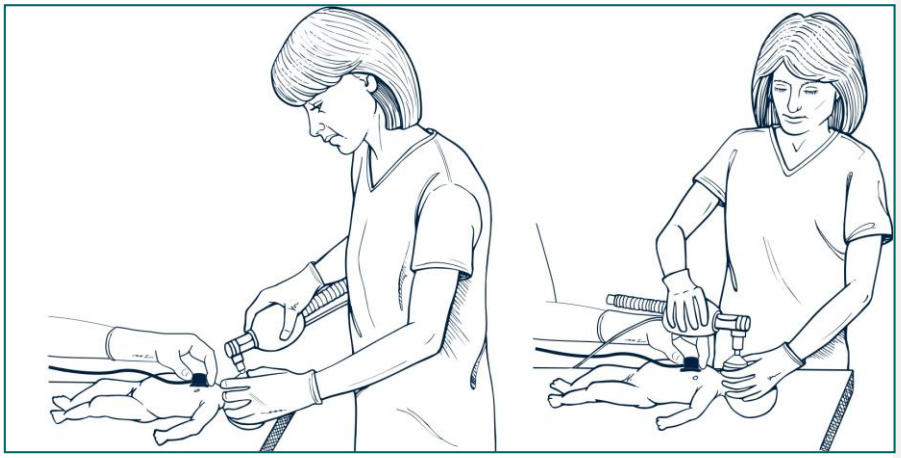
NAVJAAT SHISHU SURAKSHA KARYAKRAM



BASIC NEWBORN CARE AND RESUSCITATION PROGRAM MANUAL

Ministry of Health and Family Welfare,
Government of India

MESSAGE

Although childhood and infant mortality in India has reduced substantially during the last decade, the rate of neonatal mortality is still high. Nearly two-thirds infant deaths each year occur within the first four weeks of life, and about two-thirds of those occur within the first week. Thus, the first days and weeks of life are critical for the future health and survival of a child.

Newborn care often receives less-than optimum attention. It is now well known that the newborns themselves require special attention separate from that of their mothers to assure a healthy start to life. The immediate causes of newborn death include infection, birth asphyxia, complications related to premature birth, and congenital anomalies. Most of the neonatal deaths can be prevented with simple, cost-effective solutions that do not depend on highly trained provider or sophisticated equipment.

Effective Newborn care is a crucial challenge that is faced by every health care setting dealing in maternal and child health. Training of Doctors, Nurses and ANMs in low resource settings is an urgent need. A key component is to equip the staff with appropriate knowledge and skill to improve the quality of service delivery. The Ministry of Health and Family Welfare is addressing this through the launch of the Navjaat Shishu Suraksha Karyakram (NSSK). A simple and scalable training module on Basic Newborn Care and Resuscitation has been developed for this programme.

This programme provides evidence-based knowledge in improving newborn heath especially care at birth. The health provider after training will furnish all the required care at birth, identify and manage common complications, stabilize (if necessary) and refer/transfer newborns needing additional interventions.

I am sure that this programme, will act as an enabling tool for newborn survival and health in the country.

Ghulam Nabi Azad
Union Minister for Health and Family Welfare
Government of India

Foreword

India's Infant mortality is a staggering 2.1 million per annum and contributes to nearly 21 per cent of the global burden of infant deaths. The rate of decline of Infant mortality rate in India over a period of time has slowed down. During the decade 1980 to 1990 Infant mortality rate declined by as much as 34 points, however during the decade 1990 to 2000 Infant mortality rate declined by just 12 points.

The major reason for this situation is the very slow decline in the neonatal mortality which accounts for 2/3rds of all infant mortality. Neonatal mortality world over is around 37 % of all under five mortality whereas in India this is around 50% of all under 5 deaths, which means that the proportion of U5 deaths by neonatal causes is disproportionately high in India.

The important causes of neonatal deaths is birth asphyxia and along with serious infections results in more than 50 % of all neonatal deaths. If infant mortality has to be brought down than it becomes important that these major causes of neonatal deaths are addressed.

The Government of India keeping this in mind has developed a program on "Basic Newborn Care and Resuscitation" which would address these causes in a large way. This program is timely and certainly would have a significant contribution in bringing down neonatal mortality and other serious long term morbidities like neuro-developmental sequelae in survivors of asphyxiated newborn babies. With more and more deliveries occurring at health care institutions as a result of the Jannani Suraksha Yojna, it becomes important that the large number of health professionals attending to births, are trained in the simple procedure of resuscitation and basic new born care.

The training manual has been prepared with the help of Indian Academy of Pediatrics and the pediatrics department of AIIMS and encompasses important evidence based procedures in a simple language. The training is of one day duration and should be easily scaled up to health providers thus making available the much needed skills for new born care and resuscitation at facilities. Health providers will benefit by the liberal illustrations used in the manual. The manual should prove to be invaluable in developing the skills of health providers to address neonatal mortality and to save new born lives.

Naresh Dayal, IAS
Secretary Health and Family Welfare,
Ministry of Health and Family Welfare,
Government of India

From the Mission Director (NRHM)

Worldwide 37 per cent of under-five deaths are attributed to neonatal causes (within the first 4 weeks of life). In India, this figure is around 50 per cent, which means that the proportion of under five deaths by neonatal causes is disproportionately high. Current neonatal mortality rate in India is 37/1000 live births accounting for almost two thirds of the infant deaths.

"Navjaat Shishu Suraksha Karyakram" a new programme on Basic Newborn Care and Resuscitation, is being launched by the Ministry of Health and Family Welfare to address important interventions of care at birth i.e. Prevention of Hypothermia, Prevention of Infection, Early initiation of Breast feeding and Basic Newborn Resuscitation.

Newborn care and resuscitation is an important starting-point for any neonatal program that is required to ensure the best possible start in life. The objective of this new initiative is to have persons trained in Basic newborn care and resuscitation available at every delivery. The implementation of this programme will help prevent a significant number of newborn deaths and ensure newborn survival.

The training package in this manual is based on the latest available scientific evidence and will be immensely useful in decreasing neonatal mortality in our country and in achieving our National goals.

P.K. Pradhan, IAS
Additional Secretary and Mission Director (NRHM)
Ministry of Health and Family Welfare
Government of India

Preface

India accounts for nearly 0.9 million newborn deaths per year that is 30% of global neonatal deaths. Nearly half of under 5 deaths occur in neonatal period and most of these deaths occur within first few days of birth. Birth asphyxia and sepsis are the major causes of these deaths. The National Population Policy Goal of IMR below 30/1000 live births by 2010, mandates urgent measures to be put in place to prevent these deaths to reach the NPP Goal. One of the effective measures to prevent deaths is to have skilled birth attendants trained in resuscitation, prevention of infection and temperature management. Initiation of breastfeeding within one hour of life itself is estimated to save a number of new born lives.

The Basic New born Care and Resuscitation program developed by the Ministry of Health and Family Welfare will help develop skills of health providers to address birth asphyxia and other causes of mortality at birth. The two day training envisaged under this program, would be able to enhance the skills of health providers and especially the birth attendants at facilities. It is estimated that this skill based training when put in place in the States can prevent approximately 1- 2 lakh newborn deaths every year.

The program in the first phase will be launched in the 8 EAG States (Bihar, Rajasthan, Uttar Pradesh, Orissa, Madhya Pradesh, Uttarakhand, Jharkhand, and Chhattisgarh), Jammu and Kashmir and Assam to address the high neonatal mortality in these states.

The Indian Academy of Pediatrics (IAP) and the Pediatrics Department of All India Institute of Medical Sciences have provided invaluable help in developing the manual and tools for this program. The Indian Academy of Pediatrics will also provide help in developing trainers in these States. The National Neonatal Forum will also be assisting in rolling out this national programme.

I would like to acknowledge the contributions of Dr. Panna Choudhury, National President, Dr. Naveen Thacker, Dr. Vikas Goyal of IAP; Dr. A.K. Dutta, Vice Prinicipal, Lady Hardinge Medical college and Dr. Vinod Paul, Professor and Head of the Department of Pediatrics, AIIMS in developing this program. Use of materials from manual of AAP copyrighted material, Latter-Day Saint Charities, JN Medical College, Belgaum and WHO-CC for training and Research in newborn care, AIIMS, New Delhi is duly acknowledged. I would also like to acknowledge the contribution of Dr. B. Kishore Assistant commissioner Child Health who worked relentlessly to put up the entire thing together.

Amit Mohan Prasad, IAS
Joint Secretary (RCH),
Ministry of Health and Family Welfare,
Government of India

CONTENTS

RESUSCITATION OF THE NEWBORN BABY

This lesson on Neonatal resuscitation is designed to complement in-service education and orientation of skilled birth attendants involved in care of newborn babies. At the end of this session participant would be able to:

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

CONTENTS

The lesson 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.
- ***Clinical skills:*** Developing clinical skills on the mannequin (return demonstration).
- ***Self-evaluation***: At the end of text, self evaluation based on what has been learnt is included. Feel free to refer your text material, if you need assistance in recapitulating.

1. INTRODUCTION

World wide approximately one million babies die per year due to asphyxia out of which about one third (approximately 3 lakhs) is contributed by our country.

A single intervention - resuscitation - deals with the problem of birth asphyxia as it occurs.

The need for resuscitation should always be anticipated. Thus, every birth attendant should be skilled in newborn resuscitation, (including anticipation, preparation, timely recognition and quick and correct action) and should have the necessary equipment and supplies - clean and functioning
- to be able to respond quickly and correctly when needed.

Adequate ventilation is more important than additional oxygen; quick action with the bag and mask is more important than intubation. Therefore resuscitation can and should be initiated virtually anywhere, including those places where oxygen is not available. The choice of device for ventilation is not as important as how effectively it is used. The most common causes of failed resuscitation are failure to recognize the problem promptly, not reacting quickly enough and not ventilating effectively. Correct technique and assessment of the effectiveness of ventilation are critical.

Advanced procedures (chest compression, intubation, use of drugs) are needed only in a small proportion of cases. These procedures have strict indications and are beneficial only in specific circumstances and if carried out by an experienced person.

In reality, even the simplest equipment is frequently not available and skilled health workers are lacking. In many places only one birth attendant is normally present at the birth, dividing her attention between the mother and the newborn. I

Basic resuscitation , done correctly, will help *most*, even where only few resources and simple training are available.

2. WHAT IS NEONATAL RESUSCITATION?

Neonatal resuscitation means to revive or restore life to a baby from the state of asphyxia. *The aim of neonatal resuscitation program is* to teach the steps necessary to ventilate a newborn baby that is not breathing and protect the life of baby. Ninety percent of newly born babies make the transition from intrauterine to extra uterine life without difficulty. They require little or no assistance to begin spontaneous and regular respirations. Approximately 10 % of newborn require some assistance to begin breathing at birth and only about 1% may need extensive resuscitative measures to survive.

Any baby can have breathing difficulties 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
- in what order
- be able to work quickly in coordination

KEY TO SUCCESSFUL RESUSCITATION

- Anticipation
- Preparation
- Call for help
- Document /record
- Fast
- Be Gentle
- Provide warmth
- Maintain Hygiene

4. PREPARATION FOR BIRTH

4.1 Prepare Personnel

- **Birth attendant identifies a helper and explains roles:** According to the facility available choose a helper to assist you in neonatal resuscitation. Helper may be a qualified nursing staff, another untrained hospital staff or relative of mother. Explain the role to be played by helper before labor, helper is needed to help you to activate emergency plan. You should assign and explain the role to helper according to his/her skill.
- **Helper confirms understanding of role**
- **Birth attendant describes the emergency plan:** According to the resources available at your facility make arrangements for any emergency during neonatal resuscitation. Make arrangements for calling doctor or another skilled person in resuscitation in case of emergency or make arrangement for shifting the baby to nearest referral unit.

4.2 Preparation in the delivery room

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

PREPARING FOR BIRTH

Essential:

1. A draught free, warm room with temperature $\geq 25^0$C
2. A clean, dry and warm delivery surface
3. A radiant warmer / overhead lamp with 200 watt bulb if available
4. Two clean, warm towels/clothes
5. A folded piece of cloth (1/2 to 1" thick)
6. A newborn size self inflating bag
7. Infant masks in two sizes: size '1' for normal weight baby and '0' for small baby
8. A suction device
9. Oxygen (if available)
10. A clock (with seconds hand)

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 250-500 mL and 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 mucus extractor with a bulb is NOT recommended because they are difficult to clean and might act as a source of cross infection.
- Suction should not exceed a negative pressure of 100 mmHg or 130 cm water.

4.3 Test the function of equipments

- Before birth check that all equipment and supplies are available and are in working condition.
- For warm environment, you have to switch on radiant warmer or overhead lamp at least half hour before anticipated time of delivery
- Close the windows and switch off fan to prevent drafts of air

4.4 Test the function of the bag and mask for ventilation

- Fit mask onto the bag and deliver test breathes against the palm of the hand. You should feel pressure in the palm as the bag is squeezed.
- Form a seal between the mask and the palm of the hand. Squeeze the bag enough for the pop off (pressure release) valve to open and make a sound as the air escapes as shown in Fig 1.1.
- Check that the bag re-inflates quickly when you release after squeezing the bag.

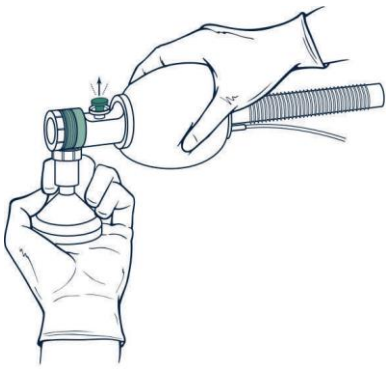


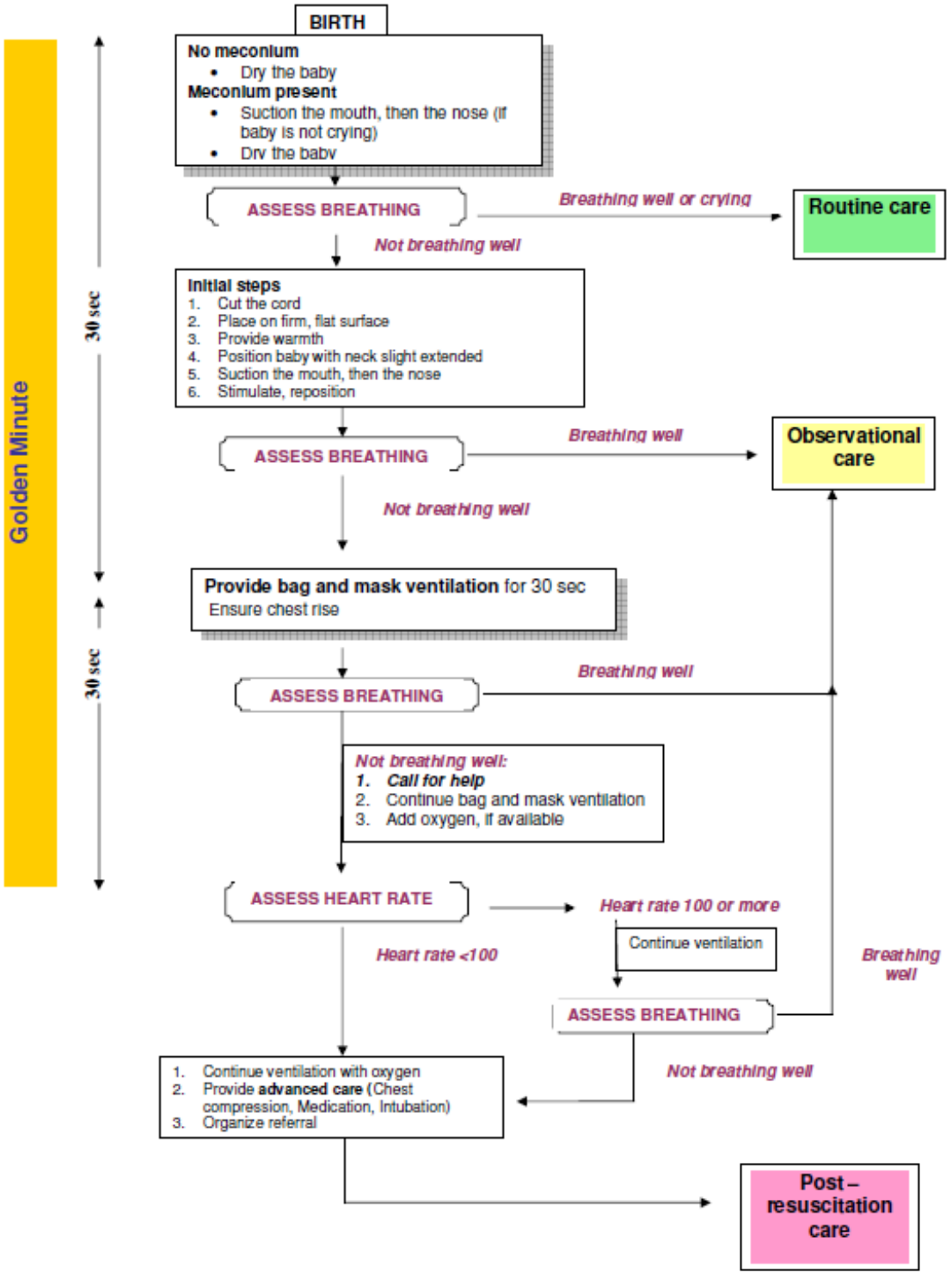
Fig. 1.1 Testing bag and mask

GROUP DISCUSSION

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

Show each item of resuscitation equipment as it is discussed: Bag, mask, suction device, clock, warm and folded cloths

Flow Diagram for Basic Neonatal Resuscitation



Routine care

- **Provide warmth**
- **Suction mouth & nose (if necessary)**
- **Cut cord in 1-3 minutes**
- **Keep baby with mother**
- **Initiate breastfeeding**

Observational care

- **Provide warmth**
- **Observe breathing and temperature**
- **Watch for complications*; refer, if so**
- **Initiate breastfeeding, if well**

Post-resuscitation care

- **Provide warmth**
- **Observe breathing, temperature, color, CFT**
- **Monitor blood sugar**
- **Watch for complications *; refer, if soInitiate breastfeeding, if well**

*** convulsion, coma, poor feeding, lethargy, respiratory distress**

5. ASSESSMENT AT BIRTH

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

5.1 Deliver the baby on mother's abdomen

A newborn baby should be delivered onto mother's abdomen. If the baby is not delivered onto his mother's abdomen, make sure there is a warm towel or cloth on the bed to place the baby on.

5.2 Note the time of birth and dry the baby

Keeping the baby warm at birth is a priority. The baby has to be dried 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 as shown in Fig 1.2.

Fig. 1.2. Drying the baby and removing wet towel

Why it is necessary to dry and remove wet cloth

After birth the baby remains wet with amniotic fluid which if not dried immediately can lead to heat loss. This heat loss may result in rapid decrease in infant's body temperature.

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.

5.3 If meconium present

Meconium is the faeces passed by fetus in utero; it is greenish to brownish in color. If meconium is present and the baby is not crying you should **immediately** start suction (Fig 1.3).

First do suction from mouth by inserting the tube of suction devise no more than 5 cm beyond the lip. Apply the suction while withdrawing the tube. Then insert the suction tube 1-2 cm into each nostril and apply suction while withdrawing the tube. For suctioning attach the mucus trap to a suction machine or suck from your mouth. Stop suctioning when secretions are cleared, even if the baby does not breathe. Then dry the baby as described above.

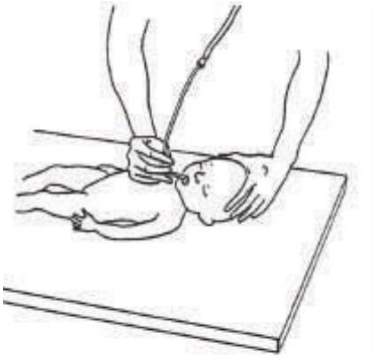


Fig 1.3 Suction mouth first then nose

Points to remember

- Always do suction first from mouth then nose.
- Be careful not to suction vigorously or deeply (more than 5 cm in mouth and more then 2 cm in nose) as it can produce a vagal response, causing the heart rate to slow down or breathing to stop.

Apply suction while withdrawing the tube. Then do suction from both nostrils by placing the tube approximately 2 cm inside each

5.4 Assess the baby's breathing

The baby's breathing should be assessed whilst drying:

- Watch the way the baby's chest rises and falls.
- The chest should move equally on both sides with no difficulty, between 30 to 60 times in a minute.

When a baby's breathing is assessed one of four main behaviours may be seen. These are:

Assessment	Decision
Baby is crying	No need for resuscitation or suctioning. Provide routine care.
Baby is not crying, but his chest is rising regularly between 30 to 60 times in a minute	No need for resuscitation or suctioning. Provide routine care.
Baby is gasping	Start resuscitation immediately.
Baby is not breathing	Start resuscitation immediately.

6. STEPS OF RESUSCITATION

If the baby needs resuscitation:

- Tie and cut the cord.
- Tell the mother that her baby is having difficulty beginning to breathe and that you are going to help him. Tell her quickly but calmly.
- Transfer the baby to a warm clean, flat and dry surface.
- Provide warmth
- Position the baby
- Clear the airway
- Stimulate and reposition

6.1 Provide warm environment

To provide warm environment (Fig 1.4)

- Place the newborn under overhead lamp with 200 watt bulb placed around 50-60 cm above surface

OR

- Place the newborn under radiant warmer

To prevent drafts of air shut all windows and switch off fan before birth

Fig 1.4 Methods to provide warmth

6.2 *Open the baby's airway: position the head*

Do this by:

- 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 overextension or flexion which will close the airway).

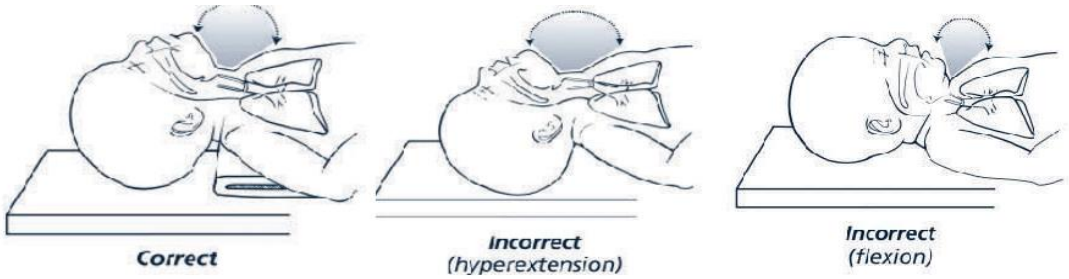


Fig. 1.5 Correct and incorrect head positions for resuscitation

6.3 Open the baby's airway: suction the mouth and the nose

- Suction first the mouth and then the nose (Remember 'M' comes before 'N') as desribed earlier.

6.4 Stimulate to breath

If the baby doesn't cry after birth, wipe dry remove wet cloth, position the baby and clear airway then stimulate the baby for breathing (Fig1.6). Safe and appropriate methods of providing tactile stimulation include:

- Slapping or flicking the soles of the feet
- Gently rubbing the newborn's back or extremities

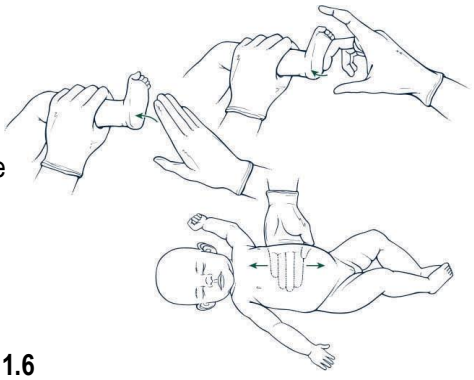


Fig 1.6

Acceptable methods of stimulating a baby to breathe

What forms of stimulation may be hazardous?

Certain actions that can harm a baby and should not be used are:

Harmful Actions

- Slapping the back
- Squeezing the rib cage
- Forcing thighs into abdomen
- Dilating anal sphincter
- Using hot or cold compresses or baths
- Shaking

6.5 Reassess the baby's breathing

Suctioning may stimulate the baby to start breathing. If this happens (i.e. the baby is breathing), place the baby with mother and provide observational care.

6.6 Observational care

Baby who breathes after initial steps of resuscitation requires ongoing observation for the well being of baby. Observational care comprises of:

- **Keep baby with mother:** Do not separate the mother and the newborn. Allow the newborn skin-to-skin contact with the mother.
- Observe breathing and temperature
- Watch for complications (convulsions, coma, etc); refer, if so
- Initiate breastfeeding, if well

7.0 IF THE BABY IS STILL NOT BREATHING: VENTILATE

Remember **ventilation of the lungs is the single most important step in resuscitation of a newborn**. If the baby is not breathing or breathing is abnormal at the end of the first 30 seconds after providing initial steps of resuscitation, then you should immediately start ventilation with bag and mask.

7.1. Basic parts of Bag and Mask

7.1.1 Bag

It is a self-inflating bag, inflates automatically without a compressed gas source. It stays inflated at all times, unless being squeezed. Bags used for newborns should have a volume ranging from 240 to 500 ml usually 500 ml capacity bag is used for resuscitation. The bag is made of silicon rubber, which can be easily cleaned and autoclaved for reuse (Fig 1.7).

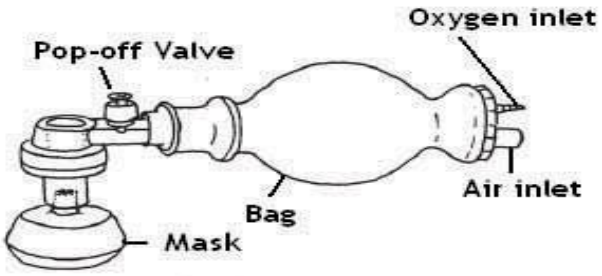


Fig 1.7 Parts of bag and mask

7.1.2 Posterior part of bag

The posterior part of bag consists of two inlet tubes smaller one is for oxygen and bigger one is for entry of air into the bag, oxygen reservoir if used is attached to air inlet tube.

7.1.3 Pop-off valve

Pop-off valve is situated on front side of the bag. It is a pressure release valve, which opens if excessive pressure is generated, thus limiting the pressure being transmitted to the baby. If you ventilate with high pressure and/or rate, the lungs could become over inflated, causing rupture of the alveoli and a resulting air leak.

7.2 Mask

Masks come in different sizes and shapes (round and anatomically shaped). Anatomically shaped masks are shaped to fit the contours of the face. They are made to be placed on the face with the pointed part of the mask fitting over the nose. Mask is attached at the anterior end of bag.

8. PREPARATION FOR VENTILATION WITH BAG AND MASK

8.1 Selection of mask

Selection of a mask for use with a particular newborn will depend on how well the mask fits the newborn's face. For the mask to be the correct size, the rim should cover the tip of the chin, the mouth, and the nose but not the eyes. If the mask is too large it may cause possible eye damage and will not seal well, If the mask is too small it will not cover the mouth and nose and may occlude the nose (Fig.1.8).

Fig. 1.8 Correct and incorrect mask sizes

8.2 Clear airway

Be sure that the airway is clear; for this you may suction the mouth and nose one more time to assure there will be no obstruction to the assisted breaths that you will be delivering by bag and mask.

8.3 Position the baby's head

The baby's neck should be placed in "sniffing position" to maintain an open airway. You may use shoulder roll for better positioning of head if required.

8.4 Position yourself at the bedside

You should position yourself at the side or head of the baby to use the resuscitation bag effectively (Fig 1.9). Either position will allow you to hold the mask on the baby's face comfortably and allow you to have an unobstructed view of the abdomen and chest. If you are right- handed, you probably will feel most comfortable controlling the bag with your right hand and the mask with your left hand.

Fig. 1.9 Correct positions to visualize chest movements

If you are left- handed, you will probably want to control the bag with your left hand and hold the mask with your right hand.

It is important that the bag is positioned so that it does not block your view of the baby's chest, since you need to be able to observe chest movement during ventilation.

8.5 Positioning the bag and mask on the face

The mask should be placed on the face so that it covers the nose and mouth, and the tip of the chin rests within the rim of the mask. You should begin by cupping the chin in the mask and then covering the nose.

The mask usually is held on the face with the thumb, index, and/or middle finger encircling the rim of the mask in shape of letter '**C**' while the ring and fifth fingers bring the chin forward to maintain a patent airway (Fig 1.10).

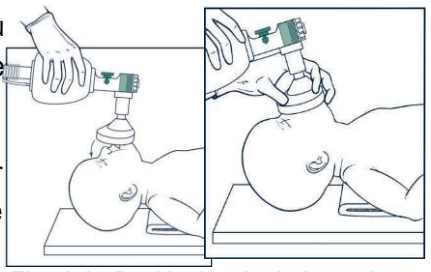


Fig. 1.10 Positioning the baby and mask

Once the mask is positioned, using light downward pressure on the rim of the mask can form an airtight seal. Care should be taken in holding the mask.

Observe the following precautions:

- Do not "jam" the mask down on the face. Too much pressure can mould (flatten) the back of the head and bruise the face.
- Be careful not to rest your fingers or hand on the baby's eyes.
- Make sure that adequate seal has been made between mask and face otherwise air would leak from the mask leading to ineffective ventilation.

8.6 Initiation of ventilation

Start ventilation by squeezing the bag to deliver breath. Remember, the lungs of a fetus are filled with fluid, so the first few breaths will often require higher pressures and longer inflation times than will subsequent breaths. Adequate pressure required to squeeze the bag should be just enough to produce gentle chest rise as it happens in normal breathing.

Remember if the baby appears to be taking a very deep breath, the lungs are being over inflated. You are using too much pressure and there is danger of producing an air leak in the lungs

How often should you squeeze the bag?

During the initial stages of neonatal resuscitation, breaths should be delivered at a rate of **40 to 60 breaths per minute,** or slightly less than once a second (Fig 1.11). To help maintain a rate of 40 to 60 breaths per minute, try saying to yourself as you ventilate the newborn: **"Breathe – Two – Three, Breathe – Two – Three"**. If you squeeze the bag on "Breathe" and release while you say "Two, Three", you will probably find you are ventilating at a proper rate.

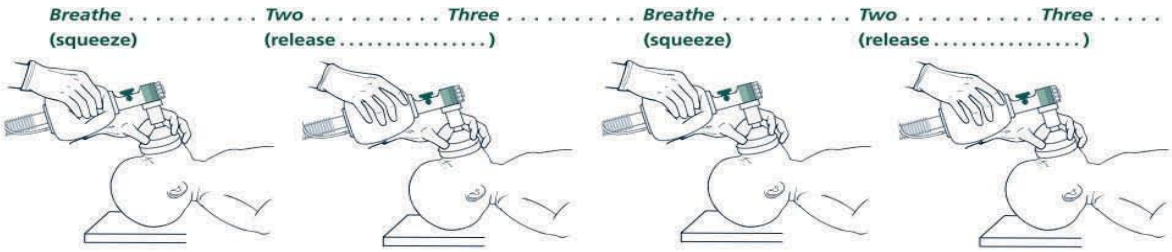


Fig. 1.11 Counting out loud to maintain a rate of 40 to 60 breaths per minute

8.7 Ensure chest rise

After starting ventilation with bag and mask, you should look for chest movement after ventilating two to three times to ensure adequacy of ventilation. If the chest movement is absent or inadequate then you should immediately take **"Steps to improve ventilation".**

Reasons for inadequate or absent chest movements are

- The seal is inadequate
- The airway is blocked
- Not enough pressure is being given

You should immediately take following **"Steps to improve the ventilation"**

- **Reapply the mask to the face and try to form a better seal** Use a little more pressure on the rim of the mask and lift the jaw a little more forward. *Do not* press down hard on the baby's face. The most common place for a leak to occur is between the cheek and bridge of the nose.
- **Check the baby's position and extend the neck a bit farther**.

If chest movement inadequate or absent

- **Check the mouth, oropharynx, and nose for secretions c l e a r** the mouth and nose if necessary.
- **Try ventilating with the baby's mouth slightly open**.

If chest movement inadequate or absent

- **Increase the pressure to squeeze the bag until there is perceptible movement of chest.**

After undertaking the steps to improve ventilation (if required) you should continue to ventilate the baby for 30 seconds and afterwards assesses the baby for signs of improvement and act accordingly

9. HOW DO YOU EVALUATE THE SUCCESS OF VENTILATION?

Improvement is indicated by:

- Spontaneous breathing

Some babies improve quickly and begin breathing well after 30 seconds of adequate ventilation. Some babies require prolong ventilation with bag and mask. Evaluate the baby after 30 seconds of adequate ventilation by asking yourself: **Is the baby breathing spontaneously?**

If yes then gradually reduce the rate and volume of breaths and watch for the baby's breathing. A baby who is **breathing well** will be crying or breathing quietly and regularly (chest is rising symmetrically with frequency 30-60 /minute, and there is no chest in drawing and no grunting for one minute). If the baby is breathing well then stop the ventilation and provide observational care as described earlier.

A baby who is not breathing well (gasping or not breathing at all) after 30 seconds of adequate ventilation needs continued ventilation and further evaluation.

- Call for help. A more skilled worker will be required to evaluate and assist in resuscitation.
- Continue bag and mask ventilation.
- Provide oxygen through bag and mask if available.
- Assess the heart rate.

10. EVALUATE HEART RATE

Evaluate the heart rate by feeling the umbilical cord pulse or listening to the heart beat with stethoscope while you stop ventilation for 6 secs.

Feel the pulse in the umbilical cord where it attaches to the baby's abdomen (Fig 1.12). If no pulse can be felt in the cord, you or your helper must listen over the left side of chest with the stethoscope and count the heart beat. It may be necessary to stop ventilation for few seconds to listen with stethoscope.

Fig. 1.12 Evaluate heart rate

Counting the number of beats in 6 seconds and multiplying by *10 can provide quick estimate of the beats per minute. (For example, if you count 8 beats in 6 seconds, announce the baby's heart rate as 80 beats per minute.)*

A heart rate above 100 beats per minute is normal

A heart rate less than 100 beats per minute is slow.

If you are unable to count the heart rate then minimize the time without ventilation by listening to the heart rate as below:

If the heart rate sounds faster than your own pulse – probably the heart rate is normal

If the heart rate sounds slower than your own pulse - probably the heart rate is slow

10.1 How does the heart rate change your further action?

If the heart rate is normal (above 100 bpm) but the baby is still not breathing well continue to provide bag and mask ventilation and reassess after every 30 seconds until the baby is breathing well as majority of babies whose heart rate is above 100 bpm eventually start to breathe well. However if the baby still does not breathe, continue ventilation and seek advanced care or organize referral.

If the heart rate is slow make sure that you have taken all the steps to improve the ventilation. The chest should move gently with each breath. Continue to do bag and mask ventilation and reassess heart rate approximately after every 30 seconds, in the mean time the more skilled healthcare provider (doctor) should provide advanced care if possible. The baby may need more advanced support such as endotracheal intubation, chest compressions and medications. Arrange for referral if advanced care is not available. Care in a specialty facility will be required. Ventilation should continue uninterrupted during the transport process.

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

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 / heart rate) even after 20 minutes of birth, ventilation may be stopped.

11. POST RESUSCITATION CARE

Babies who have received only brief ventilation can be given observational care. However babies who require prolonged positive pressure ventilation are at risk for deterioration, and are at high risk for developing subsequent complications; so these babies need supervised medical care (post resuscitation care).

- Keep the baby warm
- Check breathing, temperature, colour and CFT
- Monitor blood sugar
- Watch for complications
- Initiate breastfeeding if well

DEMONSTRATION

There will be a demonstration on 'steps of resuscitation of an asphyxiated baby'.

Scenario:

Mother delivers a baby.

Two trainers/facilitators: one plays the mother and the other the health worker.

SELF EVALUATION

1. In suctioning a baby's nose and mouth, the rule is to first suction the _____ and then the _____.

2. Choose the correct answer:

The following babies will need resuscitation

i. baby crying at birth: Yes/No

ii. baby breathing at a rate of 40 per minute: Yes/No

iii. baby is gasping at birth: Yes/No

iv. baby not breathing at birth: Yes/No

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

4. You are using a self inflating bag to ventilate a baby. The bag fills after every squeeze. But the baby's chest is not rising. List 3 possible reasons and the actions that had to be taken:

_____	_____
_____	_____
_____	_____

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

12. FOLLOW UP CARE AFTER SUCCESSFUL RESUSCITATION

Monitoring of a baby after successful resuscitation include:

For the baby

- The mother and baby should be kept together with the baby in skin-to-skin contact.
- Encourage the mother to breastfeed her baby as soon as it is ready. This will help to prevent hypoglycemia (a low blood sugar).
- Assess the baby's attachment at the breast, can you hear him swallow? Help the mother breastfeed if needed.
- Good suckling is a sign of recovery. If the baby is unable to suck effectively help the mother to express colostrum.
- Record what has happened in the baby's notes and in the labour record:

Newborn name:.....Date of birth: .....Time of birth .....

Condition at birth:

Immediate cry/breathing Delayed cry/breathing

Resuscitation initiated.

- Describe procedures:.....
- When did spontaneous breathing begin? .....
- For how long (minutes) was ventilation needed? .....
- How was the condition (breathing, body temperature, suckling) of the newborn 30-60 min after resuscitation? .....
- If no spontaneous breathing, when did ventilation stop? .....

How would you describe the outcome?

a. Live born infant, resuscitation successful.
b. Live born infant, resuscitation not successful, the newborn died.
c. Stillborn, resuscitation not successful.
d. Stillborn, resuscitation not attempted.

For the mother and family

- After resuscitation, explain to the mother and family what has happened and how the baby is now.
- Keep the mother and baby in the delivery room and **DO NOT** separate them.
- **NEVER** leave the woman and newborn alone. Monitor **them ev**ery 15 minutes during the first hour.

13. RECORD THE EVENTS

Record what has happened as soon as possible after the baby is stable and with the mother.

Keeping records of events which occur at the time of delivery and in the immediate period afterwards can be vital. The information is important if a baby needs to be referred or becomes sick in the next few days.

14. EXAMINE THE BABY BEFORE DISCHARGE

The baby should be thoroughly examined before it 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.

DEMONSTRATION

Conduct a demonstration on the 'Steps in resuscitating a newborn baby'.

S. No	*Steps*
1.	**Deliver the baby on to mother's abdomen**
2.	**Note the time of birth and dry the baby- If no meconium-**
3.	**Assess the baby's breathing:** ○ Baby breathing or crying – no further action ○ Baby gasping or not breathing – start initial steps
4.	Cut cord quickly; transfer baby to a firm warm surface and **START resuscitation**. Provide warmth Position the baby Suction first mouth and then the nose Stimulate, reposition
5.	If still not breathing, **VENTILATE** ○ Use correct sized mask ○ Ensure proper seal ○ Squeeze 2-3 times and observe the chest rise ○ If chest rise is adequate, ventilate for 30 seconds and reassess ○ If chest rise is NOT adequate, take steps to improve ventilation
6.	Assess heart rate after 30 seconds of ventilation, if not breathing well: If > 100/min: assess breathing; if breathing well, **STOP VENTILATION** If <100/min or not breathing well: continue ventilation with oxygen, provide advanced care if available or organize referral.

CARE OF THE BABY AT BIRTH (DURING 1 HOUR AFTER BIRTH)

LEARNING OBJECTIVES

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

- Describe the basic needs of the baby at birth
- Describe evidence-based routine care of a newborn baby at the time of birth
- Enumerate the components of 'Clean chain'
- Enlist the components of 'Warm chain'

CONTENTS

The lesson 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:*** 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.

1. INTRODUCTION

The first hour after birth have a major influence on the survival, future health and wellbeing of a newly born infant. The health workers have an important role at this time. The care they give during this period is critical in helping to prevent complications and ensuring intact survival. A normal newborn weighs more than 2500 grams, breathes normally and regularly, has warm trunk and soles (temperature 36.5-37.4° C), pink in color (no central cyanosis) with spontaneous body movements and actively sucks on breast.

2. THE BASIC NEEDS OF A 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. ***Protection from infection***

As these basic needs indicate, 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. Breastfeeding has a significant protective effect against infections. Early breastfeeding and keeping the baby close to the mother also reduce the risk of hypothermia and hypoglycemia.

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

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 summarized in the box:

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 chest and abdomen (between the breasts).
3. Clamp and cut the umbilical cord in 1-3 minutes.
4. Immediately dry the baby with a warm clean towel or piece of cloth; wipe the eyes.
5. Assess the baby's breathing while drying.*
6. Wipe both the eyes (separately) with sterile gauze
7. Leave the baby between the mother's breasts to start skin-to-skin care.
8. Place an identity label on the baby.
9. Cover the baby's head with a cap. Cover the mother and baby with a warm cloth.
10. Encourage the initiation of breastfeeding.

**** - if the baby is not crying or breathing well, the next steps of resuscitation have to be carried out (as explained in the lesson on* 'Neonatal resuscitation'*).***

The individual steps are briefly explained below:

1. ***Call out the time of birth:***
   It is important to tell 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 onto a warm, clean and dry towel or cloth on a warm dry surface***
   The baby should be delivered onto a warm and clean towel and kept on the mother's chest. If this is not possible, the baby should be kept in a clean, warm, safe place **close** to the mother.

3. ***Clamp and cut the umbilical cord***
   The umbilical cord should be clamped after 1 to 3 minutes using a sterile, disposable clamp or a sterile tie and cut using a sterile blade about 2 cm (1-inch) away from the skin.

4. ***Immediately dry the baby with a warm clean towel or piece of cloth; wipe the eyes.***
   The baby should be thoroughly dried to prevent from getting cold (this would be explained in the module on 'Thermal protection'). 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 very quickly.

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 as explained in the lesson on 'Resuscitation'.

6. Wipe both the eyes with sterile gauze

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).

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. 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.

9. 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 25^0C). 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.

10. Encourage the initiation of breastfeeding

Breastfeeding should be initiated with in one hour of birth in all babies.

DEMONSTRATION

DEMONSTRATE the immediate care of a normal newborn at the time of birth. Emphasize on cord and eye care with a doll, fresh (or preserved) umbilical cord, sterile tie and blades, pieces of cloth, etc.

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 (*see above*).

Keeping the baby between the mother's breasts also 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 cover, especially if the room temperature is lower than 25^0C. The steps of prevention of heat loss are explained in the lesson 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.
- Dry the baby immediately; remove the wet cloth.
- Wrap the baby with clean dry cloth.
- Keep the baby close to the mother (ideally skin-to-skin) to stimulate early breastfeeding.

- Postpone bathing/sponging for 24 hours.

2. After delivery:

- Keep the baby clothed and wrapped with the head covered.
- Minimize bathing especially in cool weather or for small babies.
- Keep the baby close to the mother.
- Use kangaroo care for stable LBW babies and for re-warming stable bigger babies.

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 positive pressure ventilation might be required. These steps are already explained in the lesson on *' Neonatal 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; may also begin to dribble. These signs indicate that the baby is ready to breastfeed.

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 should be put next to the mother's breast 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 attached, attachment and positioning should be checked. The mother should be helped to correct anything which is not quite right.

7. PREVENTION OF INFECTIONS: 'CLEAN CHAIN'

Babies are securely 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 six cleans):

- Clean attendant's hands (washed with soap).
- Clean delivery surface.
- Clean cord- cutting instrument (i.e. razor, blade).
- Clean string to tie cord.
- Clean cloth to wrap the baby.
- Clean cloth to wrap the mother.

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 cloth as a diaper/napkin.
- Wash your hands after changing diaper/napkin. Keep the baby clothed and

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) _____

8. IMMEDIATE CORD AND EYE CARE

8.1 Immediate cord care

The umbilical cord can be cut and clamped/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:

Immediate care of the umbilical cord

Steps:

1. Put the baby on mother's abdomen 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. Observe for oozing blood. If blood oozes, place a second tie between the skin and first tie.
6. DO NOT APPLY ANY SUBSTANCE TO THE STUMP.
7. DO NOT bind or bandage stump.
8. Leave stump uncovered.

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

8.2 Eye Care

Eye care is given to protect a baby's eyes from infection. The baby's eyes should be **wiped as soon as possible after birth -** both eyes should be wiped gently with *separate* sterile swabs soaked in warm sterile water.

In areas with a high incidence of sexually transmitted diseases such as gonorrhoea, eye drops or ointment should also be instilled (as per local guidelines) **within one hour of delivery** of the placenta. 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 swab soaked in sterile water using separate swab for each eye. Clean from medial to lateral side.
- Give prophylactic eye drops within 1 hour of birth as per hospital policy*.

Don'ts:

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

9. 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 during the **first hour** after delivery*

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

i) **Breathing** and
ii) **Temperature** or warmth

The health personnel should monitor all the parameters every 15 minutes for 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 your hands)

SELF EVALUATION

1. During the first hour after birth babies need to be monitored every ----------minutes

2. Name the two most important parameters that need to be monitored in the first hour after birth:
   i. _____
   ii. _____

3. Routine care of eyes at birth includes

_____

_____

**You would be given individual feedback*

PREVENTION OF INFECTION

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

LEARNING OBJECTIVES

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

- Enumerate key points which prevent infection in the hospital.
- Enumerate six steps of effective hand washing.

CONTENTS

The lesson 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.
- **Skills:** Practicing skills in hospital setting.
- **Self evaluation:** At the end of text evaluation, based on what you have already learnt. Feel free to consult your text material, if you need assistance in recapitulating.

1. IMPORTANCE OF SEPSIS

Sepsis is the most important cause of neonatal death in hospital.
Normally the newborn is free from harmful organisms for initial few hours after birth. Staff working in health facilities 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, optimal number of health providers for care of more babies
- Plenty of disposals
- Strict adherence to good housekeeping 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 2 minutes (follow six steps of hand washing).
- Put on sterile half sleeve gown.

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

2.3 Sterile gloves

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

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

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

3.2 Steps of effective hand washing (Fig 3.1)

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

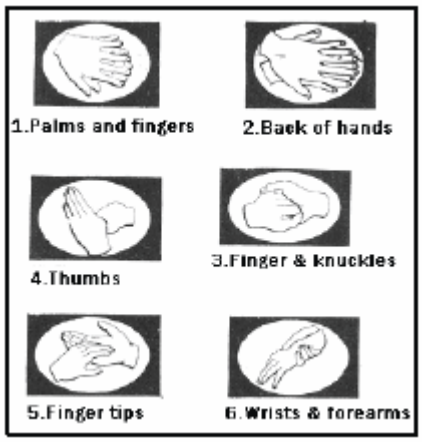


Fig 3.1 Steps in hand washing

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

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

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

DEMONSTRATION

DEMONSTRATE the steps of hand washing and ask the participants to practice the skill.

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 washing 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).

_____

_____

_____

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

4. SAFE DISPOSAL OF HOSPITAL WASTE

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

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

THERMAL PROTECTION

LEARNING OBJECTIVES

After going through this lesson, 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

CONTENTS

The module includes following elements:

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

1. IMPORTANCE OF TEMPERATURE REGULATION

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

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, LBW babies have decreased thermal insulation due to less subcutaneous fat, and decreased heat production due to less 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 production.

Why are newborns prone to develop hypothermia?

- *Larger surface area*
- *Decreased thermal insulation due to lack of subcutaneous fat*
- *Reduced 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 herself warm. A cold baby

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

A small, preterm baby who is too 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 38^0C; once the baby is born it is in a much colder environment and hence starts to lose heat immediately.

Newborn loses heat by

1. Evaporation (particularly soon after birth due to evaporation of amniotic fluid from skin surface)
2. Conduction (by coming in contact with cold objects e.g. cloth, tray, etc.),
3. Convection (by air currents in which cold air from open windows replaces warm air around baby) and
4. Radiation (to colder solid objects in vicinity e.g. walls). *(Figure 4.1)*

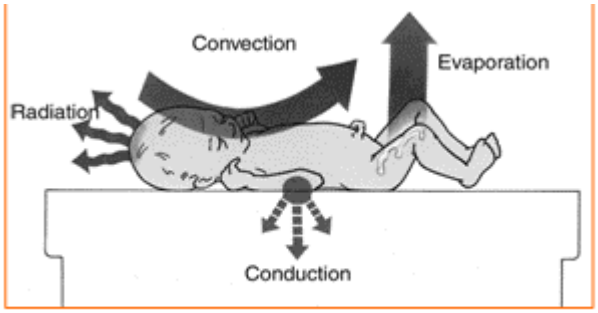


Figure 4. 1 Mechanisms of heat loss

Four ways a newborn may lose heat to the environment:

- *Radiation*
- *Conduction*
- *Convection*
- *Evaporation*

The process of heat gain is by conduction, convection and radiation in addition to non-shivering thermogenesis.

DEMONSTRATION

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

5. TEMPERATURE RECORDING

Normal temperature in a newborn is 36.5-37.4° C.

Accurate temperature recording is needed if a baby is:

- Preterm/low birth weight or sick
- Admitted to hospital, regardless of 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.

When an accurate temperature is needed, one should always use a thermometer. 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.

Preferably a low reading thermometer that can measure temperatures as low as 30^0C should be used in the newborn to record temperature (should be able to record between 30^0C to 40^0C).

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 five minutes**.

The steps of axillary temperature recording are summarized in the box below.

Recording the axillary temperature

Precautions:

- **Wash your hands before taking a baby's temperature.**
- Keep the baby warm throughout the procedure. He/she does not need to be in a special position for the temperature to be taken.

Steps:

1. Make sure that the thermometer is clean.
2. Shake it down, so that it reads less than 35^0 C
3. Place the silver/red/bulb end of the thermometer under the baby's arm, in the middle of the armpit
4. Gently hold the baby's arm against the body.
5. Keep the thermometer in place for 3 minutes.
6. Remove the thermometer and read the temperature. DO NOT add 0.5 or 1^0C to this.
7. Keep thermometer in a sterile container after cleaning with spirit.
8. Record the temperature in the baby's case notes.

5.2 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.

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. In newborns, abdominal temperature is representative of the core temperature.

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

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

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 37.4°C	Warm trunk Warm extremities	Normal baby	• Cover adequately with pre-warmed cloth • Keep the baby next to mother • Encourage breast feeding
Mild hypothermia (Cold stress)	36 to 36.4°C	Warm trunk Cold extremities	Extremities bluish and cold Poor weight gain if chronic cold stress	• Skin-to-skin contact • Cover adequately • Ensure room is warm • Provide warmth • Encourage breast feeding
Moderate hypothermia	32 to 35.9°C	Cold trunk Cold extremities	Poor sucking Lethargy Weak cry Fast breathing	• Cover mother and baby together using pre-warmed clothes • Cover adequately • Provide warmth Reassess every 15 minutes; if temperature doesn't improve, provide additional heat • Encourage breast feeding
Severe hypothermia	Less than 32°C	Cold trunk & cold extremities	Lethargic Poor perfusion Fast or slow breathing Slow heart rate Hardening of skin with redness and edema Bleeding Low blood sugar	• Rapid re-warming till baby is 34°C and then slow re-warming • Oxygen • IV fluids - dextrose (warm) • Inj .vitamin K • Reassess every 15 minutes; if temperature doesn't improve, provide additional heat

DEMONSTRATION

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

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. 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. Warm delivery room (25°C)
ii. Newborn care corner temperature to be maintained at 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

7.3 Steps to prevent heat loss in postnatal ward

i. Breastfeeding
ii. Appropriate clothing, cover head and extremities
Iii. Keep mother and baby together
Iv. Keep room warm
v. Postpone bathing and weighing

Use a wall-mounted thermometer to keep room temperature 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. Skin-to-skin contact or next to mother (Rooming in)
iv .Radiant warmer in nursery
v. Keep the room temperature of baby care area 25°C
** Using a 200 watt bulb may not be sufficient to keep the baby warm. There is also a risk of breakage of bulb.*

7.5 Wrapping and covering a baby

Wrapping a baby soon after birth and thereafter is important for maintaining the baby's temperature. Steps for wrapping and covering the baby (Fig 4.2).

- Wrap the baby using a sheet, spread the sheet
- Fold one corner on itself- place the baby's head on the infolded corner so as to cover the head till

the hairline on forehead

- Cover over the right shoulder and tuck on left side
- Fold from the foot end and tuck beneath the chin
- Finally cover the left shoulder and tuck on the right side

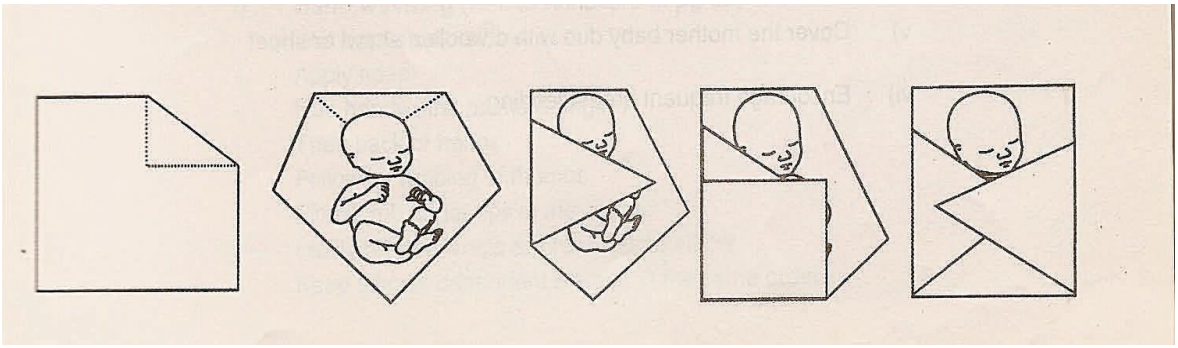


Fig 4.2 Steps for wrapping and covering the baby

7.6 How to keep room warm?

i. Avoid using air conditioner even in summer
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

DEMONSTRATION

The facilitator will conduct a demonstration on ‘Temperature regulation and warm chain’.

SELF EVALUATION

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

2. Newborn baby loses heat by four mechanisms; name them
_____
_____
____

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

4. Routine temperature should be recorded by _____ route.

5. Normal axillary temperature range is ___ to ___.

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

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

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

8. WHAT IS KANGAROO MOTHER CARE?

Kangaroo Mother Care (KMC) is a special way of caring the low birth weight (LBW) babies. It improves their health and well being by promoting effective thermal control, breastfeeding, infection prevention and bonding.

In KMC, the baby is continuously kept in skin-to-skin contact by the mother and breastfed exclusively.KMC is initiated in the hospital and continued at home.

8.1 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.

8.2 The two prerequisites of KMC are:

i. Support to the mother in hospital and at home

A mother needs counseling, support, and supervision from health care providers for initiating KMC in the hospital. She would also require 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 health providers for solving problem are crucial to ensure safe and successful KMC at home.

Components of* Kangaroo Mother Care (*KMC)
- *Skin-to-skin contact*
- *Exclusive breastfeeding*

Pre-requisites of* Kangaroo Mother Care (*KMC)
- *Support to the mother in hospital and at home*
- *Post-discharge follow up*

8.3. Benefits of KMC

The benefits of KMC include:

1. Temperature maintenance with a reduced risk of hypothermia
2. Increased breastfeeding rates
3. Early discharge from the health facility
4. Less morbidities such as apnea and infections
5. Less stress (for both baby and mother) and
6. Better infant bonding.

8.4. 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, 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 an ordinary chair or in a semi-reclining posture on a bed with the help of pillows.

DEMONSTRATION

Facilitator will conduct a demonstration on KMC.

8.5. Eligibility criteria

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, he should be transferred to a proper facility after initial stabilization and appropriate management. 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.

9. PREPARING FOR KMC

9.1Counseling

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.

9.2 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 or shawl. A suitable apparel that can retain the baby for extended period of time can be adapted locally.

9.3 Baby's clothing

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

10. THE KMC PROCEDURE

10.1 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.

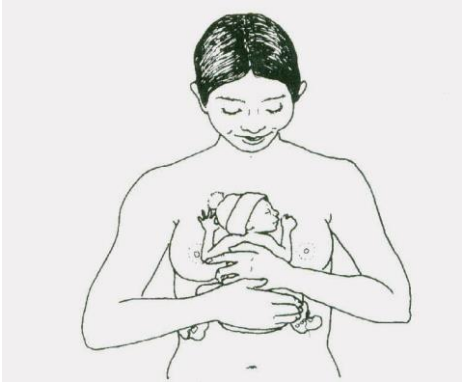


Fig 4.3 Kangaroo Mother Care (KMC)

10.2 Monitoring

Babies receiving KMC should be monitored carefully especially during the initial stages. 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

10.3 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.

10.4 Privacy

KMC unavoidably requires 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.

10.5 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 oxygen therapy.

10.6 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.
- When the baby does not require intensive care, she should be transferred to the postnatal ward where KMC should be continued.

11. 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 45° 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 or the father or the relatives to sleep with the baby in the kangaroo position.

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

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. Can KMC be provided in the following situations?
   i. Baby on OG tube feed: Yes / No
   ii. Baby receiving IV fluids: Yes / No
   iii. Baby receiving free flow oxygen: 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.

Following aspects of KMC were shown:

i) _____

ii) _____

iii) _____

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)

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 in a separate cot, not yet dressed in any clothes and only wrapped in a hospital cotton sheet. HR is 140/minute, RR 56/minute. Extremities are cold 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?

_____
_____
_____
_____
_____

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

_____
_____
_____
_____
_____
_____

_____

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

12. KEEPING RADIANT WARMER READY TO RECEIVE A BABY

Prepare at least 30 minutes before the baby is delivered in the labour room to ensure the baby is received in warm, comfortable environment.

Keeping radiant warmer ready

Steps:

1. Clean the radiant warmer/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 radiant warmer on the manual mode with 100% heater output so that the temperatures of all items likely to come in contact with baby are warm.
5. Once the radiant warmer is ready – switch to skin mode with desired setting.

FEEDING OF NORMAL AND LOW BIRTH WEIGHT BABIES

LEARNING OBJECTIVES

The participants will learn about:

- Enteral feeding of normal birth weight babies (≥2500g) and low birth weight babies (<2500g)
- Breastfeeding counseling and support
- Managing common problems encountered during breastfeeding
- Feeding by *Paladai*

CONTENTS

The lesson 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 hospital setting.
- ***Role play:*** There will be 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 breast milk. All healthy normal weight babies must be exclusively breastfed till the age of 6 months. Health professionals must have the 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. Exclusive breastfeeding should be continued till 6 months of age. Health workers should know about the advantages of breast milk and the anatomy of breast and physiology of lactation so that they can teach and counsel the mothers with confidence.

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

Advantages of breastfeeding

Exclusive breast fed babies are at decreased risk of

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

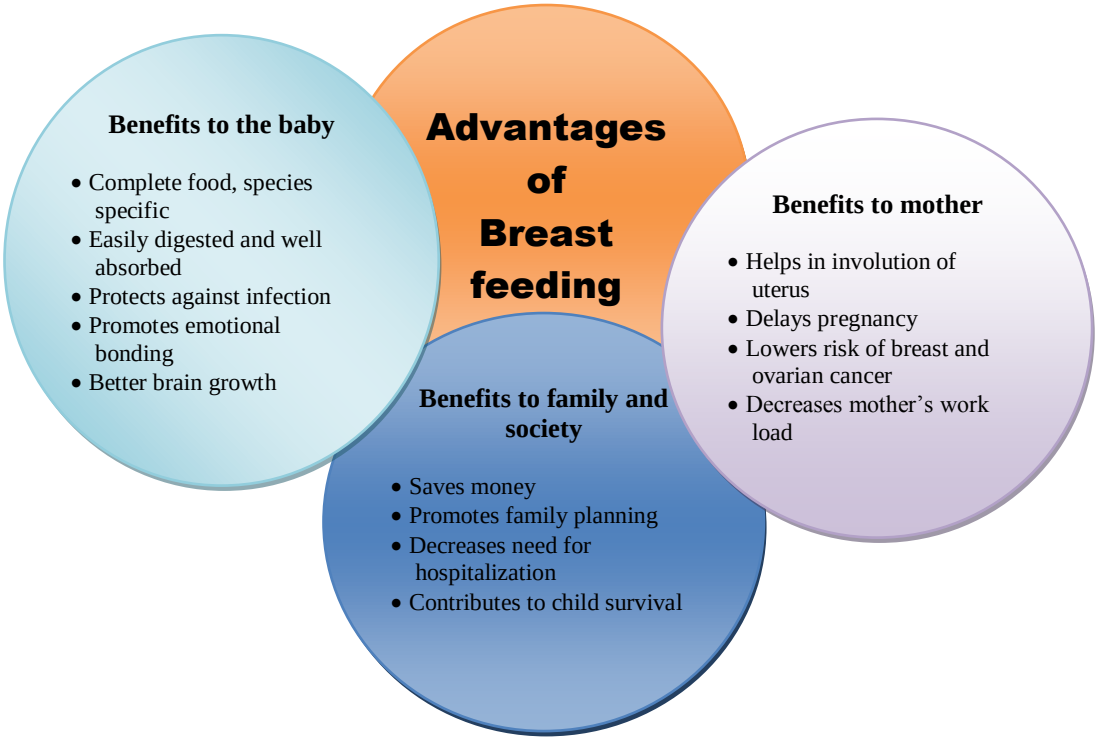


Figure 5.1 Advantages of breastfeeding

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.
- She should 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 **supported** with her forearm and the hands.

Step 3: Demonstrate the four key points in position

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

- the baby's head and body should be straight;
- the baby's face should face mother's breast;
- the baby's body should be close to her body;
- she should support the baby's whole body

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
- the baby's mouth is wide open
- the baby's lower lip is turned outwards
- the baby's chin is touching the breast.

Examples of good and poor attachment are given in Figure 5.2.

Good attachment **Poor attachment**

Figure 5.2 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 milk not removed effectively thus causing breast engorgement.
- Poor milk supply hence baby is not satisfied after feeding.
- Breast produces less milk resulting in a frustrated baby and refusal to suck. This leads to poor weight gain.

Correct positioning 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. HOW FREQUENTLY A MOTHER HAS TO BREASTFEED HER BABY?

A healthy newborn baby can be breastfed 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.

5. ASSESSING THE ADEQUACY OF BREASTFEEDING

After the mother has been counselled 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 the baby

i. Passes urine 6-8 times in 24 hours.
ii. Goes to sleep for 2-3 hrs after the feeds.
iii. Gains weight @10-15 gm/kg/ day.
iv. Crosses birth weight by 2 weeks.

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.

6. 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.

Key messages to promote exclusive breastfeeding

1. Put baby to feed at breast as soon as possible after birth preferably in the delivery room. This is important for the mother, baby, and for milk production.
2. On the first day, breast milk is thick and yellowish (known as colostrum). Feeding this milk provides nutrition and prevents infections. DO NOT DISCARD COLOSTRUM.
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 at least eight to ten times and whenever baby cries with hunger.
6. The more the baby sucks at breast the more milk the breast will produce and the 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 before six months.
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.

Following aspects of breastfeeding were shown:

i. _____

ii._____

iiii._____

7. ISSUES IN BREASTFEEDING

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.

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. 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 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. If fungal infection apply medicine on the nipple and inside the mouth of the baby.

Sore nipples

Causes

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

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.
- If fungal infection apply medicine on the nipple and inside the mouth of the baby.

7.3 Breast engorgement

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

***Treatment*:** Breast engorgement can be prevented by early and frequent breast feeds and correct attachment of the baby to the breast. Treatment consists of local warm water packs 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 form. The mother may have high grade fever and pain in breast.

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

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 (see table given below).

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

SELF-EVALUATION

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

2. Enumerate the four key points of positioning of baby for breastfeeding.

i. _____

ii. _____

iii._____

iv._____

3. Signs of good attachment are

i. _____

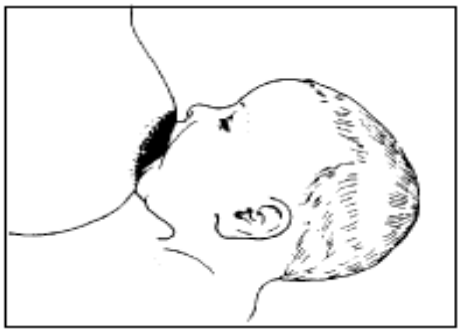
ii. _____

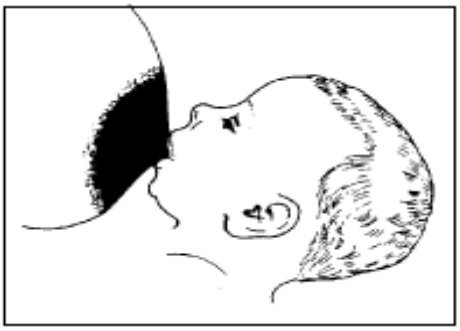
iii._____

iv._____

4. What differences do you see?

Baby sucking on _____ Baby sucking on _____





5. Enumerate the problems caused by poor attachment.

_____

_____

____

6. How will you assess the adequacy of breastfeeding?

_____

_____

_____

7. How many times should a baby be breastfed?

_____

8. Can mother skip one or two night feeds? Yes/No

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

_____

_____

_____

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

_____

_____

_____

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 (<2500 gms) babies differs from that of normal birth weight babies. Preterm low birth weight babies require higher calories and proteins. Moreover, these babies (especially those <1800 gm) often have difficulty in taking milk directly from breast and may require more help and ongoing monitoring.

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 (usually one with birth weight <1250 gm) can not 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 orogastric 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 correct method of feeding.

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 before 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 2000 gm 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 steps are given in the box below:

Step 1: Preparation of container

1. Choose a cup, glass, jug or jar with a wide mouth.
2. Wash the cup with soap and water (she can do this before hand)
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.

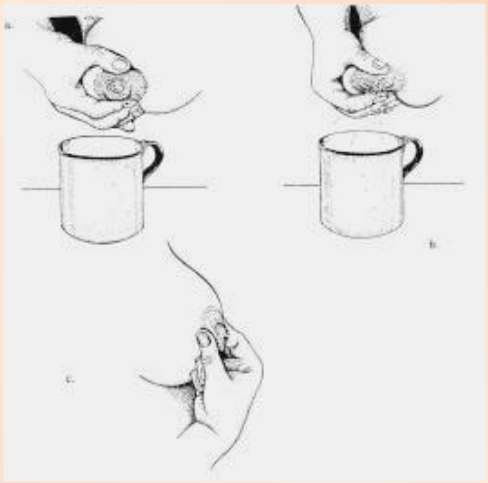
1. Take a wet warm towel and wrap the breast in it. Let it be there for 5 min.
2. With two fingers, massage the breast using circular motion of fingers. Use pulp of fingers only with modest pressure. Alternately she can use knuckles of a fist. Massage the breast towards nipple as if kneading dough. Massage 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.

Step 3….

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.
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.
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 to express breast milk adequately takes 20-30 minutes, especially in the first few days when only a little milk may be produced. It is important not to try to express in a shorter time.

DEMONSTRATION

Facilitator will demonstrate ***expression of breast milk*** using a poster.

4. HOW TO FEED?

4.1 Paladai feeding

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

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

Figure 5.3 Paladai feeding

The steps of '*paladai*' feeding are given in the box below:

How to feed an infant with a '*paladai*'

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 lip rests lightly on the infant's lower lip.
4. Tip 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 *paladai* in boiled water and air-dry it before and after each use.

VIDEO DEMONSTRATION

There will be video demonstration on *paladai* feeding. The video demonstration will be followed by discussion.

……
……
……

SELF EVALUATION

Let us see how much you have learnt

1. The best milk to be given by *paladai* feeding is

   _____

2. Advantages of *paladai* feeding include

   _____

   _____

3. Preterm LBW babies are often not able to breastfeed. The reasons include:

   _____

   _____

   _____

TRANSPORT OF NEONATES

LEARNING OBJECTIVES

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

COMPONENTS

1. Stabilization prior to transport.
2. Communication with parents, referral unit.
3. Preparation. *
4. Maintenance of "Warm Chain".
5. Prevention of Hypoglycemia.
6. Maintenance of airway and oxygenation.
7. Instructions to accompanying family members about danger signs.

- Decide about doctor, nurse to accompany.

EQUIPMENTS

1. Appropriate clothing for baby (cotton sheets/plastic sheet, cap, woolen blanket).
2. Thermometer, thermocol / card board box.
3. Cotton.
4. Nasogastric tube
5. Mucus suction catheter
6. Oxygen source and nasal cannula (if needed)
7. Resuscitation bag

PROCEDURE

Each component of neonatal transport is described below:

Transport of neonates

I. Stabilize prior to transport

- Warm the baby till hands and feet are warm to touch.
- Suction the airway if essential.
- Oxygenate if needed.
- Give/arrange medications as per physician's order (normal saline, dextrose, vitamin K, antibiotics, phenobarbitone, epinephrine).

II. Communication

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

III. Prevention of hypothermia: Maintenance of "Warm Chain".

- Warm baby before transport.
- Change soiled nappy and linen.
- Warm clothing (cover fully with cotton clothes) or cover head, wrap in blanket, include plastic sheet wrap between layers of clothing (if available);
- Other alternatives are:
  - Skin-to-skin contact with mother/accompanying person
  - Use of thermocol / cardboard box with holes for ventilation
  - DO NOT USE hot water bottles.

IV. Prevention of hypoglycemia

- Gavage feed / IV dextrose bolus prior to transport. (confirm with physician) followed by a constant drip.
- Instruct regarding feeding during transport.
- Ensure 'Quick' transport.
- Prevent hypothermia.

V. Prevention of hypoxia

- Clear airway.
- Consider use of oxygen cylinder with nasal cannula or mask during transport.
- Instruct regarding gentle handling.
- Instruct regarding gentle stimulation / clearing secretions / position during transport.

GROUP DISCUSSION

Group discussion on safe transportation of sick neonates and care before and during the referral.

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APPENDIX – 1

EQUIPMENTS

RESUSCITATOR/AMBU BAG/SELF INFLATING BAG

A. Parts

- Valve assembly
- Patient outlet
- Air inlet
- Oxygen inlet
- Safety valve
- Body of the bag

B. Test Function

- Block Patient outlet or mask by palm of your hand
- Squeeze 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

C. 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 "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 .

D. Decontamination

- ***Washing and rinsing***
  - Dissemble as shown on the reverse.
  - Wash in warm water using a detergent.

- Rinse in clean water

- ***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

RADIANT WARMER

- Ensure that the temperature of the room is 22o C.
- Place the warmer away from air currents.
- Clean the mattress and platform , and cover the mattress with clean linen sheet
- When it is known beforehand that a baby is to arrive in the newborn unit, turn on the warmer at least 20 minutes prior to pre-warm the linen and mattress so that the baby does not lie on a cold surface initially.
- Read temperature on display. Adjust heater output to
    - High: If baby temperature is below 36^0C
    - Medium: If baby temperature is between 36-36.5^0C and to
    - Low: If baby temperature is between 36.5-37.5^0C
- Once the baby's temperature is between 36.5-37.50C, switch on the servo mode/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 the baby is clothed or covered unless it is necessary for the baby to be naked or partially undressed for observation or for a procedure.
- Place only one baby under each radiant warmer
- Turn the baby frequently while under the warmer, if possible.
- Check the temperature of the warmer and of 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.
- Move the baby to be with the mother as soon as the baby no longer requires frequent procedures and treatment. If in servo mode the heater output is < 20%, it is safe to shift the baby to mothers 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 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 10 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 later and there after the heater output goes to 40 % ; if alarm is silenced the heater will kept on for another 15 to 20 minutes as per manufacturers recommendation.
- For low birth weight or sick neonate adjust heater output depending on baby temperature.
- Never use full (100%) heater output unsupervised.
- Record baby temperature every 2-4 hourly.
- Use this 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 chemical.
- Bassinet, cot should be disinfected daily using soap/detergent solution or disinfection solution.

WEIGHING MACHINE

PARTS

i) Pan or baby tray
ii) Weight scale dial
iii) Machine proper

WORKING

i) Wipe clean the weighing pan
ii) Check for and adjust zero error
iii) Calibrate using a known weight
iv) Place baby with sheet

v) Note weight (a)
vi) Remove baby
vii) Weigh the sheet above (b)
viii) Subtract b from a (a-b)
ix) Record weight

CLEANING AND DISINFECTION

i) Clean with soap and water
ii) Wipe with spirit swab b/w patient use

DOs & DONTs

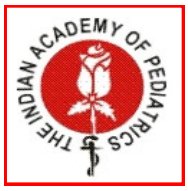
iii) Always look for and adjust zero error
iv) Always calibrate using a known weight
v) Do not weigh baby naked
vi) Remove excessive clothing
vii) Do not stack up line or other objects on the weighing pan when not in use
viii) Record weight only when needle is stationary & not oscillating.

TROUBLESHOOTING

i) Place on a flat firm surface
ii) Calibrate before each use
iii) Record zero error if it can not be corrected and account for it

MAINTENANCE

i) Calibration
ii) Annual maintenance contract



Indian Academy of Pediatrics

WHO-CC for training and research in newborn care, AIIMS