape • Sterile gloves • Antiseptic solution and cotton-wool balls • Extra napkins (diapers) • A source of illumination: Torch	• Any drug (e.g. antibiotics) the baby is receiving if a dose is anticipated during the trip • IV fluid (Normal Saline, Ringer lactate , 10% dextrose)

If the baby is able to feed and the mother is not accompanying the baby, carry expressed breast milk and send mothers blood sample.

PREVENTION OF INFECTION, HOUSE-KEEPING AND WASTE DISPOSAL

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

LEARNING OBJECTIVES

After going through this module, participants will be able to:

- **Enumerate key points of prevention of infections in the hospital**
- **Enumerate eleven 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 participants. Key messages are highlighted in the boxes.
- ***Demonstration:*** Observing nursing routines for asepsis (house keeping, disinfectant use).
- ***Skills:*** Practice skills in a hospital setting.
- ***Self evaluation:*** At the end of text a self evaluation based on what you have already learnt is included. Feel free to consult your test material, if you need assistance in recapitulating.
- ***Video film:*** Learn asepsis routines for prevention of infections and hospital waste disposal in baby care area.

1. IMPORTANCE OF ASEPSIS

Sepsis is the most important cause of neonatal deaths 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. Health care providers working in the hospital 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.

2. ASEPSIS BASICS

2.1 Basic requirements for asepsis in a baby care area

- Running water supply
- Soap
- Elbow or foot operated taps
- Strict hand washing
- Avoid overcrowding, recruit optimal number of nurses for care of more babies
- Plenty of disposables
- Rational antibiotic policy asepsis routine and house keeping
- Strict adherence to house keeping and asepsis routines

2.2 Guidelines for ENTRY into the baby care area

- Remove shoes, socks, woolens, watch, bangles, and rings
- Roll up the full sleeves up to elbow. Put on new slippers wash hands with soap and water for 1 minute (40-60 seconds) by following eleven steps of hand washing
- Put on sterile half sleeve gown

2.3 Policy regarding VISITORS

- Only parents of the babies should be allowed entry into the nursery
- Mothers are welcome 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 and siblings should be guided and supervised about proper hand washing technique

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

2.4 Sterile gloves

- Always use sterile gloves for invasive procedures like sampling, starting intravenous lines, giving intravenous injections etc.
- Throw used gloves in blue bag
- Adequate number of sterile and clean pair of gloves should be available in the unit

2.5 Full sleeve gown and masks

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

2.6 Other basics

- Keep separate spirit and povidone iodine/ chlorhexidine swab containers, stethoscope, tape measure and thermometer for each baby
- Change intravenous sets and tubings used for TPN daily or as per set routine
- Feeding tubes can be left alone 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% gluteraldehyde for 4 to 6 hours

2.7 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 cleaning, only wet mopping should be done
- Clean the walls with 2% bacillocid once in each nursing shift
- Dustbins should be washed daily with soap and water; polythene should be changed daily or whenever full

3. HAND WASHING

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

3.1 Hand washing norm

- ONE MINUTE hand washing (11 steps) to be done before entering the unit
- Hand hygiene with alcohol hand rub for 20-30 seconds before and after touching babies, before any clean/aseptic procedure, after body fluid exposure risk and after touching baby surroundings.

3.2 Steps of effective hand washing

- Roll sleeves above elbow
- Remove wrist watch, bangles, rings etc.
- Using plain water and soap, wash parts of the hand in the following sequence:
  0. Wet hands with water
  1. Apply enough soap to cover all hand surfaces
  2. Rub hand palm to palm
  3. Right palm over left dorsum with interlaced fingers and vice versa.
  4. Palm to palm with fingers interlaced
  5. Back of fingers to opposing palms with fingers interlocked
  6. Rotational rubbing of left thumb clasped in right palm and vice versa
  7. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa
  8. Rinse hands with water
  9. Dry hands thoroughly with a single use towel/sterile napkin
  10. Use towel to turn off tap
  11. Your hands are now safe

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. at a lower level 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

Remember - Rinsing hands with alcohol is NOT A SUBSTITUTE for proper hand washing

4. HAND RUB

4.1 Purpose

To reduce bacterial colony counts on the hands of care providers so that hospital acquired infections can be prevented.

4.2 Points of emphasis

Use alcohol based hand rubs

- After drying hands following hand washing

- Before and after every routine patient contact

Remember: Alcohol based hand rubs have been shown to be definitely superior to soap and water hand washing in reducing bacterial colony counts of the hands. Hence, application of alcohol-based hand rubs must be preferred over hand washing for all routine contact.

It is equally important to remember: Alcohol-based hand antiseptics are not effective on hands that are visibly dirty or contaminated with organic materials. Hands that are visibly dirty or contaminated with organic material must be washed with soap and water, even if hand antiseptics are to be used as an adjunct measure.

4.3 Indications

The term "patient contact" is not restricted to direct contact with a patient. It includes the following:

- Performing any kind of non-invasive procedure
- Recording any patient parameter
- Touching baby's clothes/linen
- Handling baby's incubator/warmer/devices attached to baby
- Handling baby's probes/BP cuff
- Handling baby's IV tubings/syringes
- Handling baby's milk tubings/syringes

4.4 Procedure

Technique of applying alcohol-based hand rub

- Apply product to palm of one hand (two press on 500 mL Sterilium® bottle pours ~ 3.0 mL of sterilium) and rub hands together, covering all surfaces of hands and fingers as in steps of hand washing.
- For surgical scrub press six times: 9.0 mL of sterilium is required.
- Wait until hands are dry. Do not touch the baby with wet hands.

How to make an alcohol handrub locally at low cost :

- Because alcohol used by itself dries the skin and can make it crack, mix alcohol as follows with an ingredient to moisturize the skin
  - 100 ml of 60-90% alcohol
  - 2 ml of glycerin, propylene glycol, or sorbitol

How to use locally made hand rub:

- Pour 3-5 ml (1 teaspoon) of the alcohol handrub into the palm of your hand.
- Rub hands together, including between fingers and under nails, until dry.

After using this method 5-10 times, you will need to remove the build-up of moisturizer (such as glycerin) from your skin. Wash this off with soap and water.

5. SKIN PREPARATION FOR 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. The procedure of skin preparation is given in the box below:

Skin preparation for venipuncture

1. Wash and dry hands.
2. Wear sterile gloves.
3. Prepare skin site, confine to smallest possible area of skin.
4. Swab with alcohol/chlorhexidine 2% 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 of prick.

6. OTHER RECOMMENDATIONS

- Never use stock IV fluids (heparinized saline). 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
- Open the top surface of the bottle , keeping the seal intact
- First clean with spirit swabs, then use povidone iodine soaked sterile cotton to cover the top surface 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
- Antibiotic vials to be changed after 24 hrs. e.g. injections ampicillin and cefotaxime
- There is no need for flushing with heparinized saline to keep the IV line patent
- Use separate IV line for giving antibiotics (do not open the IV fluid line for giving injections)

7. UNIVERSAL PRECAUTIONS

7.1 Purpose

Universal precautions refers to the practice, in medicine, of avoiding contact with patients' bodily fluids, by means of the wearing of nonporous articles such as medical gloves, goggles, and face shields.

7.2 Points of emphasis

Under universal precautions all patients are considered be possible carriers of blood-borne pathogens. The guideline recommends wearing gloves when collecting or handling blood and body fluids contaminated with blood, wearing face shields when there is danger of blood splashing on mucous membranes and disposing of all needles and sharp objects in puncture-resistant containers.

7.3 Policy

Universal precautions are designed for doctors, nurses, patients and health care support workers who are required to come into contact with patients or bodily fluids. This includes staff and others who may not come into direct contact with patients.

What do universal precautions mean?

- Always wear sterile gloves for heel stabs, phlebotomy and insertion of vascular catheters
- Wear gloves while handling any kind of body fluids
- Do not recap used needles by hand

- Do not remove used needles from disposable syringes by hand
- Do not bend, break, or otherwise manipulate used needles by hand
- Destroy needles using the needle destroyer provided in every ward
- Dispose scalpel blades and other sharp items in puncture-resistant containers for disposal.

7.4 Indications

Universal precautions are typically practiced in any environment where workers are exposed to bodily fluids, such as

- Universal precautions apply to blood and to other body fluids containing visible blood. Universal precautions also apply to tissues and to the following fluids: CSF,synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid.
- Universal precautions do not apply to feces, nasal secretions, sputum, sweat, tears, urine, and vomits unless they contain visible blood. The risk of transmission of HIV and HBV from these fluids and materials is extremely low or nonexistent.

7.5 Supplies

Protective clothing includes but is not limited to:

- Barrier gowns
- Gloves
- Eyewear (goggles or glasses)
- Face shields

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

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

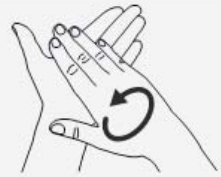
0

Wet hands with water;

1

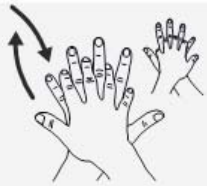
Apply enough soap to cover all hand surfaces;

2



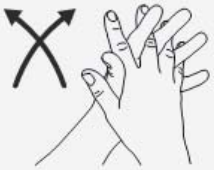
Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

4



Palm to palm with fingers interlaced;

5

Backs of fingers to opposing palms with fingers interlocked;

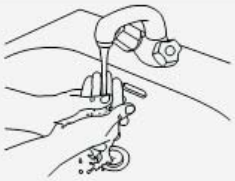
6

Rotational rubbing of left thumb clasped in right palm and vice versa;

7

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8



Rinse hands with water;

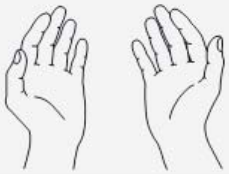
9

Dry hands thoroughly with a single use towel;

10

Use towel to turn off faucet;

11



Your hands are now safe.

World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

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WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

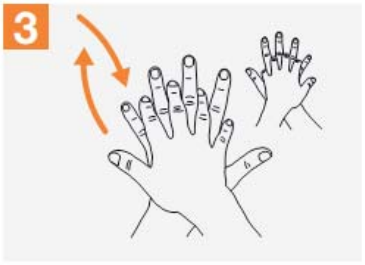
How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

Apply a palmful of the product in a cupped hand, covering all surfaces;

Rub hands palm to palm;



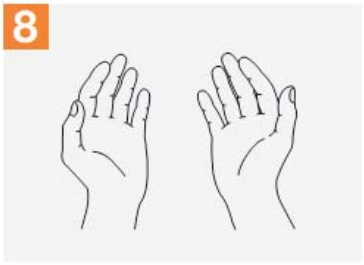
Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Once dry, your hands are safe.

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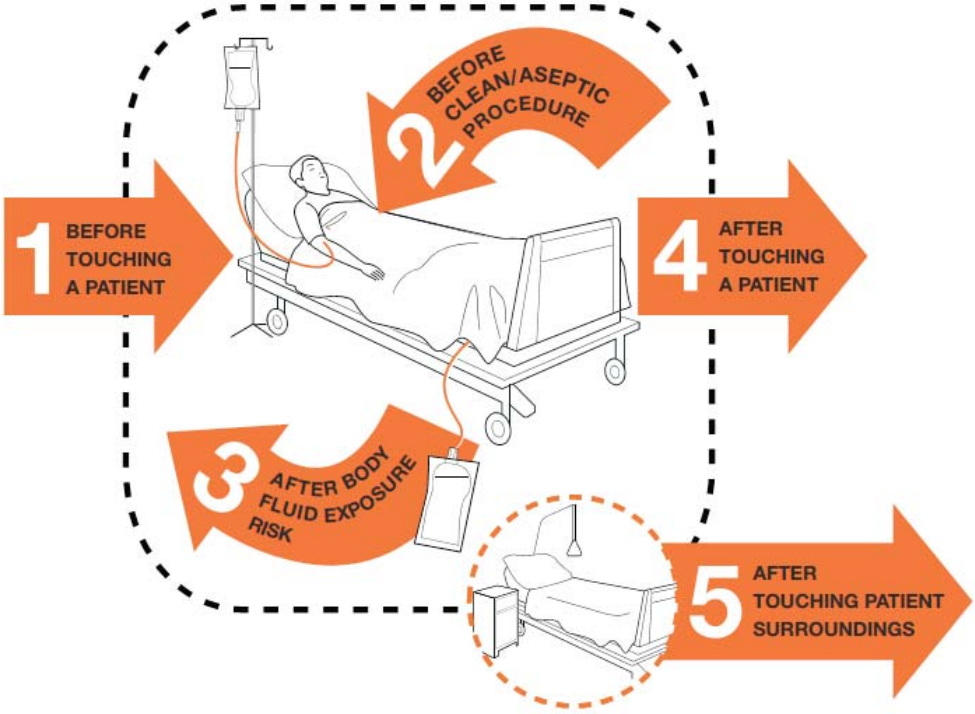
May 2009

Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching him/her.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.

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May 2009

DEMONSTRATION

The facilitator will conduct a demonstration on 'Steps of hand washing and hand rub and five moments of hand hygiene ' using a poster. This will be followed by another demonstration on 'How to wear gloves'.

8. 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 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) - twice weekly
- Equipment (viz. laryngoscopes, AMBU bags, mask, stethoscopes, oxygen hoods, B.P. cuffs) - twice weekly
- Liquids (viz. water in humidifier bottles) - every two week

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)/20% ecoshield. Otherwise one can just do routine cleaning thoroughly.

9. OTHER STEPS

Assignment in the NICU and nursery

Baby should be assigned to the nurses, based on 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.

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.

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 counseled 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 and
- 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:
  i. Spirit swab container
  ii. Povidone iodine swab container
  iii. Thermometer (clinical)
  iv. Stethoscope
  v. Tape measure
  vi. Adhesive tape for fixing lines / probes

SELF EVALUATION

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

   b._____ minutes hand rub before entering the newborn care area.

   c._____ 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 evaluated yourself.

ORAL DRILL

There will be an oral drill by the facilitator on 'Disinfection routines'.

Name	Disinfection method	Frequency & other considerations
Baby linen, blanket cover	Wash and autoclave	Use autoclaved linen each time
Cotton gauze	Autoclave	As required.
Feeding utensils (paladai, 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
Stethescope, measuring tape, thermometer, BP cuffs, probes of radiant warmer/incubator pulse oximeter	Clean with spirit swab	Daily and before use
Laryngoscope	Clean with spirit swabs thoroughly daily and after each use. Wrap in autoclaved cloth, put date on cover.	If used for an infected baby, wash with soap and water. Put the blade in 2% gluteraldehyde after removing the bulb. Wash thoroughly after removing from gluteraldehyde.
Syringe pumps	Clean with wet clean cloth. If blood stained, use soap and water.	Daily in morning shift ; if possible, in each shift
Oxygen hood	Wash with soap and water ; dry with Clean linen	Daily in morning shift.
Face mask	Clean with soap and water, immerse in gluteraldehyde for 20 min, rinse in distilled/running water, dry and wrap with autoclaved linen	Daily and after each use
Resuscitation bag and reservoirs, oxygen tubing, bottle and tubing of suction machine	Clean with detergent/soap and water after dismantling. Immerse in gluteraldehyde for 4-6 hours. Rinse in distilled water. Dry, wrap in autoclaved linen and put a date	Weekly for resuscitation bag and reservoir. Daily for others.
Weighing machine	Wipe with surface disinfectant	Daily in morning shift and when required
Radiant warmer & Incubator	Clean with soap water daily, if occupied. If not occupied, clean with 2% Bacilloicid	Daily

10. SAFE DISPOSAL OF HOSPITAL WASTE

Proper disposal of hospital waste is important to keep the environment clean. The waste should be disposed off in a proper way. All health professionals should be well conversant with their local hospital policies for waste disposal which may vary from place to place.

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

a. 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.

b. Yellow drums / Bags

Infected non-plastic waste e.g. human anatomical waste, blood, body fluids, placenta, diapers etc. This type of waste requires incineration.

c. Blue drums / Bags

Infected plastic waste such as used disposable syringes, needles (first destroy the needle in the needle destroyer) and soiled gloves.

Used sharps, blade and broken glass should be discarded in puncture proof containers before discarding.

Patients' IV set, blood transfusion set, endotracheal 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.

* Some hospitals use red drums / bags for disposal of glass, sharps and blades .

DEMONSTRATION

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

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?

   a. _____

   b. _____

   c. _____

   d. _____

4. Indicate the waste disposed based on colour of bag/drum in your hospital

   Black _____

   Yellow _____

   Blue _____

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

ORAL DRILL

There will be an oral drill by the facilitator on 'Disinfectants and House-keeping routines':

I. Disinfectants and Germicides

Name	*Indication for use*	*Direction for use and special considerations*
Bacillocid spray (2%)	• Walls of nursery • Incubators & warmers (when not in use) • Surface of weighing machine	Put off air conditioners at the time of spray
2% gluteraldehyde (Cidex)	• Face mask & Ambu bag • Reservoir	Before immersing into cidex, clean thoroughly with soap and water time of contact : • For sterilization : 4-6 hours • For disinfection : 15 - 20 mins (once prepared, solution is active for 14 days)
Ecoshield (H_2O_2 11%w/v, 0.01% w/v Silver nitrate) (Prepare solution as per instruction of manufacturer)	Fumigation of nursery	**Routine fumigation:** 200 ml of ecoshield in 800 ml of water, 1 litre/1000 cu ft for aerial fumigation. Nursery is to be sealed properly - switch off AC and seal AC duct. Switch on fumigation machine for 1 hr. Open and clean the nursery.
Sodium hypocholorite (bleach)	Sharps / needles and disposables	Keep the solution covered, change it every 24 hours
Spirit	Skin preparation, cleaning laryngoscope blades, tape measure, and 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 20 min
Phenyl 5%	Cleaning floors	Daily in the morning shift or as required
Povidone-iodine	Skin preparation	Use with caution in extremely preterm babies
Chlorhexidine 2%	Skin preparation	

II. House-keeping routines

Name	*Disinfection method*	*Frequency & other considerations*
Floors	Wet-mopping with phenyl	Once in each shift NO dry sweeping DO NOT use 2% glutearldehyde (Cidex)
Walls	2% Bacillocid	Once in each shift
Fans	Wipe 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	Detergent or powdered soap	Daily in the morning shift or as required

** These are general guidelines which may be adapted based on the avilability of disinfectants and the infection control policy of the hospital*

VIDEO

There will be video demonstration on 'Hand washing, asepsis routine and disposal of hospital waste'. The video demonstration will be followed by discussion.

1. Video demonstration covered following aspects for prevention of infection

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

2. Following should have been included in the video

_____

_____

3. Video covered

Hand washing	Yes/No
Equipment disinfection	Yes/No
Daily housekeeping	Yes/No
Waste disposal	Yes/No

COMMON EQUIPMENTS & TROUBLE SHOOTING

The module is designed to complement pre-service and in-service education of nursing personnel involved in care of newborns.

LEARNING OBJECTIVES

The participants will be able to :

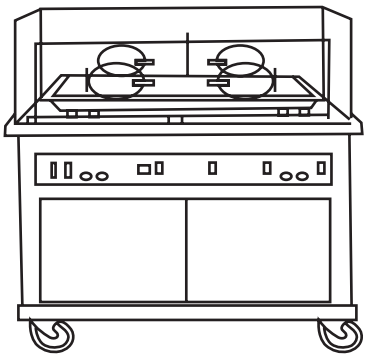
- **Use and maintain the neonatal equipments: Incubator, radiant warmer, phototherapy machine, resuscitation bag, weighing machine, suction machine, oxygen concentrator, pulse oximeter, infusion pump, glucometer**
- **Learn trouble shooting, keeping them clean and routine maintenance**

MODULE CONTENTS

The module includes the 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.
- ***Demonstration:*** Observing the functioning and maintenance in the hospital setting.
- ***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.

I. INCUBATOR



Parts

- Canopy with port holes (baby tray for placing the neonate).
- Heat source with fan underneath the baby tray
- Skin probe (for sensing the baby's skin temperature).
- Air probe
- Control Panel(displays and control knob)
  - Mode selector(selects air or skin mode)
  - Heater output display.
  - Temperature selection key/knob (select the desired skin temperature).
  - Temperature display (displays the temperature of baby's skin, the set temperature and air temperature).
  - Alarm display for power failure, system failure, skin probe failure, set skin temperature (above & below set temperature) and air flow.
- Determine the appropriate temperature for the incubator based on the baby's weight and age (Table below)
- Warm the incubator to the desired temperature before placing the baby inside

Recommended incubator temperature for Air Mode

Weight of baby	Incubator Temperature by Age*			
	35°C	34°C	33°C	32°C
Less than 1.5 kg	1 to 10 days old	11 days to 3 wks old	3 to 5 wks old	More than 5 wks old
1.5 to 2.0 kg		1 to 10 days old	11 days to 4 wks old	More than 4 wks old
2.1 to 2.5 kg		1 to 2 days old	3 days to 3 wks old	More than 3 wks old
More than 2.5 kg			1 to 2 days old	More than 2 days old

- Clean the mattress and cover it with a clean sheet

- Ensure that the incubator's water reservoir is empty; dangerous bacteria may grow in the water and infect the baby. Leaving the reservoir dry will not affect the function of the incubator
- Ensure that the baby's head is covered with a cap, feet secured with socks and the diaper on
- Place only one baby in each incubator. If baby is in supine position, place the skin probe on the right hypochondrium. When in prone position, place the probe on the loin area
- Close the hood as quickly as possible after placing the baby inside and keep the portholes of the incubator closed at all times to keep the incubator warm make sure to place the incubator away from the walls
- Work in air mode, if baby is unstable and skin mode/servo mode if baby is stable. If the incubator is in skin/servo mode the set temperature should be between 36.5°C to 37.5°C. Smaller the baby, higher is the set temperature
- Check the temperature of the **incubator** every hour for the first eight hours, and then every three hours:
  - If the temperature of the incubator does not match the set temperature, the incubator may not be functioning properly; adjust the temperature setting until the desired temperature is reached inside the incubator or use another method to warm the baby
- Measure the **baby's** temperature every hour for the first eight hours, and then every three hours:
  - If the baby's temperature is less than 36.5°C or more than 37.5°C, adjust the temperature of the incubator accordingly;
  - If the baby's temperature remains less than 36.5°C or more than 37.5°C inspite of the incubator being kept at the recommended setting, suspect infection
- Move the baby to the mother as soon as the baby no longer requires special care, frequent procedures and or treatment. For a stable baby, if the heater output is less than 25% on skin/servo mode or in air mode at 28ºC to 30°C and the baby is maintaining the skin temperature, it is time for shifting the baby to the mother
- Place the incubator in a place where there is no direct sunlight OR Place the incubator shielded from direct sunlight
- Always position the incubator in such a way that free air enters the air inlet
- When the equipment is in use, all approachable internal and external surfaces should be cleaned daily with soap and water. Spirit or other organic solvents must NOT be used to clean the incubator hood or panel
- Every seventh day, after shifting the baby to another clean incubator, the used equipment

should be cleaned thoroughly, first by light detergent solution and then by antiseptic solution. All detachable assemblies, especially from the under deck area, are to be treated similarly. After drying, the parts are reassembled and sterilized using a vaporizing agent and/or fumigation. Adding 30 ml of 2 % glutaraldehyde and 90 ml of distilled water in humidity tank and plugging it for 4 hours leads to fumigation of the incubator. Plug in for half an hour and keep closed for four hours. After this clean incubator thoroughly. After fumigation it should be thoroughly aired. The sleeves of the access windows must preferably be changed daily and cleaned. Check and dust the air filter every day

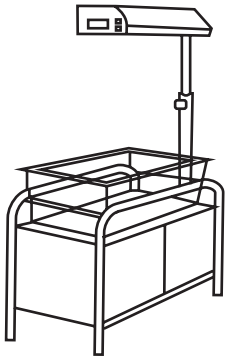
- Maintenance checklist
  - Date of change of air-filters : every 3 months
  - Date of temperature calibration : every 3 months
  - Date of preventive check : every 6 months

ALARMS ON THE INCUBATOR:

Whenever alarm is ON try to identify the reason and take corrective action. Silencing the alarm without understanding may harm the baby.

Alarm	Problem	Response
"Power alarm"	This alarms if the mains power fails.	Find alternative means for heating if power cannot be fixed e.g. (KMC).
"System alarm"	This alarms if there is an error in the electrical circuit. There will be "Error codes" (EEE) on the display.	Change incubator as the incubator needs repair.
"Over temperature alarm"	This signals that the temperature inside the incubator is too high. The heater power will be automatically disconnected. It sounds when the air temperature is > 38°C in manual mode or when the air temperature is > 39°C in servo mode.	Check "set" temperature settings and adjust down if set too high. If set temperature appropriate then change incubator as it needs repair
"Air flow alarm"	This alarm sounds if the air circulation in the incubator fails.	Change the air filter as per the recommendation or look if the fan is moving. If problem persists, the incubator should be changed; this is a maintenance issue.
"Sensor alarm"	This alarm sounds if the air sensor is not connected properly or if it is not functioning properly.	Try to re-connect the sensor correctly. If this does not work, it requires changing.
"Skin temperature alarm"	This alarm operates in servo mode only. It sounds when the patient temperature differs from the SET temperature by > 1°C in skin mode and 3°C in air mode	Change to manual mode and adjust the temperature to try and normalize the baby's temperature. Check for signs of infection.
"Set temperature alarm"	This alarm operates in manual mode only. It alarms if the set temperature is >1.5°C above or < by 3°C below the air temperature once the incubator has had sufficient time to heat after turning on.	The incubator needs repair.

II. RADIANT WARMER



Parts

- Bassinet (for placing the neonate).
- Radiant heat source
- Skin probe (for sensing the baby's skin temperature).
- Air probe
- Control Panel(displays and control knob)
  - Mode selector(selects manual or servo mode)
  - Heater output control key/ knob to increase or decrease the heater output manually.
  - Heater output display.
  - Temperature selection key/knob (select the desired skin temperature.
  - Temperature display (displays the temperature of baby's skin, the set temperature and air temperature).
  - Alarm display for power failure, system failure, skin probe failure, skin temperature high/low and heater failure.
- Ensure that the temperature of the room is $\geq$ 22°C for optimal functioning
- Place the warmer away from air currents
- Clean the mattress and platform, and cover the mattress with clean sheet
- Turn on warmer for at least 20 minutes to pre-warm the linen and mattress
- Read temperature on display. Adjust heater output to
  - High : If baby temperature is below 36ºC
  - Medium : If baby temperature is between 36ºC-36.5ºC and to
  - Low : If baby temperature is between 36.5ºC-37.5ºC
- Once the baby's temperature is between 36.5-37.5ºC, switch on to servo skin mode
- If baby is in supine position place the skin probe on the right hypochondrium. When in prone position, place the probe on the loin area. To prevent skin injury, place tegaderm and fix the probe on it with an adhesive
- Ensure that the baby's head is covered with cap and feet secured in socks and keep the diaper on
- If the baby is < 1000 grams use cling wrap across the panels to prevent insensible water loss
- Place only one baby under each radiant warmer
- Keep the baby dry, change soiled or wet napkins or diapers and baby sheets
- Turn the baby frequently while under the warmer, if possible
- Check the temperature of the warmer the room every hour and adjust the temperature setting accordingly. Record the heater output in each shift (every 6 hours). Any sudden increase in heater output is an early indicator of sickness

- Shift with mother as soon as the baby no longer requires frequent procedures and treatment. If the heater output is <20% in servo mode, it is safe to shift the baby to mother's side

Servo Mode

- Set temperature at 36.5ºC, heater output will adjust automatically to keep baby at set temperature. If baby temperature is below the set temperature, the heater output will increase; if baby is at set temperature or higher the heater output will become zero
- Look for probe displacement when the baby is in servo mode. Check for and ensure proper probe placement every hour

Manual Mode

- Once connected to mains, heater output can be regulated by knob on front panel. The output is displayed as % or bars or bulbs
- Use maximum (100%) output for rapid warming of bassinet in labor room 20 minutes before delivery. Reduce output to 25-75% after 10 minutes depending on ambient temperature. If left on with heater output >80%; alarm is activated within 15 or 20 minutes and there after the heater output goes to 40%; if alarm is silenced the heater output will be kept on maximum for another 15 to 20 minutes as per manufacturers recommendation
- For low birth weight or sick neonate adjust heater output depending on baby's temperature.
- Never use full (100%) heater output unsupervised
- Record baby's temperature every 2-4 hourly
- Use manual mode only for pre-warming, during resuscitation and initial stabilization

For disinfection

- For daily cleaning of front panel use damp cloth soaked in mild detergent (soap water)
- Don't use spirit or other chemicals
- Bassinet, cot should be disinfected daily using soap/detergent solution or disinfectant solution

ALARMS ON THE SERVO RADIANT WARMER

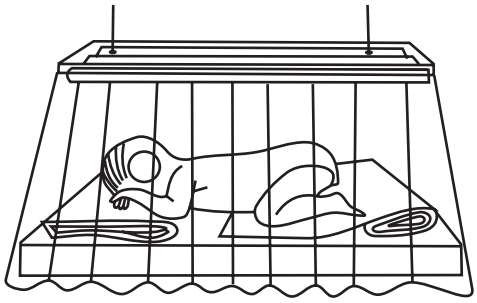
(NO ALARMS IN MANUAL MODE)

Alarm	Problem	Response
"Power alarm":	This alarms if the mains power fails.	Find alternative means for heating if power cannot be fixed e.g. (KMC). Check the fuse.
"System alarm":	This alarms if there is an error in the electrical/ electronic circuit	Change WARMER, as it needs repair.
"Skin Probe failure alarm":	This alarm sounds if the temperature probe sensor is not connected properly or if it is not functioning properly.	Try to re-connect the sensor correctly. If this does not work, change it.

"Skin temperature alarm High or Low ":	This alarm operates in servo mode only. It sounds when the patient temperature differs from the SET temperature by > 0.5ºC.	Change to manual mode with maximum output if baby is having low temperature and adjust the temperature to try and normalize the baby's temperature. If baby is having fever, shift to manual mode and set appropriate heater output. Check for signs of infection.
Heater Failure	Indicates heater is not working	Change warmer, needs repair.

III. PHOTOTHERAPY UNIT

Parts of phototherapy machine:



Source of light

- Flourescent lights (conventional phototherapy)
- Compact flourecent lights(CFL)
- Light emitting diodes(LED)

Other parts

- Fan
- Light meter

Tips towards delivering safe and effective phototherapy

- Protect the eyes from light using eye patches once the lights are on
- Keep baby naked with a small nappy to cover the genitalia
- Place the baby as close to the lights as the manufacturers' instructions allow. Use white curtains or linen as slings so as to reflect back as much light as possible to the baby, making sure not to cover top surface of unit which allows air flow for cooling the bulbs.
- Encourage frequent breast feeding. No need to supplement breastfeeding with any other type of feed or fluids
- Temporary interruptions for feeding or procedures are allowed. But not for oro-gastric feeding or for IV fluids
- If baby is on IV fluids or expressed breast milk increase the volume by 10%.
- Monitor for and ensure urinary frequency 6-8 times /day.
- Monitor temperature 4 hourly and weight every 24 hours.
- Estimate serum bilirubin frequently ~ q12 hourly. Clinical or visual assessment of jaundice under lights becomes fallacious.
- Change tube lights every 6 months (or usage time >1000 hrs) whichever is earlier; or if tube ends blacken or if tubes flicker. LED bulbs have longer life of 20,000-30,0000 hours while CFL lamps life is 2000-3000 hours.
- Monitor irradiance of the phototherapy machine once every week. Use a flux meter to monitor irradiance. Change light source if irradiance falls below 6-8 microwatt/ cm2 /nm.

Caution

- Do not use phototherapy unit under a warmer
- Ensure eye patches do not obstruct nostrils

- For babies below 1.5 kg preferably use phototherapy over incubator
- After switching on the unit , check if all tubes/bulbs are on
- Do not place anything on the phototherapy unit (this blocks air vents).

Trouble shooting

Problem	Possible cause	Corrective action
Too noisy machine or gives too much heat	The fan may not be working optimally or choke is faulty	Rectify the fan or choke
Inadequate irradiance	Machine bulbs covered with dust or reflectors are dirty or Life of bulb over	Clean the dust form unit; Change the bulbs at specified periods
Flickering bulbs or blackened end of tubes	Problem with starter or Tubes life is over	Change starter /bulbs / tube lights as required
Unit is not switching	Problem with electrical socket , fuse or loose contact in plug or damaged mains cord	Take action as per need

*After doing the above procedure(s), if the unit is still having problem, call qualified technician to repair the unit.

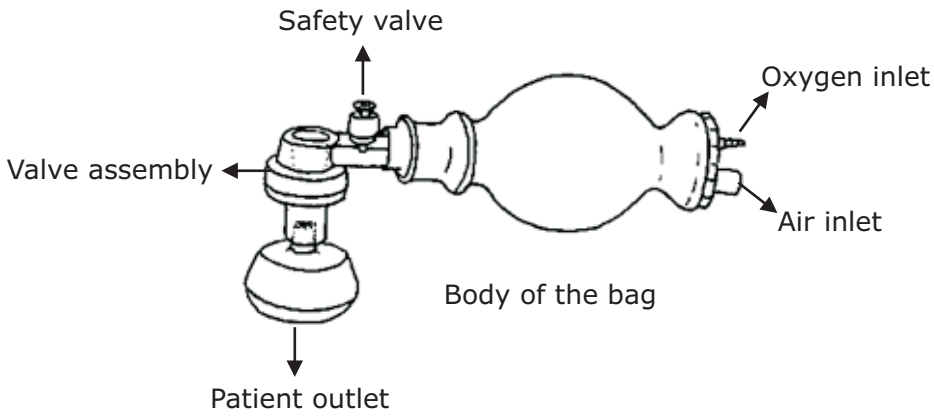
Maintenance

- Change bulbs / tube lights as per recommendation of equipment
- Maintain a log of hours by logbook or time recorder on equipment
- Ensure if inbuilt fan is installed it is working & vents are not covered
- Periodic removal of dust from overhead unit makes unit more efficacious
- If unit overheats the baby , the choke & fan assembly needs repair

Cleaning/Disinfection

- Use moist or dry cloth to clean unplugged unit
- Ensure the reflectors , bulbs remain dust free

IV. RESUSCITATOR BAG



Checking Bag& Mask

- Block patient outlet or mask by palm of your hand
- SSqueeze the bag

  i) You should feel pressure against your hand
  ii) Check opening of inspiratory valve
  iii) With higher pressure one can open pop-off safety valve

Procedure

- Choose appropriate size of the bag and mask
- Position the baby in a sniffing position/slight extension
- Provide tight seal
- Use finger tips to generate enough pressure to move chest of baby
- Observe for improvement in heart rate, colour and chest rise
- Follow the rhythm "Squeeze two three, "to ensure 40 to 60 breaths per minute
- For prolonged bag and mask, insert an orogastric tube and then continue bag and mask
- Do not use bag and mask for suspected diaphragmatic hernia and non vigrous babies born through meconium stained amniotic fluid

Decontamination

i) Washing and rinsing - Dissemble all parts
   - Wash in warm water using a detergent
   - Rinse in clean water

ii) Disinfection/sterilization
   - Except reservoir whole bag can be boiled, autoclaved or soaked in disinfectant solution. After soaking in disinfectant, clean with distilled water or running water. Dry the valves and then reassemble.

Trouble shooting

Problem	Possible cause	Corrective action
Chest does not rise with B&MV	Leakage around mask Blocked airways Needs higher pressure Mouth closed Pop-off valve gives way due to loose spring	Provide tight seal Re-suction, reposition Use higher pressure Change bag
Bag doesn't generate pressure while tested on palm	Leakage/cracked bag Leakage at air inlet Pop-off valve defective	Change bag Ensure valve push
Baby doesn't improve	Needs higher level resus-citation Needs oxygen	Based on HR-Do CC or use medications Ensure O_2 supply Attach reservoir.

V. WEIGHING MACHINE (Electronic)

Parts

- Pan or baby tray
- Display panel for weight
- Machine proper
- Mains adapter

Working

- Put on a firm even surface .Wipe clean the weighing pan
- Plug on and wait till the display panel registers zero
- Check for and adjust zero error
- Place a clean cloth/paper
- Press the knob to reset the reading to zero or else you will have to subtract the weight of the cloth from the total weight when baby is weighed along with the sheet
- Place the baby over the cloth/paper
- Keep baby in the middle of the weighing pan; hold the remaining tubes and lines in hand
- Detach as many tubes/equipment as possible prior to weighing. Keep the naked baby on the towel and record the weight (subtract the weight of the cloth if the scale has no facility to reset to zero)
- Record weight on baby record and plot on growth chart

Do's

- Put the weighing scale on a flat, stable surface
- Record weight prior to feeding
- If using pre-weighed splint, reduce the weight from baby's weight
- Always look for and adjust zero error
- Remove excessive clothing
- Record weight only when display is stationary & not fluctuating
- Take care of the different catheters not to get displaced.
- Calibrate using a known standard weight every week.

Don'ts

- Do not stack up line or other objects on the weighing pan when not in use.
- Do not pour water on the electronic display.
- Do not keep the weighing machine in humid atmosphere.

Cleaning and disinfection

- Clean with soap and water; use damp cloth to clean
- Wipe with spirit swab between two babies

Troubleshooting

Problem	Possible cause	Corrective action
The unit does not function	The plug , socket , cable or fuse may be faulty	Correct & repair as necessary
Machine reads ERR or sorry	Too heavy weight is put on the scale	Use appropriate weight to weigh
Low battery	The battery is discharged	Connect power cord to recharge
Machine shows erratic weights	Needs calibration	Use standard weights of 100 /200 gms or ½ kg / 1kg every 7 days for calibration

VI. SUCTION MACHINE (Electric)

Parts

- Motor
- Vacuum gauge with precision regulator
- Suction bottles
- Suction catheter
- Suction tubing

Working

- Connect to mains
- Switch on the unit and occlude distal end to check the pressure. Ensure it does not exceed 100mm Hg
- Take disposable suction catheter of appropriate size
- Connect to suction tubing
- Perform suction gently
- Switch off the suction machine and discard suction catheter

Cleaning & Disinfection

- Wash suction bottle with soap & water
- Change bottle solution (1 % hypochlorite) every day

Do's

- Suction gently
- Maintain asepsis during the suctioning procedure

- Use only disposable suction catheter
- Check adequacy of suction pressure

Don'ts

- Do not do vigorous & deep suction

Troubleshooting

- Check fuse
- Check cord
- Check earthing
- Check for leakages in the bottle/tubing

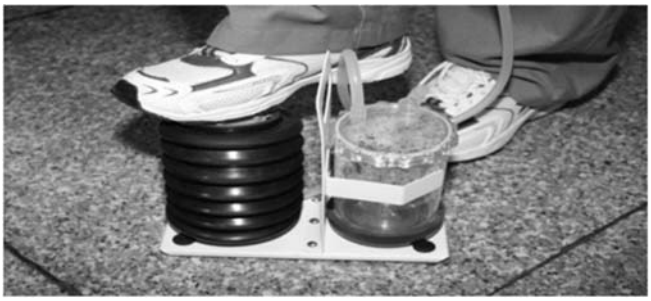
Maintenance

- Check for adequacy of suction pressure
- Change tubing if leaky or broken

VII. SUCTION MACHINE (Foot Operated)

Parts

- Suction tubing
- Suction bottles



Using the foot suction

1. Ensure that foot suction is close to resuscitation trolley so that it can be operated while resuscitating the baby.
2. Place the foot suction on floor across and in front of resuscitation trolley, with bellows on right side (if you use your right foot) and fluid collection jar on left side.
3. Ensure that suction catheter is placed on baby mattress and tube length in not short.
4. Connect suction catheter to patient end of suction tubing attached to suction machine.
5. Place right foot on bellows and press down ensuring that it slides down in contact with the central vertical metal plate. This ensures that bellows do not tilt outwards, preventing slipping of foot.
6. Foot pressure can be adjusted to ensure adequate suction pressure.
7. Pinch the suction catheter end press bellows and check for suction pressure
   - For safety of newborn maximum suction pressure is limited to 100 mm Hg, irrespective of foot pressure.
   - It is most effective if regular rhythmic compression of the bellows is performed.

Cleaning/sterilization

1. Empty the fluid collection jar. The foot suction must be cleaned immediately after use.
2. The fluid collection jar can be autoclaved at 124°C. This can also be washed with soap and water.
3. Re-assemble when dry.
4. Replace in carry case.
5. Empty fluid jar immediately when filled more than half.
6. In case fluid jar cannot be emptied immediately when full, to prevent overflow of fluid into bellow, open the alternate suction inlet. No suction pressure will be created even if bellow is compressed.

Troubleshooting

1. Check for leakage in bottle/tubing.
2. In case fluid jar cannot be emptied immediately when full, to prevent overflow of fluid into the bellows, open the alternate suction inlet.
3. Check for adequacy of suction pressure.

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VIII- OXYGEN CONCENTRATOR

Parts

- Machine with compressor
- Flow meter with /without splitter
- Humidification bottle

Working

1. Plug onto the power supply.
2. Switch on the concentrator using the ON/ OFF button.
3. Once the concentrator is on, a yellow light will come up.
4. Next, adjust the flow to 3-4 liters. This light will be on till the desired concentration of oxygen is achieved, which in most concentrators is nearly 90-93%, after which it goes off.
5. Every manufacturer has its own way of showing the achieved desired concentration. In some concentrators this yellow light will become green after achieving the desired concentration.

Maintenance

- Coarse filter Ensure it is dust free , wash daily
- Zeolite granules Change every 20,000 hrs
- Bacterial filter Change every one year

Trouble shooting

Problem	Possible cause	Corrective action
Too noisy machine	Coarse filter blocked by dust	Wash filter daily
Machine or room gets heated	Machine is near the wall	Keep away from wall or outside the room for free circulation of air
Yellow light is not going off	Desired oxygen concentration not reached	May be due to high humidity or the flow rate is more, which exceeds the capacity of zeolite material. Decrease the flow rate.
Compressor heats up	Malfunctioning of compressor	Look at fan, it may be jammed, and hence may need repair.

IX- PULSE OXIMETER

Parts

- Monitor
- Saturation probes

Working

1. Assemble all necessary equipment.
2. If saturation monitor probe is reusable, cleanse probe with alcohol, let it dry.
3. Connect the power cable to the electric socket and turn monitor on.
4. Apply probe to a site that is well perfused.
5. Ensure both sides of probe are directly opposite each other.
6. Secure probe in place. Avoid edematous, bruised sites and excessive pressure.
7. Set high and low alarm limits for saturation (2% above and below desired limits) and heart rate 100 to 160/min.
8. Set pulse and alarm volumes.
9. Check the waveform or the perfusion index, if available, for the accuracy of the signal.
10. Check for correlation of depicted heart rate on monitor and the actual heart rate by auscultation.
11. Document heart rate, colour, oxygen saturation hourly.
12. Change site of probe at least once per shift.

Precautions

- Do not allow excess ambient light to shine on the probe, if so cover the probe with an opaque material
- Do not tie the BP cuff proximal to the limb on where the probe is fixed
- Do not place equipments generating electromagnetic signals in the vicinity
- Do not run the oximeter on battery alone, if back up power is available

Disinfection

Clean probe with spirit swab before every application. Use soap and water to clean monitor - Do not autoclave, pressure sterilize

- Do not use petroleum based, acetone or other harsh solutions

Trouble shooting

Alarm	Possible cause	Corrective action
Ambient light	Excessive light on sensor	Relocate, cover with opaque paper /cloth
Check sensor	Motion, low perfusion, wrong position	Reposition, relocate
Interference detected	Erratic signal with electromagnetic waves in vicinity like tv, mobile ph.	Remove interference
Low battery	Low internal battery	Connect to AC power
Sensor failure	Broken cable, faulty photodiode, sensor damage	Replace sensor
System failure	Internal component failed	Unit needs service /change

X-SYRINGE INFUSION PUMP

Parts

- Driving Unit
- Control Panel
- Display Panel

Working

1. Connect the power cable to the power slot and fix the infusion pump on to the installation pole.
2. Press the On button for 1 second to switch on the syringe pump. All signals on the display unit will glow for a second.
3. Choose the appropriate size and type of syringe as per the need of the patient.
4. Set the syringe in the slot in the driving unit. To do this, lift up the syringe holder and place the drug filled syringe with the inner and the outer cylinders in their corresponding grooves and

ensure good fixation.

5. The syringe should be connected to the appropriate tubing. Avoid cutting of the IV set tubing to fit the syringe nozzle.
6. Set the rate of infusion using the up and down arrow keys in the control panel.
7. Before starting infusion press the prime button to flush the tubings to remove all air bubbles.
8. Now connect to the patient after ensuring patency of the IV line.

Maintenance

- ***Cleaning :*** In case of spillage wipe with soft cloth soaked in lukewarm water
- ***Disinfection :*** Disinfect with cloth dipped in soap and water, in case of blood spilled

Don'ts

- Do not use alcohol based disinfectant
- Do not autoclave
- Do not clean with wet cloth while connected to mains

Trouble shooting

Alarms Message	Possible cause	Corrective action
"OUT OF INFU"	Slider has moved inadvertently	Fix syringe again and restart infusion
"OCCLUSION"	Tube occluded with >60 kPa pressure	Check and remove cause of occlusion; P.N. Unnecessary pushing fluid into the IV line may cause extravasations
"AC FAILURE"	Low internal battery	Connect to AC power
"SYRINGE IN USE"	Syringe removed from holder	Set syringe properly and resume infusion
"NEAR EMPTY"	Infusate almost over ctioning of compressor	Keep loaded syringe ready

XI - Glucometer

Common brands of glucometers available in India

A) Glucose oxidase based reflectance meters

1. Ames Glucometer (Bayer Diagnostics)
2. One Touch (Johnson & Johnson)
3. Lifescan (Johnson & Johnson)
4. Glucosite (GDS Diagnostics)
5. Refcolux (Boehringer Mannheim)

B) Glucose oxidase & electrode based analyzers

1. Pulsatum (Pulsatum Health Care Pvt. Ltd.)
2. Glucometer Elite (Bayer)

C) Reagent strips for visual reading

1. Dextrostix (Bayer)
2. Glucostix (Bayer)
3. Haemoglukotest (Boehringer Mannheim)

Selection of glucometer

1. The procedure of estimation should be simple. Visual techniques and most of the reflectance meters (Glucometer, etc.) require wiping/washing of the strip after a particular period. Any error here can lead to errors in results.
2. 'One-TouchTM, meter does not require any wiping of the strip.
3. The meters should be preferably calibrated for plasma glucose this may improve the precision.
4. The reagent strips should be freely available and the cost should be reasonable.
5. Ensure the strips should be stable for sufficient period of time in tropical climate..

Maintenance

i) Blood glucose meters must meet accuracy standards set by the International Organization for Standardization (ISO).

ii) The meters should be calibrated regularly, as recommended by the manufacturers.

iii) The instrument should not be exposed to excessive humidity, extreme heat or cold for prolonged periods.

iv) A daily check of the strip guide, reflectance disc and optical window should be made. The strip guide can be cleaned with a brush and water or a mild detergent, after removing it from the instrument. The reflectance disc and optical window can be cleaned with a soft, lint free cloth or lens tissue soaked with water, surgical spirit or alcohol.

v) The instrument should be handled gently.

Caution for storage of strips

1. As the reagent stripsare affected by heat, humidity and excessive exposure to light it should bestored in a cool dark place at a temperature less than 25°C;
2. But these should never be frozen.
3. The bottles contain 'silica gel' to absorb the moisture.
4. The color of the strip should be checked before using it.

SELF EVALUATION

Q1. The size of resuscitation bag for neonates should be

a. Less than 240 ml

b. Between 240 - 750 ml

c. Between 500-750 ml

d. Between 240 -1000 ml

Q2. Name the device used for increasing concentration of oxygen in the resuscitation bag

_____

Q3. Resuscitation bag can be disinfected easily by

_____

Q4. Incubator is preferable over warmer in following situations

_____ _____

_____ _____

Q5. Staff nurse must educate mother following instructions while giving phototherapy for jaundice

_____ _____

_____ _____

_____ _____

_____ _____

Q6. In addition to recording weight what are other indications for use of weighing machine

_____

_____

Q7. How would you disinfect the following parts of foot operated suction machine :

(i) Fluid collection jar : _____

(ii) Rubber stopper : _____

You will be given individual feedback after you have done self evaluation

DEMONSTRATION

Demonstration on common equipment available in the hospital will be done. This will be followed by return demonstration and feedback to participants .

VIDEO

Equipment videos on common equipment are available as audio visual podcast and will be shared for discussion.

CARE OF AT-RISK AND SICK NEONATES

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

LEARNING OBJECTIVES

At the end of this session, participants will be able to:

- **Teach the mother how to look after her baby and what to do if her baby has any health problems**
- **Identify and manage at-risk and sick neonates**

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.
- ***Role-play:*** Observing the procedure of 'counseling before discharge'. Participants will also be provided with opportunity to role play.
- ***Oral drill:*** You will learn how to classify neonates as normal, at-risk and sick.
- ***Self-evaluation:*** At the end of text, a self evaluation based on what has been learnt is included. Feel free to consult your text material, if you need assistance in recapitulating.

I. CARE OF AT-RISK NEONATES

1. WHO IS AN 'AT-RISK' NEONATE?

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

1. Weight 1500-2499g
2. Temperature (axillary) 36.0°C-36.4°C
3. Babies with moderate or severe hypothermia who respond to warming
4. Cried late (>1min) but within 5 minutes of birth
5. Sucking poor, but not absent
6. Depressed sensorium, but is arousable
7. Respiratory rate of over 60 per minute, but no chest retractions
8. Jaundice present, but no staining of palms/soles
9. Presence of any one of the following:
   - Diarrhea or vomiting or abdominal distension
   - Umbilicus draining pus or pustules on skin
   - Fever

2. CARE OF AT-RISK NEONATES

2.1 Where should an at-risk neonate be managed?

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

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

The care of at-risk babies is outlined below:

2.2.1 *Warmth*

The details are explained in a separate module (Refer to 'Thermal Protection' module).

The steps are dependent up on the current temperature of the baby (see below).

Temperature	Management
Normal temperature	Prevent hypothermia • Wrap the baby in layers of clothing • Cover the head and limbs • Place the baby in direct contact with mother • In winter months, the room may have to be warmed with heater, angeethi etc
Cold stress (temperature between 36.0°C and 36.4°C)	Treat hypothermia • Wrap the baby with extra layers of clothing • Cover the head and limbs • Place the baby in close contact with the mother, preferably skin-to-skin • In winter months, heat the room with a heater, angeethi etc.
Hypothermia (Temperature <36.0°C)	• Requires immediate exposure to a radiant heat source (such as radiant warmer) or heater • Other measures same as for cold stress

2.2.2. *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.

2.2.3 *Feeds*

Feeding of at-risk infants is explained in another module (Refer to the module on 'Feeding of normal and low birth weight baby).

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

2.2.4 *Specific therapy*

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

Condition	Treatment
Umbilical redness/pus discharge	Local application of 1% gentian violet and syrup cotrimoxazole 1/3 tsf BDX5days
Skin pustules	Local application of 1% gentian violet
Pneumonia (Respiratory rate >60/min, no chest retractions)	Syr Cotrimoxazole 1/3 tsf BD x 7 days (or syrup Amoxycillin 1.25ml TDSx7days)

2.2.5 *Monitoring*

The following signs should be monitored every two hours:

Signs to be monitored	
Temperature	Convulsion
Sucking	Bleeding
Sensorium	Diarrhea
Respiration	Vomiting
Apnea	Abdominal distension
Cyanosis	
All the signs should be monitored ***2 hourly***	

2.2.6 *Re-evaluation*

After stabilization and/or specific therapy, the baby has to be re-evaluated for improvement.

The two cardinal signs of improvement are:

i. The temperature will become normal (36.5°C -37.5°C) and

ii. The baby will accept feeds well.

Other signs such as rapid breathing, depressed sensorium, 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 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.

2.2.7 *Communication*

Communication with the family, especially the mother is very important during the management of at-risk and sick neonates. Health workers should inform the mother frequently regarding the baby's condition - whether it is improving or not.

If the condition improves, the family has to be reassured; mother should be explained about the care of the baby at home. A note has to be made regarding the baby's condition and care.

If the condition does not improve, the family needs to be explained regarding the need for referral and transport. They should be guided about where to take the baby for further treatment. Mother has to be counseled regarding the care during transport.

Communication with the family

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

3. FOLLOW - UP

3.1 Advice about follow-up visits

Mother has to be advised regarding the time of follow-up visit, whether the baby is referred or sent home (See table).

As we can see from the table, one visit by the health worker at home is a must after discharge. This improves the relationship between the family and the health worker and also leads to better understanding of the home environment.

Condition	Time of follow-up visit
If sent home	***Health worker:*** *to visit next day* ***Mother (with the baby):*** *to be called after two and seven days*
If referred	***Health worker:*** *to visit one day after discharge from hospital* ***Mother (with the baby):*** *to be called after two and seven days of discharge from hospital*

3.2 What advice should you give to mother and family regarding home care?

3.2.1. Keep the baby warm

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. 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 characterize him at-risk. Bathing an 'at-risk' baby may aggravate his condition severely.

3.2.2. Provide exclusive breast milk feeding

Baby should be provided only breast milk. Often an at-risk 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/paladai. It should be emphasized that baby must be put on the breast first, to provide stimulus for lactation. This should be followed by expression of breast milk and assisted feeding with spoon or paladai. The mother should be explained the method of manual expression of breast milk and feeding with spoon.

3.2.3. Continue the prescribed treatment

If the baby has been advised local gentian violet application on the cord for umbilical sepsis or on skin for pustules, that advice should be followed at home also. Babies prescribed oral cotrimoxazole for mild pneumonia should be administered the medication regularly.

3.2.4. 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 (ii) (s)he has warm trunk, warm and pink soles and palms.

The baby should also be monitored for any danger signs described above.

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

3.2.5. Counsel and educate the mother and 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 health care provider must encourage the mother/family to gain confidence in looking after the baby.

3.2.6. Follow-up

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

At follow up baby's weight should be taken. A gain of 10-15 g/kg per day is expected after 7 to 10 days of age. Immunization should be provided as for other neonates.

SELF EVALUATION

1. An 'at-risk' neonate will have:
   a. Birth weight: _____
   b. Sensorium: _____
   c. Respiratory rate:_____
   d. Yellowness of skin, but no_____

2. The staff nurse should monitor the following signs every 2 hourly in 'at-risk' neonates:

_____	_____
_____	_____
_____	_____
_____	_____

3. Follow-up care of 'at-risk' neonate includes:

Condition	Time of follow-up visit (for health worker)	Time of follow-up visit (for mother)
If sent home	_____	_____
If referred	_____	_____

4. Signs of well-being in an 'at-risk' neonate include:

_____

_____

_____

_____

5. Where is 'at risk' neonate managed?

_____

_____

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

_____

_____

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

II. CARE OF SICK NEONATES

1. 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
    - Multiple skin pustules
    - Fever

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

2. CARE OF THE SICK NEONATE

2.1 Where is sick neonate managed?

A sick neonate is looked after in a district or small hospital.

2.2 What can be done at the hospital?

At smaller health facility, only immediate care is provided. The principles of care at this level are:

2.2.1. Warmth

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

2.2.2. Stabilization (Refer to the modules on 'Emergency Triage in common procedures')

The sick neonate may need physical stimulation, bag and mask ventilation or oxygen if there is respiratory failure. If necessary, an intravenous access has to be established and the following medications administered (as per the doctor's orders):

- Inj. Dextrose (10%) 2ml per kg IV stat followed by drip

- Inj. Normal saline 10 ml per kg IV slowly over 10 minutes if pulses are poor or capillary refill time is over 3 seconds.
- Inj. **Vit. K 1 mg IM** (If not given at birth)

2.2.3. Feeds (Refer to the module on 'Feeding of normal and low birth weight baby)

In a sick newborn, oral feeding should not be insisted upon. (s)he shall be started on intravenous fluids depending upon the level of sickness. Once the baby becomes stable, he should be put on the mother's breast and allowed to breast feed. If he is unable to do so, he should be given expressed breast milk by either gavage or spoon/paladai. Intravenous fluids should be stopped as early as possible.

2.2.4 Specific 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
- Vitamin K and anticonvulsants, if indicated

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

2.2.5. Monitoring

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

Signs to be monitored	
Temperature	Convulsion
Sucking	Bleeding
Sensorium	Diarrhea
Respiration	Vomiting
Apnea	Abdominal distension
Cyanosis	Capillary refill time
*All the signs should be monitored **hourly***	

2.2.6 Communication

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

2.2.7 Organize transport (Refer to the module on 'Common Procedures: Transport of Neonates')

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

- Encourage mother to accompany
- If possible, let a health care provider accompany the baby
- Ensure warmth on the way

Explain family the care to be provided during transport (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

SELF EVALUATION

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

1. What are the signs you will monitor in a sick neonate?

   _____

   _____

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

   _____

   _____

3. How frequently would you monitor

   a) At risk neonate : _____

   b) Sick neonate : _____

4. Mark (✓) for 'sick' neonate
   a. Weight 1800g
   b. Jaundice staining plams/soles
   c. Cried after 5 minutes of birth
   d. Axillary temperature 36.2°C
   e. Respiratory rate >60/mt without retractions

5. Organization of transport for 'sick neonate' must ensure.

   _____

   _____

   _____

   _____

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

ORAL DRILL

There will be an oral drill by the facilitator.

Clinical	Normal Neonate	'At Risk' Neonate	Sick Neonate
Weight	≥2500g	1500 - 2499g	<1500g
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 but NO retractions	Retractions/ Apnea/Gasping
Jaundice	Absent	Present without staining of palms/soles	Staining of palms/soles
• Diarrhea • Vomiting • Abdominal distension • Umbilical discharge (pus) • Multiple skin pustules • Fever	None	Presence of any one	Presence of two
• Central cyanosis • Convulsions • Bleeding • Major malformation	None	None	Presence of any one

Note: If the baby has multiple signs, (s)he gets classified into the sickest category

Recommended reading

- Postnatal Care of the mother & newborn , WHO HQ's recommendations 2013.
- Standard Treatment Protocols for management of common newborn conditions at small hospitals , WHO SEARO 2013.

References

1. Neonatal Resuscitation :Second Edition , publication of National Neonatology Forum of India ,2014 available on www.nnfi.org.

2. Teaching Aids on Newborn Care: Deorari AK (Ed), 3rd Edition, 2005, New Delhi. Publication of National Neonatology Forum of India.

3. Standard Treatment Protocols for management of common newborn conditions at small hospitals , WHO SEARO 2013.

4. Postnatal Care of the mother & newborn , WHO HQ's recommendations 2013.

5. UNICEF, 1993. Guidelines for conducting Lactation Management Training Courses for health care providers in Hospital.

6. Essential newborn care course ,WHO HQ's 2009.

7. Care of the Newborn Reference Manual, May 2003. Saving Newborn Lives Initiative, Save the Children, USA.

8. WHO Publication, Kangaroo Mother Care: A Practical Guide, 2003.

9. Managing Newborn Problems: A guide for doctors, nurses, and midwives. WHO Publication, 2007.

10. Pregnancy , postpartum and newborn care : A guide for essential practice. WHO publication, 2010.

11. Pocket book of hospital care for children: Guidelines for the management of common illnesses with limited resources, WHO HQs 2013.

12. Neonatal Equipment : Everything you would like to know. Deorari AK & Paul VK (Eds) 4 Edition, 2010, Sagar Publications, New Delhi.

KAP Questionnaire

(for attitude and practices only)

PRE Workshop

This questionnaire has been designed for the 'Evaluation of impact of Nursing Training on the knowledge, practices and neonatal outcome'. You have been chosen as one of the respondents to this questionnaire which will serve as baseline information and as future reference to newborn care in your country. We hope that you will answer the questions as best as you can. We assure you that information will be kept confidential and will in no way jeopardize your career.

1. Do you teach mothers to assess baby's temperature by touching feet and abdomen?
   [ ] Yes
   [ ] No

2. Do you practice skin-to-skin contact for stable LBW(<2500gms) babies admitted in the nursery?
   [ ] Yes
   [ ] No

   If yes, how does this practice help LBW baby?

   .....

   .....

3. Do you see babies who are otherwise stable in nursery, developing hypothermia (skin temp < 36°C).
   [ ] Yes
   [ ] No

   If yes, do you try to find out why this has happened in that particular baby?
   [ ] Yes
   [ ] No

   If yes, enumerate the possible reasons:

   .....

4. How much duration do you hand wash before entering baby care area?
   [ ] 15 seconds
   [ ] 2 minutes
   [ ] 5 minutes

5. Does your unit have a continuous supply of tap water 24 hours a day?
   [ ] Yes
   [ ] No

   If no, how do you perform handwashing before entering the nursery?
   [ ] Do not handwash
   [ ] Use tumbler and bucket
   [ ] Other utensils
   [ ] Perform hadwash once inside the unit

6. For inserting an intravenous line, do you wear gloves after hand washing?
   [ ] Yes
   [ ] No

7. Do you check with mothers / parents before they enter nursery whether they have active infection or not?
   [ ] Yes
   [ ] No

8. Does anyone spend time with mothers explaining the importance of hand washing?
   [ ] Yes
   [ ] No

9. Do you provide cord care personally?
   [ ] Yes
   [ ] No

   If yes, how?
   [ ] Soak cord with alcohol
   [ ] Apply gentian violet
   [ ] Apply mercurochrome
   [ ] Put antibiotic power
   [ ] No application

10. Do you think that a baby should be kept warm after birth?
   [ ] Yes
   [ ] No

   If yes, how do you keep baby warm?
   [ ] Use of bulb
   [ ] Wrap baby in a blanket
   [ ] Use hot water bottles
   [ ] Use Warmer or Incubator
   [ ] Skin to skin contact
   [ ] No measure taken

11. Do you feel that hypothermia causes significant neonatal morbidity and mortality?
   [ ] Yes
   [ ] No

   If yes, how important is this contribution?
   [ ] Very strong
   [ ] Strong
   [ ] Somewhat
   [ ] Minimal

12. Which route do you use for recording temperature of sick LBW babies admitted to the nursery?
   [ ] Rectal
   [ ] Axillary
   [ ] Groin
   [ ] Skin
   [ ] Mouth
   [ ] Ear

13. Do you know how to warm a sick LBW baby with severe hypothermia (<32°C)?
   [ ] Yes
   [ ] No

   If yes, how will you warm the baby?
   [ ] Cover adequately so as to prevent ongoing heat loss

[ ] Cover adequately so as to prevent ongoing heat loss and warm quickly to 36.5°C
[ ] Cover adequately so as to prevent ongoing heat loss and warm quickly (up to 34°C) followed by gradual warming (up to 36°C) (uncover if using radiant warmer for warming)

14. Do you insert IV lines on baby?
[ ] Yes
[ ] No

How do you prepare the skin before inserting an IV line?

.....

.....

15. Do you take the help of another staff while starting an IV line?
[ ] Yes
[ ] No

If yes, does your colleague assisting you help in comforting the baby?
[ ] Yes
[ ] No

If yes, what action does she take?

16. How frequent do you change site of intravenous cannula?
[ ] Daily
[ ] 48 hours
[ ] 72 hours
[ ] As long as it works

17. What do you advise the initial feeding to be?
[ ] Breastmilk
[ ] formula milk
[ ] sugar water
[ ] Honey
[ ] Others, specify

18. How much time do you spend talking to a mother whose baby is admitted in the nursery?

[ ] Not at all
[ ] Only to ask for supplies
[ ] Tell general condition, progress
[ ] Tell general condition, progress and help in expression of breast milk and taking care of the baby

19. Are you happy with your present skills and knowledge on providing care to sick newborn?
[ ] Yes
[ ] No

If no, are you willing to undergo further training to augment your present skills and knowledge?
[ ] Yes
[ ] No

KEY OPERATIONALIZATION CRITERIA OF ESSENTIAL NEWBORN CARE

Neonatal Resuscitation Practices		
	Prior	**3 months after training**
Written guidelines for resuscitation care		
Newborn resuscitation is described in the wall charts		
Warming facilities available during resuscitation		
Functional apparatus for suctioning a newborn		
Functioning bag & mask 0 &1 size		
Oxygen supply		
Sterile delivery kit		
Emergency medicine tray		
Weighing scale		
Clock with seconds		
Birth register		
Care of baby at Birth		
Birth attended by skilled attendant		
Six cleans being followed at time of birth		
Immediate skin to skin care being practiced for normal		
For normal births baby and mother kept together		
Resuscitation corner available for babies who need help in breathing		
% of babies put to breast within 30 minutes		
% of babies being offered prelacteal feeds		
Thermal Protection Practices		
Normal babies kept next to mother		
At birth baby cleaned with dry cloth		
No bath at least for 24 hr		
Sick babies kept in separate warm room with mother		
Caps/socks used for LBW baby		
Mother explained to assess baby's temperature by touch		
Temperature being monitored for LBW, sick babies		
Functional warmer available for sick/LBW baby warmth		
Wall chart on thermal protection		
Thermometer to measure room temperature		

Kangaroo Mother Care		
Educational material for families in local language		
Wall chart on KMC in hospital		
Mother's counseled for skin-to-skin care for LBW baby		
% of mother's with LBW practicing KMC in ward		
% of nursing staff agreeing to promote KMC		
% of nursing staff aware about KMC		
Feeding Practices		
Baby put to breast within 30 min		
Counseling being done for attachment/positioning		
No other fluids or drinks are given to babies		
No pacifiers or bottles in the hospital		
No advertisement, free samples or other promotion of breast milk substitute allowed in hospital		
Expressed breast milk being fed to small babies		
Use of paladai/cup for feeding EBM when baby unable to feed or mother cannot stay with the baby		
Prevention of Infection		
Regular water supply		
Hand washing facility available tap, soap, sink etc		
Adherence to hand washing practice		
Availability of waste disposal colored bags		
Needle destroyed in special container with polar bleach or hypochlorite		
Written policy guidelines for housekeeping and disinfection available in the area		
Ward is kept clean		
Skin preparation for IV followed alcohol/iodine/alcohol		
Infection control surveillance on periodic basis		
Management of 'normal', 'at risk' and 'sick' neonate		
Normal babies kept with mother		
Normal babies born by instrument/cesarean kept with mother		
Nothing is applied to cord		
Vitamin K given according to local schedule		
Sick newborn kept in separate room		
Mother of sick newborn stays with baby		
Early postnatal counseling to mother		
Discharge counseling to family		
Admission discharge register for babies with basic demographic details, diagnosis & outcome		

Following are attitude & practice questions.
There are no Yes, No Choices

Please circle the appropriate answer for each statement

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
I feel comfortable initiating IV line alone	1	2	3	4	5
Handwashing should be done before entering nursery	1	2	3	4	5
Skin-to-skin contact with mothers is a good practice for LBW babies	1	2	3	4	5
I would prefer babies under my care receiving expressed breast milk rather than formula milk	1	2	3	4	5
I feel comfortable using warmer and incubator for premature babies	1	2	3	4	5
I feel that I can help a mother initiate breast feeding who complains of insufficient milk supply	1	2	3	4	5
I believe Nursing practices play an important role in prevention of infection in admitted newborn	1	2	3	4	5
I feel that a written policy and procedure manual will help my day-to-day practicin the nursery	1	2	3	4	5