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Manual of Community Health Nursing Procedures



Pampa Sarkar

JAYPEE

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7
CHAPTER

Procedure for Newborn to Adolescent

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LEARNING OBJECTIVES

After completion of this chapter students will be able to:

- Describe about the newborn assessment along with breastfeeding technique and position.
- Explain about different breastfeeding problems and assisted feeding.
- Enumerate the maintenance of temperature of newborn.
- Discuss under six assessments.

- Newborn assessment.
  - Steps to record height.
  - Steps to record weight.
  - Steps to record mid upper arm circumference (MUAC).
  - Steps to record head circumference.
  - Steps to record chest circumference.
  - Measurement of arm span.
- Care of low birth weight (LBW) baby.
- Correct breastfeeding technique, position and good attachment.
- Procedure of expression of breast milk (EBM).
- Care of a breast.
- Breastfeeding in LBW baby.
- Maintenance of temperature of newborn:
  - Warm chain.
  - Hypothermia.
  - Kangaroo mother care (KMC).
  - Hyperthermia.
  - Temperature recording and thermal control.
- Baby weighing.
- Napkin changing.
- Cord care and infected cord care.
- Infected eye care.
- Baby bath.
- Administration of baby bath.
- Toddler assessment.
- Preschooler assessment.
- Haemoglobin estimation of adolescent.

INTRODUCTION

Birth is an important period of transition in utero life to ex-utero existence. After birth effective care required to overcome this transition to render support and to make sure of stabilization. Every newborn baby is carefully and gently checked at birth for signs of any problems or complications. A complete physical assessment will carry out which includes everybody's system.





NEWBORN ASSESSMENT

Physical examination is an important part of pediatric care. Neonatal assessment is the health assessment of a newborn (from birth till 28 days of life) to assess the well-being of the baby, to find out the congenital anomalies, to make parents be aware about the newborn's current status of health and development.

Definition

It is a systematic examination (physical and neurological) of newborn. "A detailed and systematic whole-body examination of a stabilized newborn during the early hours of life"

Purposes

- To identify the growth and development patterns of the newborn.
- To find out any disease in early stages.
- To ascertain the cause and extend of disease.
- To recognize any change in the conditions of disease, any impairments or deterioration as a result of treatment.
- To decide whether the nursing care is needed or not.
- To support and monitor the baby and their families by meeting early signs specially in case of communicable disease.
- To provide opportunity for health teaching.

Components of Newborn Assessment

- Physical assessment.
- Vital signs recording.
- Height measurement.
- Weight measurement.
- Head circumference measurement.
- Chest circumference measurement.
- Mid upper arm circumference (MUAC) measurement.

Methods of Physical Examination of Newborn

1. **Inspection:** Visual examination of the body is termed as inspection. It is the examination with the naked eyes. The general appearance, nutritional status, skin color, rashes, wounds and deformities can be identified by this method. It assists to evaluate both physical and mental assessment.

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2. **Palpation:** It is the examination by feeling or by sensation of touch with the help of the hands. It is performed to detect the size and positions of the organs, glands, palpable masses and area of tenderness.
3. **Percussion:** It is the examination by tapping with the fingers of an area of the body to make sure the conditions of the internal organs by the sounds that are generated. It is performed by putting a finger of the left hand firmly against part to be assessed and tapping with the fingertips of the right hand.
4. **Auscultation:** It is the examination by hearing to sounds within the body with the assistance of a stethoscope, fetoscope or directly with the ear put on the body.

By using these methods, the general examination or head-to-foot examination is performed. The examination is done in all well-ordered manners emphasizing upon one area of the body at a time.

Principles to be Followed During Physical Examination

- Ready the baby's unit with clean linens.
- Collect the equipment which may be used during the physical examination.
- Explain the procedure and its purpose to the mother of the baby.
- Maintain privacy of the newborn.
- Take assistance during the examination if required. Position for the physical examination with minimum exposure.
- Predict the need of specific diagnostic tools and supplies. Keep items ready.
- Discard used or soiled items in appropriate manner.
- Keep safe the newborn from falling and getting injured.
- Call help from parents to get the baby on to the examination side and out of it.
- Label specimen if any and send to the laboratory immediately after collection.
- Record the physical examination and discuss the findings with the mother of the baby.

Preparation of the Baby

- Make the baby clean.
- Place the baby in a comfortable position which is convenient.
- Loosen his/her clothes.
- Wrap the baby with extra sheet and expose only the needed area.
- Avoid unnecessary exposure.
- Remove the anxiety and fear by proper explanation and allowing the parents to be at the bedside.
- Remember young baby should be examined in the mother lap.



ARTICLES REQUIRED

Sl. No.	Articles	Purposes
1.	Community bag	To carry out the necessary articles.
2.	Measuring tape	To measure head circumference and arm circumference.
3.	Digital thermometer	To measure body temperature.
4.	Stethoscope	To listen heart sound.
5.	Infantometer	To measure length of the baby.

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6.	Weighing scale.	To measure weight of the baby.
7.	Torch	To observe mouth and eye.
8.	Spirit swabs	To disinfect articles.
9.	Paper bag	To discard waste.
10.	Soap with soap case or liquid hand wash and hand towels.	To prevent cross infection and to dry the hands.

PROCEDURE

1. **Preprocedural steps:**
   i. Analyze the mother's obstetrical history, number of pregnancies, history of previous pregnancies and health during the pregnancies to corelate the data to assess its effect on newborns health.
   ii. Analyze the health history of newborn—date of birth, place of birth, type of delivery, immunization status, weight and length of the newborn and the color of the newborn, cry at birth and the breastfeeding practice.
   iii. Wash hands with soap and water to prevent cross infection.
   iv. Dry the hands with towel. Don't touch the bag with wet hands.
   v. Arrange all the articles to save time and energy.
2. **Intraprocedural steps:**
   a. **Physical assessment of newborn:**
      General assessment:
      i. Temperature:
      ii. Heart rate
      iii. Respiration
      iv. Posture
      v. Color
      vi. Activity
      vii. Cry
   b. **Anthropometric measurements**

PROCEDURE

Steps to record height of the newborn:

i. Open out a newspaper on the bed.
ii. Instruct the mother, let the infant to lie on the newspaper.
iii. Place a scale on the crown of head to newspaper and set a dot on it.
iv. Straighten both the legs of infant and place the scale on the heel of the infant and set a dot on the newspaper.
v. Advise mother to take the baby.
vi. Calculate the height of the infant by measuring the distance between two dots in centimeters.
vii. Record the height of infant and match it with the growth card which is showing height for age to evaluate whether the infant has normal height or not **(Fig. 7.1)**.

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Fig. 7.1: Recording of height by infantometer.

NOTE

- Height expedition at birth 50 cm gain during 1st year 25 cm, gain during 2nd year 12.5 cm, gain during 3rd year 7.5–10 cm, gain during 3–12 years 5–7.5 cm.
- Height increases from birth to 3 months at the rate of 3.5 cm/month, 3–6 months 2.0 cm/month, 6–9 months 1.5 cm/month, 9–12 months 1.3 cm/month, 2–5 years 6–8 cm/year, 5–12 years 5 cm/year.

Weech's formula: Expected height up to 12 years length or height (in cm) = age in years × 6 + 77

Steps of Procedure to Record Weight in Infant

- Put the machine at zero.
- Instruct mother to hold the infant and stand on weighing scale after putting off shoes.
- Advise the mother to stand on the machine placing feet on both sides of scale in a way so that weight is equally dispersed on both sides of machine.
- Make the needle to fix and record the reading of mother and infant together.
- Now keep away baby from mother and record reading of mother's weight.
- Subtract mother's weight from the joint weight of mother and infant to obtain the weight of the infant.
- Document the weight of the infant.
- Make comparison of the weight of the infant with growth chart. Use blue chart for boys and use pink chart for girls.

Weighing of the Baby by Weighing Scale (Pan Type) (Fig. 7.2)

- Cleanse the baby weighing scale (pan type) by using wet cotton and make it dry.
- Open out a newspaper in the pan of baby weighing scale.
- Put the scale at zero.
- Instruct the mother to lie the baby in the pan of baby weighing scale.
- Observe the weight.
- Record the weight.
- Compare it with the growth chart to find out the nutrition status of the infant.

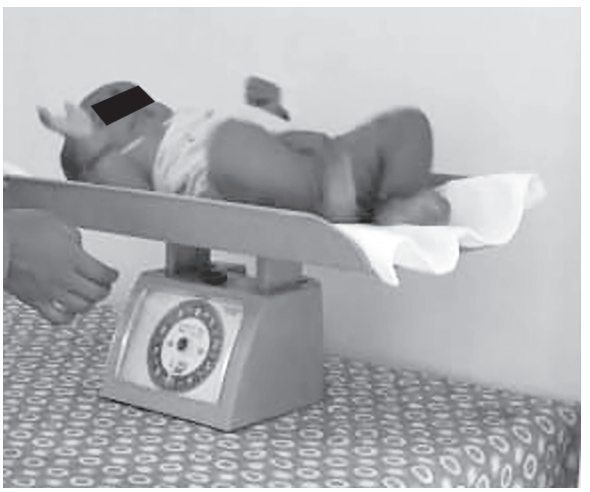

Fig. 7.2: Digital baby scale.

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Table 7.1: Average weight gain at different child age groups.

Sl. No.	Age	Average weight gain
1.	0–4 months	1.0 kg/month (30 g/day)
2.	5–8 months	0.75 kg/month (20 g/day)
3.	9–12 months	0.50 kg/month (15 g/day)
4.	1–3 years	2.25 kg/year
5.	1–9 years	2.75 kg/year

Table 7.1 depicted the average weight gain at the different child age groups.

Weight at:
- 4–5 months = 2 × birth weight.
- Weight at 1 year = 3 × birth weight
- Weight at 2 years = 4 × birth weight.
- Weight at 7 years = 7 × birth weight.

Weech's formula: Weech's formula is another way of estimating expected weight:
- At 3–12 months expected weight (kg) = age (months) + 9/2.
- 1–6 years expected weight (kg)= age (years) × 2 + 8
- 7–12 years expected weight (kg) = age (years) × 7–5/2

NOTE

- Infancy is the period of most rapid growth, especially in the first 6 months.
- Growth slows down significantly after 1 year and remains steady until puberty.
- Puberty brings a second growth spurt, which varies in timing and magnitude between sexes.
- Nutritional status, health conditions, and genetics all play a role in these averages.

Recording Mid Upper Arm Circumference (MUAC)

- It is estimated over the left upper arm.
- First instruct the mother to uncover the hand.
- Instruct the mother to bend left hand at right angle.
- Locate the acromion process (shoulder) and olecranon process (elbow).
- Dot midpoint from acromion process (shoulder) to olecranon process (elbow) with arm bent at right angle.
- Instruct the mother or the child to stand or sit with the arm hanging loose at the side.
- Estimate the MUAC circumference from the midpoint of the upper arm by using flexible tape **(Fig. 7.3)**.
- Normal MUAC is 13 cm. From 12 to 13 cm denote borderline malnutrition and below 12 cm denote child is malnourished.

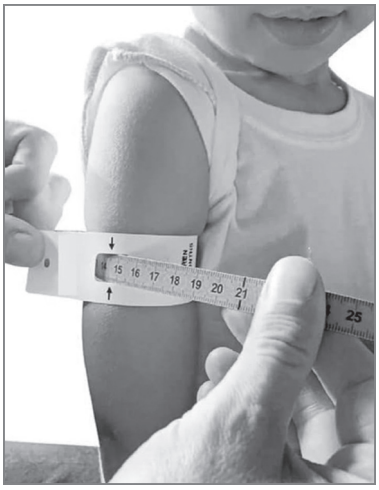

Fig. 7.3: Measurement of mid upper arm circumference (MUAC).

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When is it acceptable to use a general tape measure?

Using a general tape measure is acceptable in nonclinical settings, screenings, or when standard MUAC tapes are not available (**Fig. 7.4**). However:

- ❑ The tape must be flexible and nonstretchable.
- ❑ It must show clear, accurate metric units (cm or mm).
- ❑ It should be narrow (preferably 0.5–1.0 cm wide) to avoid bending or wrapping errors.



Fig. 7.4: Measurement of mid upper arm circumference (MUAC) by using general tape measure.

Bangle test: A quick assessment of arm circumference is done by bangle test. A fiber glass ring with internal diameter of 4 cm is passed up the arm, if it slips above the elbow, it indicates that upper arm is <12.5 cm and child is malnourished.

Shakir tape: Shakir tape is made up of fiber-glass tape. It is coded with three colors. Red color indicates MUAC is <12.5 cm, yellow color indicates MUAC is 12.5–13.5 cm and green color indicates MUAC is >13.5 cm. helps paramedical workers to assess nutritional status without recalling the normal limits of mid-upper arm circumference **(Fig. 7.5)**.

Steps of Measuring Head Circumference

- ❖ Head size corelates to the size of the brain which is rapidly increases during infancy.
- ❖ 70% Brain growth takes place during fetal life, 15% during infancy and remaining 10% during preschool years.

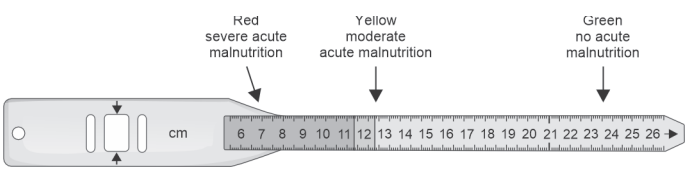

Fig. 7.5: Shakir tape.

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- An exact head circumference measure is acquired with a flexible nonstretchable measuring tape.
- Try to identify the broad way around the head.
- Enfold the tape easily around the widest possible circumference from the most prominent part of the forehead (often 1–2 fingers above the eyebrow) around the widest part of the back of the head, i.e., by putting the tape over the occipital protuberance at the back and just over the supraorbital ridge and the glabella in front **(Fig. 7.6)**.
- This can be interpreted to signify the largest circumference of the head.
- Remeasure 3 times and draw the average size.
- Expected head circumference in children at birth is 34–35 cm; 2 months 38 cm; 3 months 40 cm; 4 months 41 cm; 6 months 42–43 cm; 1 year 45–46 cm; 2 years 47–48 cm; 5 years 50–51 cm.



Fig. 7.6: Measurement of head circumference.

- Head circumference growth expedition during first year there is 12 cm increase in head circumference, while 1–5-year age, only 5 cm gain achieved in head size. Adult head size is gained between 5 years and 6 years.
- The following formula (Dine's formula) is applied for calculating the head circumference in the first year of life. (Length in cm + 9.5) plus minus 2.59/2. Growth expedition is till 3 months 2 cm/month, 3 months-1 year 2 cm per 3 months, 1–3-year 1 cm per 6-month, 3–5-year 1 cm per year.
- Head circumference is usually estimated on infants and children until age of 3 years.
- Head circumference should also be estimated in older children whose weight and height measurements are abnormal, as there may be any underlying cause.

Measurement of Chest Circumference

In a normally nourished child, chest increases in size faster than the head circumference during 2nd and 3rd years.

Technique (Fig. 7.7)

- Take flexible nonstretchable measuring tape.
- Chest circumference is estimated at the level of nipple in mid-inspiration.



Fig. 7.7: Measurement of chest circumference.

Relationship between Head Size with Chest Circumference

- At birth head circumference was 34 cm and chest circumference is 32 cm.
- The head circumference is more than chest circumference by >3 cm in preterms, small-for-date, and hydrocephalic infants.
- At around 9 months to 1 year of age: Head circumference is equal to chest circumference, but thereafter chest increase in size more rapidly than the head.

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- In case of protein energy malnutrition, because of poor growth of chest, the head circumference may persist to be higher than the chest even at the age of 2.5–3 years due to poor development of thoracic cage. Brain growth is less impaired by undernutrition. So, there will be significant detain prior to chest circumference passes head circumference.
- Both the measurements are not helpful beyond the preschool age.

Measurement of Arm Span

Arm Span

- It is the distance between the tips of middle fingers of both arms outstretched at right angles to the body, estimated across the back of the child.
- In under-5 children, arm span is 1–2 cm smaller than body length.
- During 10–12 years of age, arm span = height.
- In adults arm span is more in adults by 2 cm.
- Abnormally large arm span is found in clients with arachnodactyly (Marfan syndrome), eunuchoidism, Klinefelter syndrome, coarctation of aorta.
- Arm span is short in comparison to height in clients with short limbed dwarfism, cretinism, achondroplasia

Procedure

- Instruct the child to stand while back toward you.
- Instruct child to stretch both arms.
- Estimate arm span by using flexible tape between the tips of middle fingers.
- Advise the child to get relax and place both arms down.
- Record the arm span.

Head to TOE Examination

- **Skin: (**Dry or moist, vernix present or not, lanugo present or not, observe for pallor, cyanosis, jaundice, milia, erythema, toxicum, mottling, Mongolian spots, birthmark or any rashes).
- **Head: Inspection:** (Hair distribution, cephalohematoma or caput succedaneum present or not).
  Palpation: (Anterior fontanelle and posterior fontanelle).
- **Eyes:** Conjunctiva, Iris, Cornea, Pupil, blink reflex, doll's eye reflex, congenital cataract.
- **Ear:** Position, size and shape.
- **Mouth and throat:** Inspect for cleft lip, cleft palate, observe gag reflex, sucking, rooting and swallowing reflex, watch for Epstein pearls, tongue tie, excessive salivation and oral thrush.
- **Neck:** Inspect for shape and excessive skin fold. Chest: Inspection: size, shape and breast tissue. Auscultation: Clear, abnormal breath sounds and murmur.
- **Chest:** Size, shape, movement and breast development.
- **Lungs:** Rhythm and depth.
- **Heart:** Heart rate and heart sound.
- **Abdomen:** Inspection: Shape, umbilical cord, peristaltic wave. Auscultation: Bowel sounds present or not. Palpation: Softness, presence of any mass, liver palpable or not, spleen palpable or not.
- **Spine:** Watch for spinal curvature, bony defect, hairy tufts, meningocele, myelomeningocele.
- **Upper extremities:** Shoulder dislocation, palmar crease, digits and range of motion of joints.

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- **Lower extremities:** Congenital abnormalities, hips, digits, sole crease and range of motion of joints.
- **Genitalia:** In girl baby: Labia majora, labia minora, clitoris, any vaginal discharge. In boy baby: Scrotum pigmented or not, testes descended or not, observe for any hypospadias, epispadias, phimosis, ambiguous genitalia.
- **Buttocks** should be observed for any mass, anal opening and anorectal malformations.

REFLEXES OF THE BABY (TABLE 7.2)

Table 7.2: Reflexes of the baby.

Sl. No.	Name of reflexes	How to observe/checked
1.	Moro	Baby's body is supported with one arm with one hand and the head with the other hand. The hand holding of the head is then lowered a few extremities. In positive response the baby abducts and extend the arms but in case of abnormalities such as a fracture or brachial injury in the arm doesn't response.
2.	Rooting	Touching or stroking the check along-side of mouth causes neonates to turn head towards that side and begin sucking.
3.	Sucking	Begin strong sucking movements in response to stimulation.
4.	Swallowing	When put a finger or nipple (breast) or come in contact with roofs of the mouth, baby begins suck breast or finger.
5.	Dancing or steeping reflex	If the baby holds vertically on abdomen or in a flat, smooth surface, baby begins dance and jump by alternate feet.
6.	Palmer grasp	Grasp finger when palm is stimulated and held momentarily.
7.	Doll's eye	As head is moved towards right or left, eyes lag behind and do not immediately adjust to new position.
8.	Planter grasp	Toes curl downward when sole of foot is stimulated.
9.	Babinski	Funning and extension of all toes when one side of sole is stroked from heel upward.
10.	Extrusion reflex	If we put some food to the anterior portion of the mouth, baby expels food from the mouth.
11.	Corneal reflex	If we touch them with a cotton piece lightly, baby will close his/her eyes.
12.	Sneezing reflex	If we introduce any rolled cotton or other objects into the baby's nose, he/she will sneeze.
13.	Blinking reflex	If suddenly put a light on the baby's eye, she/he will close eyes.

Postprocedural Steps

i. Wash and clean all articles and replace these at respective place.
ii. Wash hands properly.
iii. Record the findings of assessment of newborn in dairy.

Points to Remember

- Prior to assessment, verbal consent of parents (preferably mother) should be taken.
- Illustrate the procedure to the mother to gain her confidence.

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- ❖ Ensure that neonate is breastfed before assessment.
- ❖ Avoid unnecessary exposure of the neonate to outer environment.
- ❖ Hands should be warmed before touching the baby.
- ❖ Avoid assessment after feeding.

Checklist for Newborn Assessment

Sl. No.	Steps of procedure	Yes	No	Remarks
1.	Self-introduction			
2.	Explain the procedure to the mother.			
3.	Place the home visiting bag in a safe place.			
4.	Wash hands and collects all necessary articles from bag and the mother.			
5.	Procedure steps:			
6.	Vital signs are checked.			
7.	Anthropometric measurements.			
8.	Head to toe examination (skin initially followed by head, face, eye, ear, nose, mouth, neck, chest, abdomen, spine, upper and lower extremities and genitalia).			
9.	Reflexes checking.			
10.	Evaluation of findings and share with the mother.			
11.	Making the baby comfortable.			
12.	Termination of the articles as per BMW.			
13.	Recording of the procedure.			

Total score: 13

Score range:
0–2 = poor
2–4 = below average.
5–6 = average
7–8 = good
9–10 = very good.

Signature of the student Signature of evaluator

■ CARE OF A LOW-BIRTH WEIGHT BABY

Low birth weight or LBW suggests neonates with birth weight of <2,500 grams. In India, nearly 28% infants born are LBW out of which 13% are preterm.

Even after retrieval from neonatal complications, some LBW babies may still susceptible to malnutrition, recurrent infections, and neurodevelopmental handicaps. Appropriate care of the LBW infants at home after discharge from hospital with adequate focus on feeding and nutrition can promote their survival.

Definition of low-birth-weight baby: When a baby is born, two parameters should be regarded namely birth weight and gestation: Birth weight of the baby (normally babies weigh more than 2,500 grams) (**Table 7.3**).

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Table 7.3: Type of LBW.

Sl. No.	Criteria	Weight of the baby
1.	LBW (low birth weight)	<2,500 grams
2.	VLBW (very low birth weight)	<1,500 grams
3.	VLBW (extremely low birth weight)	<1,000 grams

The gestation or the maturity of the baby:

- **Preterm (**<37 completed weeks): Preterm is defined as a baby born alive before 37 completed weeks of pregnancy.
- **Category of preterm:** The sub-categories based on gestational age are **(Table 7.4)**:

Table 7.4: Category of preterm.

Sl. No.	Category of preterm	Weeks of gestation
1.	Extremely preterm	<28 weeks
2.	Very preterm	28 to <32 weeks
3.	Moderate to late preterm	32 to <37 weeks

- **Term baby:** Who born between 37 and 41 weeks +6 days.
- **Post-term baby:** Who born ≥42 completed weeks.
- **Type of LBW:** Newborn baby can be LBW because of two reasons are as follows:
  1. **Prematurity:** Babies who born before 37 completed weeks of gestation.
  2. **Small for gestational age (SGA):** Babies with birth weight below the 10th percentile, as per gestational age and sex. 60% of LBW belongs to this category.

Keep in mind at a times, a LBW neonate may be both preterm as well as SGA. Intrauterine growth restriction denotes to a condition where a fetus has not arrived its growth potential. Though many apply the terms "small for gestational age" (SGA) and "intrauterine growth retardation" (IUGR) interchangeably, but they indicate to two subtly different populations. IUGR refers to diminish growth velocity in the fetus as recorded by at least two intrauterine growth assessments (e.g., a fetus that is "falling off" its own growth curve).

Risk factors for preterm delivery: There is no definite risk factor but some of the common responsible factors are as follows:

- History of a previous premature birth.
- Mother's age: <18 years and >35 years.
- Underweight or overweight before and during pregnancy.
- Multiple pregnancy.
- In vitro fertilization.
- Repeated miscarriages or abortions.
- Physical injury or trauma.
- Uterine, cervical or placental abnormalities.
- Substance abuse.
- Poor nutrition.
- Infections.
- Chronic conditions, such as high blood pressure and diabetes
- Stressful life events, such as the death of a loved one or domestic violence.

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Identification of a Preterm Baby

The gestational age of a baby can be calculated by LMP, antenatal sonography (especially 1st trimester), however gestational age calculation is also possible by doing a detailed physical and a neuromuscular examination. An illustrated scoring system like, expanded new Ballard score (ENBS) (Annexure 2) can be used for this purpose. The following are some of the physical parameters used in the gestational age assessment.

Physical Maturity

- **Skin:** The skin of preterm neonate is thin, transparent and gelatinous as compared to a term neonate is thick nongelatinous and keratinized.
- **Hair:** Preterm babies back have abundant growth of fine hair called lanugo. The hairy area turns bald as the gestation matures.
- **Ear cartilage:** The external ear or the pinna is soft and devoid of cartilage in preterm neonates. There is delayed recoil back promptly on being folded. In a term baby there is instant recoil.
- **Breast nodule:** In preterm neonate's breast nodule measures <5 mm and 5 mm or more in term babies.
- **Sole creases:** A deep transverse skin crease is seen in anterior one third of the sole in preterm neonates and in case of term neonates they are present over the anterior two thirds or over the entire sole.
- **External genitalia:** In case of males, the scrotum does not contain rugae and testes are not descended into the scrotum. In case of female infants, the labia are widely separated, not covering the labia minora, as a result clitoris become prominent.

Problems of LBW baby: A baby born too early faces a wide range of problems, because of immaturity of various organs, representing soon after birth or later during the neonatal period needing special attention of care. There are both short term and long-term complications of these baby during the SNCU stay and thereafter. Some complications lead to lifelong disability requiring long term follow-up.

The basic feature of the preterm LBW infant is immaturity of its organ systems. They are prone to experience:

- **Asphyxia:** Preterm neonates require additional resuscitative measures because of presence of a large body surface area, immature organ systems, fragile brain capillaries, weak chest muscles coupled with immature lungs and a frail immune system. Special skills including gentle handling of healthcare provider are necessary to avoid neurologic injury and heat loss. They require optimum oxygenation, give respiratory support and minimize infection during resuscitation of these vulnerable neonates.
- **Hypothermia:** Hypothermia is a distinct problem of preterm babies. So, they require special attention due to their large body surface area and decreased brown fat. The ambient temperature of the labor room should be at 26–28°C and make sure the maintenance of warm and gentle resuscitation, is mandatory for prevention of hypothermia.
- **Feeding difficulty:** There are immature oropharyngeal coordination and poor reflexes for feeding in preterm babies. They should be fed expressed breast milk if baby is not able to suck breastfeeding. This not only beneficial nutritionally but also immunologically and developmentally from breastmilk. That's why the mother requires extra support for expressing breast milk and the baby requires to be fed by using an orogastric tube, cup or Paladai. Neonates less than 31 weeks (or 1,200 grams), require to be gavage fed to prevent aspiration.

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At 34 weeks (1,800 grams), the suck-swallow-breathing co-ordination is improved and hence, babies >1,800 grams can be breastfed. Those weighing less than 1,800 grams but more than 1,200 grams can to be fed by Katori spoon/Paladai as they able to swallow but unable to suck at the breast. Some of the sick preterm babies and those who are extremely preterm need IV fluids initially.

- **Respiratory distress:** Because of physical immaturity of the lungs (deficiency of surfactant) preterm babies often represent with respiratory distress immediately after birth. They may also experience respiratory distress later due to hypothermia, pneumonia, late onset sepsis or metabolic problems like hypoglycemia, etc., special attention is to be taken while giving oxygen to these small babies to prevent further complications related to hyperoxia.
- **Metabolic problems:** The most common metabolic problem related with prematurity is hypoglycemia. By careful monitoring of blood glucose at specified intervals and giving appropriate fluids and feeds hypoglycemia can be prevented. Calcium and other electrolytes also required careful monitoring.
- **Infections:** The most important contributing factor for both early and late onset sepsis is prematurity. The best preventive strategies to decrease the occurrence of sepsis are:
  - Less invasive interventions.
  - Maintenance of temperature.
  - Least handling.
  - Improving breastfeeding.
  - Kangaroo mother care (KMC)
  - Maintenance adequate hand hygiene.
- **Jaundice:** Functional immaturity of the liver and other factors associated with prematurity increases the production of bilirubin and poor bilirubin conjugating capability resulting in high bilirubin levels. They are at risk of experiencing neuro-toxicity at lower bilirubin levels compared to term babies because of immaturity of the blood brain barrier. Frequent monitoring of bilirubin levels and timely initiation of phototherapy is necessary to overcome this problem.
- **Brain injury:** Babies who born before 28 weeks are at greater risk of bleeding in the brain, known as an intraventricular hemorrhage because of fragile capillaries. Most hemorrhages are mild and overcome with little short-term impact. But some babies experience larger bleeding which can cause permanent brain injury. To prevent the risk of occurrence of bleeds, fluids and drugs should be introduced slowly and sudden changes in blood pressure should be prevented. Minimal handling of these baby should be maintained.
- **Apnea of prematurity:** Preterm babies may develop apneic spells without any evident attributable cause because of immaturity of the respiratory center. Close observation and prompt action like stimulation, drugs or assisted ventilation may be necessary.
- **Anemia of prematurity:** Physiological anemia gets associated in preterm babies due to so many factors. It is essential to observe the hemoglobin levels and treat the anemia according to standard protocols.
- **Retinopathy of prematurity (ROP):** The immature retina of preterm babies is very vulnerable to oxidant damage. Oxygen levels should be scrupulously observed during respiratory therapy by using pulse oximetry and at no time should the saturation be more than 95%. This would assist to reduce oxidant damage and the chances of development of ROP, a major cause of blindness.

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- **Hearing loss:** The chances for sensorineural hearing loss increases as the gestation and birth weight decreases. Hearing loss can be occurred by ototoxic drugs like aminoglycosides and furosemide which are commonly given in preterm. Asphyxia, severe jaundice needing exchange transfusion, prolonged ventilator support (>5 days), sepsis and meningitis are all important risk factors of sensorineural hearing loss. All preterm babies have to undergo hearing screening at specified times.
- **Others:** A few babies experience other long-term complications like cerebral palsy, impaired cognitive skills, behavioral and psychological problems, chronic health issues, etc. It is very important to follow up these babies to identify and treat disabilities as early as possible.

Problem of SGA neonates: The main underlying problem amongst them is in-utero undernutrition and hypoxia. They are more susceptible to:

- Fetal distress, meconium passage in utero and perinatal asphyxia.
- Polycythemia.
- Hypothermia.
- Hypoglycemia.
- Congenital malformations.

MANAGEMENT OF LBW BABIES

- **Delivery of LBW babies:** Ideally, the delivery of an anticipated LBW baby should be done in a hospital with recognized newborn care facilities. The in-utero transfer of an LBW fetus is far more desirable, convenient and safe than transport after birth.

  Deciding the place where a LBW baby should be managed:

  A. **LBW babies weighing >1,800 grams (>34 weeks):** These babies are transferred with the mother in postnatal care area. However, they are given with extra assistance and monitoring. The mothers of these babies are counseled and educated on a regular basis by the healthcare provider, doctor or Yashoda (Mother's aide). The training of mother during her stay should include:
     - Kangaroo mother care (KMC) and assessment of temperature by touch technique.
     - Breastfeeding and expression of milk.
     - LBW feeding (content and technique)
     - Recognition/reporting of danger signs
     - Inputs into all her queries related to care of a LBW baby.

     Once the mother and the family become confident and the health worker has evaluated the knowledge and practice personally, the LBW baby can be discharged and managed at home. A baby who is not able to feed from the breast or Katori spoon or is sick should be immediately admitted to the SNGU/NBSU.

  B. **LBW babies <1,800 grams (34 weeks):** These babies should be closely observed and cared for in the SNCU, till they can be given to the mother side. The period of staying in the SNCU may be for a very short or for several days based on the sickness level of the baby.

Keeping LBW Babies Warm

- **At home:**
  - Baby should be cared next to the mother and the room should be kept warm.
  - If the room is not warm enough, the baby should be made to wear 2–3 layers of clothes, cap and socks and covered well in a blanket.

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- The mother should be demonstrated how to observe the baby for cold stress by hand touch.
- If the baby in cold stress should be provided additional warmth as soon.

❖ **In the hospital:**
- Apart from the above mentioned methods, the baby should be placed under the overhead radiant warmer or incubator to keep the baby warm.
- At least once every 6–8 hours, regular checking of axillary temperature should be performed in all hospitalized babies.

❖ **Nutrition and fluids:**
- Enteral feeds should be started as soon as clinically appropriate in all stable LBW babies.
- During planning of feeding of the LBW baby, healthcare providers should consider the following:
  a. Feeding type.
  b. Feeding quantity.
  c. Frequency of feeding
  d. Modality of feeding that is appropriate for the baby.

BREASTFEEDING

It is a well-accepted fact that the best milk for a neonate is the breast milk, as it supplies optimal nutrition to the baby. Exclusive breastfeeding helps to prevent 13% of under five deaths globally each year. Early initiation of breastfeeding within the first hour of birth along with exclusive breastfeeding can cut down 22% of all newborn deaths. To create an enabling environment for improving and supporting breastfeeding, Government of India has launched 'Mother's Absolute Affection (MAA) program in the country.

Advantages of Breastfeeding

A. Benefits to the Newborn

❖ It provides optimum nutrition for growth and development of the neonate.
❖ It gives protection against infection: It is called first immunization of the newborn.
❖ It is easily available at an appropriate temperature.
❖ It is easily digested.
❖ It provides protection against allergies, including eczema and asthma.
❖ It increases emotional bonding between mother and baby.
❖ It is found that breastfed babies have a higher IQ than the nonbreastfeed baby.
❖ Breastfed babies have at lower risk of developing hypertension, diabetes mellitus, coronary heart disease, and even cancer in later life.

B. Benefits to the Mother

❖ It facilitates the process of involution of uterus, lowering chances of postpartum hemorrhage.
❖ It assists in delaying the next pregnancy by giving almost 98% protection against conception when the baby is exclusively breastfed even in the night during the first four months of life.
❖ It reduces the chances of developing breast and ovarian cancer in the mother.
❖ It minimizes the mother's workload by saving time of preparation of artificial food.

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C. Benefits to the Family and Society

- ❖ It is more economical than artificial feeding by preventing buying cost of artificial food and also by saving fuel expenditure.
- ❖ It improves family planning.
- ❖ It reduces the chances of infection in infants and the need for their hospitalization is also reduced.
- ❖ It confers in reduction of infant morbidity and mortality.

Colostrum: Colostrum is the breast milk that produces in the first few days after delivery by mother. The **characteristics of colostrum** are as follows:

- ❖ It is thick and yellowish in color.
- ❖ It accommodates more antibodies, white blood cells and other anti-infective proteins as compared to mature milk. These anti-infective proteins and white cells give the first immunization against diseases that a baby is likely to be exposed after delivery.
- ❖ Colostrum has a mild purgative effect, which assists to clear the baby's gut of meconium. This exits bilirubin from the gut and also aids to minimize hyperbilirubinemia.

Recommended breastfeeding practices: Recommended breastfeeding practices are discussed below:

- ❖ Initiate breastfeeding soon after (within half to one hour) birth.
- ❖ Do not given prelacteal feeds (ghutti, gripe water, honey or any other milk). This will lower the breast milk intake by the baby.
- ❖ Make sure exclusive breastfeeding during first 6 months of life (feeding only breast milk and medications if needed).
- ❖ Provide on-demand breastfeed to the baby day and night at least 8 times or more per day. Let the baby to feed at one breast till the baby finishes sucking and releases the breast. Then offer her/him the other breast if the baby wants more. If the baby unwilling to feed from this breast now, then offer this breast first at the next feeding session.
- ❖ The adequacy of milk intake may be evaluated by counting the number of wet diapers per day (6–8 times/day), and weight gain (20–30 grams a day in 1st 3–4 months after replacing birth weight).
- ❖ Start complementary foods after 6 months of age.
- ❖ Continue breastfeeding up to 2 years of age or beyond.

■ EXCLUSIVE BREASTFEEDING TECHNIQUE AND POSITION

Breastfeeding is natural process and most of the mothers can feed without facing any problem. There are so many ways to breastfeed and each mother adopts her own style to suit her baby. But few mothers require some assistance for making position and attachment of the baby to the breast. For production of adequate milk in a mother, her baby needs suck often enough, and must also suck in the right way. During pregnancy period, antenatal counseling and inspecting the mother's breasts and nipples assists the mother to develop her capability to breastfeed successfully and also have to find out mothers who may need some extra help.

Breast milk is the ideal and an essential food for newborn baby. Exclusive breastfeeding should be continued up to 6 months of age of the infant.

Correct positioning: Correct positioning of the both mother and baby is essential as it will ensure correct attachment and effective sucking and minimize sore nipples and breast engorgement.

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A. Position of the baby: Appropriate position of the baby while breastfeeding should ensure that:

- ❖ Baby's body is well supported.
- ❖ The head, neck and the body of the baby are placed in the same plane.
- ❖ Entire body of the baby turns in the mother side.
- ❖ Baby's abdomen touches mother's abdomen.



Fig. 7.8: Good attachment.

B. Position of the mother: The position of the mother will be:

- ❖ Mother will relax, tension free as it hinders the breast milk secretion.
- ❖ Mother will sit with a back support.
- ❖ Mother will only engage for giving breastfeed, at that time she has no work.
- ❖ Mother will attentive to her baby and hold the baby in a way so that baby's abdomen and her abdomen will touches and observe the baby's sucking process.

Sign of good attachment: Four signs of good attachment are as follows **(Fig. 7.8)**:

i. Baby's mouth wide open.
ii. Lower lip turned outwards.
iii. Baby's chin touches mother's breast.
iv. Majority of areola inside the baby's mouth.

Effective sucking: Sucking is called effective when the following criteria are seen:

- ❖ Slow sucking,
- ❖ Deep sucking,
- ❖ Sometimes pausing,
- ❖ At last, hear the sound of swallowing.

If the infant is not sucking well, then observe for ulcers and white patches in the mouth (Thrush).



Fig. 7.9: Poor attachment.

Consequences of poor attachment: It is very essential to ensure good attachment because poor attachment results in the following **(Fig. 7.9)**:

- ❖ Pain or injure to nipple causes sore nipples.
- ❖ If breast is not emptied that resulting breast engorgement.
- ❖ Supply of milk is poor that's why baby is not satisfied and is irritable after feeding.
- ❖ Mother secrets less amount of milk leading a frustrated baby who rejects to suck. As a result, there is poor weight gain.

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Purpose:

- To get ready the women for breastfeeding.
- To initiate emotional bonding between the mother and baby.
- To supply essential nutrient to the newborn.
- To assist in mother's comfort.
- To overcome minor defects of the breast.

Breastfeeding Position

Breastfeeding is a natural process from time immoral. The mother and baby are naturally ready to accept each other's need. There are some positions of breastfeeding to assist newly mother to feed her baby accurately:

- **The cradle position:** Advised the mother to use pillows behind her back and shoulders, under the elbow of the arm for making her comfortable when she will hold the baby in her lap to support baby's weight. Ask the mother to holds the baby safe and securely, with his head lying on her forearm or in the crook of her arm, whichever is more comfortable to her. Baby's back is kept up by her forearm and her hand cups the baby's buttocks or thigh. The baby should be placed on his side with his knee attracted in close to his mother. Baby should not have to rotate his head to take the breast. If the baby were naked, his umbilicus would be invisible. His ear, shoulder and hip should be in a straight line. The baby's bottom arm can be placed either under the mother's breast or surrounded by her waist based on which is easier and more comfortable.
- **The football or clutch position:** Advised the mother place a pillow behind her shoulders and firm pillows at her side to lift the baby up to the level of her breast. The baby faces the mother while his body is surrounded under her arm along her side. The baby's bottom lies on the pillow near the mother's elbow with the hips against the back of the chair, sofa, or against the wall, if she is sitting up in bed. The baby's upper back lies along his mother's forearm while she holds his neck with her hand.
- **The cross-cradle position:** When cross cradling position is used, the baby is tummy to tummy with mother, surrounded by a pillow across mother's lap to assist baby to lift up to nipple level. When mother is getting ready to latch on baby, it is most important that baby's mouth is very close to the nipple from the start. If mother is thinking to breastfeed on the left breast, she holds the baby with the fingers of her right hand lay down loosely behind the baby's ears and neck. The baby lies in the web between the thumb, index finger and palm of mother's hand which is creating a "second neck" for baby. This assists in fixing baby's head and neck. She has the palm of her hand lay down between the baby's shoulder blades. When baby opens his mouth wide, the mother moves with the palm of her hand from between the shoulder blades not with the fingers behind the neck. This assist to put forward the chin into the breast slightly before the nose, which indicates the nipple towards the roof of baby's mouth. As the nipple graze the juncture of baby's hard and soft palates, it extracts baby's suck.
- **The side-lying position:** In this position, the mother lies on her side. To make her position comfortable, she can place pillows under her head, behind her back and under the knee of her upper leg. Her body is to be at an angle to the bed as she inclines slightly backward into the pillow behind her back. The baby is on his side facing his mother with his back lying against his mother's forearm and his knees attracted in close to his mother. A folded towel or a rolled receiving blanket, or a small pillow may require to be supported behind his back to place the baby on his side facing his mother.

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PROCEDURE FOR MANUAL EXPRESSION OF BREAST MILK (EBM)

When baby is unable to suck breast due to illness at that time expressed breast milk was needed to feed the baby.

Situation required breast milk expression: Breast milk expression is required in the following situations:

- ❖ To continue milk production and for feeding the premature, low birth weight or sick baby and who is not able breast feed.
- ❖ Working mothers, who plan to join to work can express the milk in advance and preserve it for providing exclusive breastmilk feeding for their babies.
- ❖ To prevent breast engorgement.

Storage of expressed breast milk:

a. The container should be washed thoroughly with soap and water.
b. The container of expressed breast milk (EBM) should be covered.
c. EBM should be store at room temperature for 8 hours, and in the refrigerator for 24 hours.



ARTICLES REQUIRED

Sl. No.	Articles required	Purpose
1.	Articles of hand washing.	To wash the hand.
2.	A sterile small bowl with one spoon.	To collect expressed breast milk.
3.	Boil water in a bowl.	To provide compression to the breast.
4.	Gauze piece or old clean cloth.	To give compression to the breast.
5.	Cotton swab or clean cotton cloth.	To wipe and dry the nipple.
6.	Kidney tray with paper lining.	To collect waste.



PROCEDURE

Sl. No.	Steps of procedure	Rational
1.	Place the newspaper and keep the bag on it.	To prevent contamination
2.	Collect history from the client and family members.	To identify the health problems.
3.	After identifying the health problems, explain procedure to the client and family member.	To get cooperation.
4.	Bring hand-washing articles and a piece of newspaper or plastic sheet.	To minimize the infection.
5.	Ask the family members for hot water and piece of cloth before going to hand washing.	To give back care and to dry the skin.
6.	After washing hand, open the bag and bring necessary articles on the paper.	To render care to the client.
7.	Instruct mother to sit on a chair comfortably.	To aid in better compression.
8.	Provide hot compress to the breast with the help of cotton or cloth.	To help in secretion of breast milk.

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Contd...

9.	If engorgement is present massage the breast from base to nipple line in a circular way.	To provide relief to the mother.
10.	Squeeze the breast by pressing with thumb and other finger in towards the body to express breast milk.	To collect EBM.
11.	Collect EBM in a sterile small bowl with cover.	To feed the baby as and when required.
12.	Give feeding the baby with a spoon.	To meet the nutritional need of the baby.
13.	Discard the bowl of water.	To keep the bowl clean.
14.	Wash the hand and dry.	To prevent cross infection.
15.	Document the procedure.	To keep the record.
16.	Replace the articles in the bag and zipped it.	To keep ready the bag for next visit.
17.	After giving thanks to the client and family members, leave the house.	To get cooperation in follow up visit.

Care of a Breast

There are so many conditions arises regarding breast, and it leads to breastfeeding problems. Normally no care is required for breast, only keep the breast clean with plain water. But in the following mentioned situations, it requires care.

A. **Inverted/flat nipples:** Flat or short nipples which protract well (become prominent or pull out easily) may not affecting in breastfeeding. Inverted or retracted nipples lead to difficulty in attachment to the breast.
   This condition has to be identified in the antenatal period. These mothers require additional support to feed their babies.

B. **Sore nipple:** Due to incorrect attachment of the baby to the breast, sore nipple is occurred. A baby who only sucks at the nipple does not receiving enough milk so he sucks more vigorously resulting in a sore nipple. Frequently washed with soap and water as well as detach the baby from the breast while he is still sucking may also lead in a sore nipple. Sore nipple is also developed due to candida infection.
   Treatment comprises of correct positioning and attachment of the baby to the breast. Hind milk should be used to the nipple after a feed and the nipples should be aired, to allow healing in between feeds. If fungal infection is diagnosed, treat with antifungal medication.

C. **Breast engorgement:** The milk secretion 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, milk stores in the alveoli. In such case breast becomes swollen, hard, warm and painful and is called as an engorged breast.
   Treatment: Breast engorgement can be avoided by early and frequent feeding and correct attachment of the baby to the breast. Treatment consists of local warm water packs and analgesics (Paracetamol) to the mother to get relieve pain. Milk should be gently expressed to soften the breast and then the mother must be assisted to correctly attach the baby to the breast.

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D. **Breast abscess:** If a congested, engorged breast, an infected cracked nipple, or a blocked duct and mastitis are not attended in the early stages, then an infected breast segment may develop a breast abscess. The mother may also have high grade fever and an elevated blood count.
Treatment: Mother must have to treat with antibiotics and analgesics. The abscess needs to be incised and drained. Breastfeeding must be continued from the other breast.

E. **Reduced milk supply or not enough milk:** Many mothers complain that they do not have enough milk. Common factors of reduced milk supply or not enough milk include not breastfeeding often enough, to short or hurried breastfeeds, poor attachment, poor oxytocin reflex, breast engorgement or mastitis.
Mother have to counseled that there is enough milk if the following criteria are present:
- The baby is gaining weight adequately.
- Passing urine 6–8 times/day
- Sleeping for 2–3 hours after each feed.

Treatment: If baby is not gaining weight adequately, ask the mother to feed the baby more frequently and feed especially during the night. Mother also advised to take extra calory in her diet. Ensure the mother that attachment is adequate. If any painful condition is present in the mother such as sore nipple, mastitis should be managed and treated promptly. Back massage is especially helpful for stimulating lactation. Advice KMC for LBW babies.

BREASTFEEDING IN PRETERM AND LBW BABIES

The capability of an infant to breastfeed based on the suck, swallow, and breathing coordination of the innate reflexes. The coordination of suck, swallow and breathe actions is activating at 34–35 weeks. The unique composition of preterm milk with higher concentration of proteins, calories, and protective substances make it particularly be acceptable and recommended for preterm babies. Mother must initiate expression within 6 hours of delivery and repeat 8–10 times per day to continue milk production and to feed the baby. Mother has to be encouraged to visit, touch, and care for her baby as often as possible. The baby has to be placed to the breast every 2–3 hours for feeding or nonnutritive sucking. The mother requires extra support for accepting breastfeeding in preterm and LBW babies.

Ten Steps for Successful Breastfeeding by WHO (Fig. 7.10)

Every facility including maternity and newborn care services should execute ten steps for successful breastfeeding:

1. **Hospital policies:** Hospital has to support mothers to breast feed by:
   - Not promoting infant formula, bottles and teats.
   - Making breastfeeding care standard practice.
2. **Staff competency:** Hospital has to support mothers to breast feed by:
   - Training staff on supporting mothers to breastfeed.
   - Assessing heath workers' knowledge.
3. **Antenatal care:** Hospital has to support mothers to breast feed by:
   - Discussing the importance of breastfeeding for babies and mothers.
   - Preparing women how to feed their baby.
4. **Care right after birth:** Hospital has to support mothers to breast feed by:
   - Encouraging skin to skin contact between mother and baby soon after birth.
   - Helping mothers to put their baby to the breast right away.

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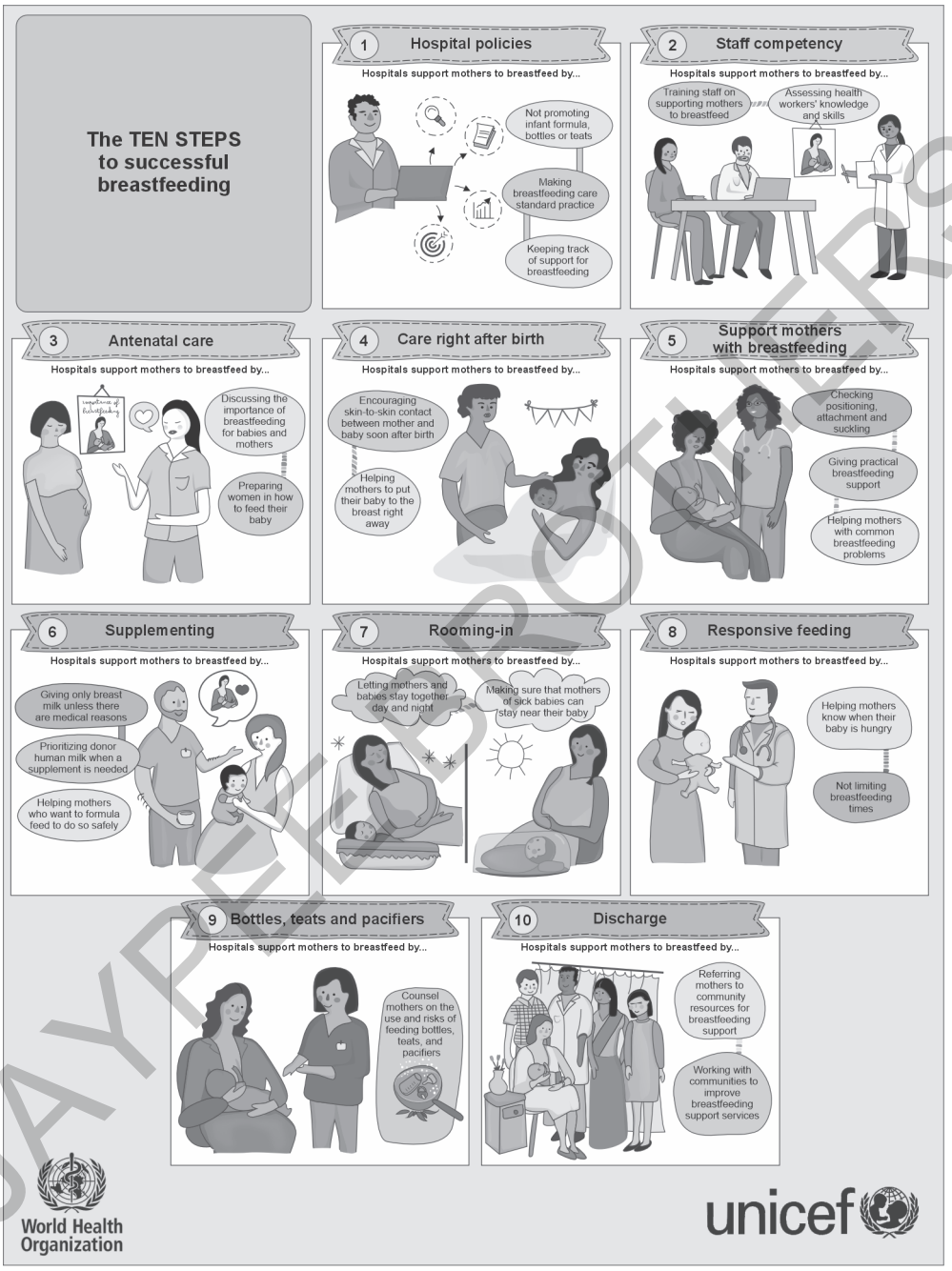

Fig. 7.10: Ten steps of successful breastfeeding.

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- **Support mothers with breastfeeding:** Hospital has to support mothers to breast feed by:
  - Checking positioning, attachment and sucking.
  - Giving practical breastfeeding support.
- **Supplementing:** Hospital has to support mothers to breast feed by:
  - Giving only breast milk unless there are medical reason.
  - Prioritizing donor human milk when a supplement is needed.
  - Helping mothers who want to do formula feed to do so safety.
- **Rooming in:** Hospital has to support mothers to breast feed by:
  - Letting mothers and babies stay together day and night.
  - Making sure that mothers of sick babies can stay near their baby.
- **Response feeding:** Hospital has to support mothers to breast feed by:
  - Helping mothers know when their baby is hungry.
  - Not limiting breastfeeding times.
- **Bottles, teats and pacifiers:** Hospital has to support mothers to breast feed by:
  - Counsel mothers on the use and risk of feeding bottles, teats and pacifiers.
- **Discharge:** Hospital has to support mothers to breast feed by:
  - Referring mother to community resources for breastfeeding support.
  - Working with communities to improve breastfeeding support services.

Critical Management Procedures

- Comply fully with the International Code of Marketing of Breast-milk Substitutes and relevant World Health Assembly resolutions.
- Have a written infant feeding policy that is routinely communicated to staff and parents.
- Establish ongoing monitoring and data-management systems.
- Ensure that staff have sufficient knowledge, competence and skills to support breastfeeding.

Key Clinical Practices

- Describe the importance and management of breastfeeding with pregnant women and their family members.
- Facilitate immediate and uninterrupted skin-to-skin contact and support mothers to start breastfeeding immediately after birth.
- Support mothers to start and continue breastfeeding and manage common difficulties.
- Do not give any food or fluids other than breast milk, unless medically indicated to the breastfed newborns.
- Help mothers and their infants to remain together and to practice rooming-in 24 hours a day.
- Assist mothers to identify and respond to their infants' cues for feeding.
- Advise mothers on the use and problems of feeding battles, teats and pacifiers.
- Coordinate discharge so that parents and their infants have timely fit to ongoing support and care.

MAINTENANCE OF TEMPERATURE OF NEWBORN

Maintenance of warmth is important to prevent heat loss or hypothermia in a newborn baby. It is the cardinal principles of newborn care. Hypothermia may lead to hypoglycemia, bleeding diathesis, pulmonary hemorrhage, acidosis, apnea, respiratory failure, shock and at last death may also occur. So, healthcare provider whether it is in hospital setting or community setting must know how to maintain warm chain to reduce neonatal deaths.

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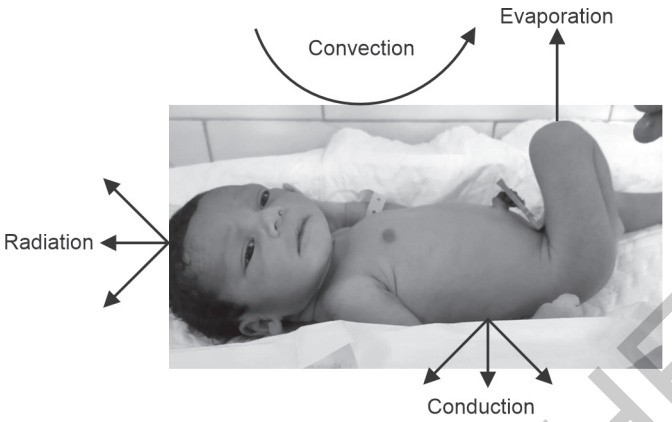

Fig. 7.11: Process of heat loss of a newborn.

Mechanism of heat loss in a newborn: The heat loss of a newborn has occurred in the following way (**Fig. 7.11**):

- **Conduction:** Conduction (by coming in contact with cold objects—cloth, tray, etc.)
- **Convention:** Convection (by air currents in which cold air replaces warm air around baby—open window, fans).
- **Radiation:** Radiation (to colder solid objects in vicinity—walls).
- **Evaporation:** Newborn loses heat by evaporation (particularly soon after birth due to evaporation of amniotic fluid from skin surface).

The process of heat gain is by conduction, convection and radiation.

Cause of occurrence of hypothermia in newborn:

- Larger body surface area.
- Decreased thermal insulation because lack of subcutaneous fat (LBW infant).
- Reduced amount of brown fat (LBW infant).
- Lack of shivering.

Concept of warm chain: The baby must be kept warm at all times right from birth in order to avoid the heat loss which can happen in a newborn after delivery. Regulation of temperature requires both prevention of heat loss and promotion of heat gain. The "warm chain" is a set of 10 interlinked interventions executed at birth and later, which will prevent hypothermia in all newborns.

1. Warm delivery room (26–28°C).
2. Warm resuscitation.
3. Immediate drying after birth and removal of wet linen.
4. Skin-to-skin contact between baby and the mother.
5. Breastfeeding.
6. Stop bathing and weighing.
7. Adequate and appropriate clothing and bedding.
8. Keep mother and baby together.
9. Warm transportation.
10. Awareness raising of healthcare provider.

Meaning of hypothermia: Normal axillary temperature is 36.5–37.5°C (97.7–99.5°F). In case of hypothermia the temperature is below 36.5°C.

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Grading of Hypothermia (Table 7.5)

Table 7.5: Grading of hypothermia.

Sl. No.	Grading	Temperature range
1.	Cold stress	36.4–36.0°C (97.5–96.8°F)
2.	Moderate hypothermia	35.9–32.0°C (96.2–89.6°F)
3.	Severe hypothermia	<32°C (89.6°F)

Temperature recording: Methods of assessment of temperature in a newborn are as follows:

A. **Axillary temperature:** Axillary temperature is as good as rectal and safer (less risk of injury or infection).
   Digital thermometer: A digital thermometer requires to be switched on for recording the temperature.
   Temperature is assessed by keeping the bulb of thermometer against the roof of dry axilla, free from moisture. Baby's arm is kept close to the body to keep the thermometer in place. The reading of temperature is taken when the thermometer beeps.

B. **Skin temperature:** In a baby is being nursed under a radiant warmer, the baby's temperature is usually assessed by a thermistor probe. The thermistor probe is connected to the skin over the right upper abdomen. The thermistor perceives the skin temperature and shows it on the panel.

C. **Human touch:** Baby's temperature can be observed with reasonable precision by human touch with the dorsum of the hand, and its reliability can be increased by training. Abdominal temperature is representing the core temperature and is reliable in the diagnosis of hypothermia. By touch, we can interpret the findings in the following way and mother also instructed to follow this at home in absence of a thermometer:
   - Warm and pink feet: Indicates thermal comfort.
   - Feet cold, abdomen warm: Indicates cold stress.
   - Both feet and abdomen cold: Indicates moderate to severe hypothermia.

Clinical signs and symptoms of hypothermia: The common signs and symptoms in a hypothermic baby are as follows:

- ❖ Lethargy.
- ❖ Irritability.
- ❖ Poor feeding.
- ❖ Poor weight gain
- ❖ Breathing difficulty (tachypnea/apnea).
- ❖ Severe hypothermia may manifest with hypoglycemia, sclerema, DIC and internal bleeding.

Prevention and management of hypothermia: In the following situations, hypothermia can happen:

- ❖ At birth (delivery room).
- ❖ While changing of nappy/clothes.
- ❖ Malfunctioning of heat source or keep away the baby from a heat source.
- ❖ During transportation of a sick baby

KANGAROO MOTHER CARE

Kangaroo mother care (KMC) is a technique applied to keep the low birth weight (LBW) babies warm. The neonate is hold in skin-to-skin contact with mother or any other adult caretaker.

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Kangaroo mother care should be provided to all LBW babies whenever and wherever possible and for as long as possible.

Advantages of KMC: Advantages of KMC are as follows:
- ❖ It provides better thermal protection to neonates.
- ❖ It helps in increasing production of milk.
- ❖ It assists in increasing the exclusive breastfeeding rates at discharge and at 1–3 months follow-up.
- ❖ It lowers respiratory tract and nosocomial infections.
- ❖ It improves weight, length and head circumference of the baby.
- ❖ It promotes emotional bonding.
- ❖ It decreases hospital stay.
- ❖ It lessens risk of mortality.
- ❖ It promotes growth and optimum long-term neurodevelopment.

Eligibility criteria for KMC:
- ❖ Mother/father
- ❖ Any adult caretaker who is willing, free of illness and maintains a good hygiene can provide KMC.

Baby: KMC can be started immediately after birth in all babies except those who are clinically not stable. If the babies are on oxygen therapy, IV fluids and tube feeding, even CAP are not contraindications to KMC **(Fig. 7.12)**.

Technique and position
- ❖ Information given to the mother concerning KMC.
- ❖ Maintain privacy and instruct her to sit or recline comfortably.
- ❖ Keep the baby between the breasts of the mother in skin to skin contact in upright position.
- ❖ Rotate the head to one side to avoid airway obstruction.
- ❖ Slight extended position of the head advantageous for eye contact with the mother.
- ❖ Make sure that the abdomen of the baby is in close proximity to the epigastrium of the mother.



Fig. 7.12: Kangaroo mother care.

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- Regular respiratory movements of mother help to avoid the occurrence of apnea.
- The hips of the baby should be flexed and the bottom of the baby should be hold up, in this way the baby clings to the mother in a frog-like position.
- Twins can also be given KMC at the same time.

Clothing for the mother and baby during KMC

- **For mother:** The mother can wear whatever she has choose comfortable depending on the environmental temperature prevailing at that time. But she should keep in mind that the given dress accommodates the baby, i.e., place the baby comfortably in contact with her skin.
- **For baby:** The baby has to only wear diaper, cap and shocks. The baby will be placed naked in Kangaroo position, except this.

Duration of KMC:

- KMC will be rendered for as long as possible.
- Each session will be for a duration of at least 1 hour.
- KMC may be continued until the baby identifies in comfortable.
- KMC duration will be counted as cumulative completed hours during a 24-hour period, is termed as short (4 hours), extended (5–8 hours), long (9–12 hours), and continuous (more than 12 hours).

Discontinuation of KMC: KMC may be stopped or discontinued, when the baby in KMC wriggles, pulls limbs out or cries.

Management of hypothermia: For the management purpose, WHO classifies hypothermia as:

- Mild hypothermia (35.5–36.4°C)
- Significant hypothermia (<35.5°C).

Management of Mild Hypothermia (35.5–36.4°C)

- Skin to skin contact is the best method to re-warm a baby with mild hypothermia.
- If KMC is not possible, warm the room by using room heater or other appropriate heating device.
- Cover the baby adequately and make sure to replace the cold clothes of the baby with warm clothes.
- Retain the room warm (26–28°C) and draught free.
- Breastfeeding is to be continued.
- While rewarming, observe temperature and capillary filling time.
- Examine baby for apnea and hypoglycemia.
- Observe axillary temperature every ½ hour till it arrives at 36.5°C, then hourly for next 4 hours, 2 hourly for 12 hours, thereafter once per nursing shift as a routine.
- Most of the babies will retrieve their normal temperature. However, if the baby continue to exist hypothermic state after 1 hour of supervised KMC, or if danger signs reveal at any stage of monitoring the baby, sepsis should be presumed and treated accordingly.

Wrapping the baby:

- Make the baby comfortable and clothed in multiple layers.
- Covered head with a cap and the baby should then be draped in 1–2 layers of sheets/blankets.

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Management of Significant Hypothermia (Temp <35.5°C)

- Detach cold clothes from the baby and replace with warm cotton clothes.
- Keep the baby under radiant warmer with clothes including cap, socks and mittens.
- Every 15–30 minutes observe temperature.
- Observe BP, heart rate, temperature and glucose.
- The baby should be stabilized prior to being transferred in case he/she requires to be referred to a higher center.
- Following additional steps may be necessary in some babies:
  - Continue breastfeeding. If baby is not able to breast feed, provided EBM through Paladai/gavage.
  - If baby has developed vomiting or feeding intolerance, initiate IV fluids.
  - If perfusion is poor, provide 10 mL/kg of normal saline.
  - Administer Inj. Vit. K1.
  - Give oxygen if necessary and maintain O_2 saturation between 91 and 95%.

Fever

Fever (temperature above 37.5°C) may be due to an environmental cause or it may be a sign of infection (usually in a term neonate). In all febrile neonates, have to identify a possible infective focus.

Causes of hyperthermia:

- Too hot environment for the baby.
- If the baby is overdressed, covered the baby in too many layers of clothes, especially in hot, humid climate.
- Placing newborn too close to a heater/hot water bottle.
- Keeping baby under a heating device like radiant warmer, incubator, phototherapy, etc., that is not functioning adequately or is not monitored regularly.
- Sepsis.

Care of hyperthermia:

- During summer months, hyperthermia may happen because of raised environmental temperature. This can be managed by placing the baby into colder environment and clothing of the baby should be light cotton clothes.
- Keep the baby from the source of heat (heater, radiant warmer).
- Undressing and exposing the neonate to room temperature, when the body temperature of the baby is 37.5–39°C.
- If the temperature is above 39°C, the neonate has to be undressed and sponged with tepid water at approximately 35°C until the temperature is below 38°C. (avoiding use of cold or ice water for sponging).
- Provide frequent breast feeds to restore fluids. If the baby is not able to suck breast, give EBM by Katori spoon or gavage. If the baby feeds are not tolerated, intravenous fluids have to administer.
- Inspect the temperature hourly till it returns to normal.
- Identify presence of infection in a hyperthermic baby by the following:
  - Lethargy.
  - Excessive cry.

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- Seizures.
- Poor feeding.
- Persistent vomiting.
- Respiratory distress.
- Apneic attacks.
- Cyanosis.
- Bleeding from any site of the body.
- Pustules and
- Umbilical sepsis.

Discharge Advice and Follow Up

- ❖ At home, in term babies, make sure that the baby is appropriately covered, and breastfeeding is continued.
- ❖ In case of low birth weight and preterm babies, extra care is necessary to maintain the body temperature.
- ❖ KMC should be given to the baby. If this is not possible, the baby should be nursed by the mother, as the mother herself is a good source of warmth for the baby.
- ❖ The room where a LBW baby is nursed has to be kept warm.
- ❖ The baby has to be clothed well. Generally, two or three layers of clothes are necessary.
- ❖ If the room is not warm enough, the baby requires to be clothed in warm clothes (woolens) including socks, mittens and a cap. A blanket has to be also used to wrap the baby.

Care at home: The mother and the family should be counseled for care at home. They should be counseled regarding:

- ❖ Exclusive breastfeeding.
- ❖ Maintenance of warm of the baby at home.
- ❖ Identification of 'Danger signs' for seeking medical help.

TEMPERATURE RECORDING AND THERMAL CONTROL

Rationale

Temperature recording is a simple bedside tool to assess the baby's temperature and ascertain the degree of hypothermia.

Equipment and Other Requirements

- ❖ Digital thermometer.
- ❖ Cotton swabs and 70% isopropyl alcohol.
- ❖ Cotton sheet.
- ❖ A wrist watch.
- ❖ Mother or other caregiver to demonstrate Kangaroo care.

Components of Thermal Control

- ❖ Drying.
- ❖ Wrapping and covering the baby
- ❖ Recording temperature.
- ❖ Tactile assessment of temperature (cold stress assessment).
- ❖ Kangaroo mother care

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Procedure

- **Drying:** Make the baby dry from head to toe, back, front, axillae and groin and discard wet linen.
- **Wrapping:** Wrap the baby by applying a baby sheet. Spread the square sheet and fold one corner on itself-place baby's head on the enfolded 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 and at last cover over the shoulder and tuck on the right side.
- **Record temperature:**
  - Place the baby on supine or on the side.
  - Make sure that arm pit is dry. Switch on the digital thermometer.
  - Abduct arm at shoulder. Keep the bulb of the digital thermometer in the apex of the axilla.
  - Hold arm in adduction at shoulder and flexion at the elbow till hear a beep.
  - Remove thermometer and read temperature.
- **Tactile assessment of temperature**
  - Wash hands thoroughly.
  - Make them to dry.
  - Rub together and warm them.
  - With the dorsum of hands, touch the baby's soles and palms. Then touch the baby's chest by applying the dorsum of hands.
  - If both are warm-baby is normothermic, if periphery is cold but chest is warm-cold stress, if both are cold-baby is hypothermic.
- **Kangaroo mother care, and developmentally supportive care**
  - Advise mother for KMC and developmentally supportive care and take her consent for starting KMC.
  - Instruct mother or caretaker to put on a front open loose shirt or blouse.
  - Instruct the mother to sit in a semi reclining position in a chair or a bed.
  - Unbutton top 2–3 buttons and slip baby with only the napkin, socks and cap on, into the shirt. Make sure that skin to skin contact between baby and caretaker.
  - Baby should be in a frog like position with the head turned to one side and is kept between the mother's breasts.
  - Tie a belt or string at the belt level to avoid the baby from slipping down.
  - Cover the mother and baby duo with a woolen shawl or sheet.
  - Motivate mother for frequent breastfeeding.
  - Demonstrate positioning including nesting, swaddling and holding the baby.

Baby Weighing by Spring Balance

Birth weight is very important to evaluate the baby's condition whether baby have normal body weight or low birth weight as the low birth baby are more prone to disease condition and they need extra care. Baby's weight is the most important indicator to assess the growth and development of a body **(Fig. 7.13)**.



Fig. 7.13: Baby weighing by spring balance.

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Purpose

- To be orient with the birth weight of the baby.
- To observe normal growth and development of the baby.
- To find out any deviation from normal.
- To decide whether the baby is needed extra care or not.

Principles

- Fix the scale prior of taking weight.
- Weigh the baby with same cloth every day.
- Measure weight of the baby every day at the same time preferably prior to feeding.
- Take weight on the mother lap to avoid falling.
- Instruct the mother to put hand under the baby's body.



ARTICLES REQUIRED

Sl. No.	Articles	Purpose
1.	Articles of hand washing.	To wash the hand.
2.	Spring balance	To weigh the newborn.
3.	Sling or squire piece of cloth (preferably 75 cm).	To keep the newborn.
4.	Cotton swab	To clean the spring balance.
5.	Spirit bottle	To decontaminate articles.
6.	Paper bag	To discard waste.



PROCEDURE

Sl. No.	Steps of procedure	Rationale
1.	Place the newspaper and keep the bag on it.	To prevent contamination.
2.	Collect history from the client and family members.	To identify the health problems.
3.	After identifying the health problems, explain procedure to the client and family member.	To get cooperation.
4.	Bring hand-washing articles and a piece of newspaper or plastic sheet.	To minimize the infection.
5.	After washing hand, open the bag and bring necessary articles on the paper.	To render care to the client.
6.	Take a squire piece of cloth from mother or take sling from bag.	To keep the baby.
7.	Take off clothes of the baby or wear light clothes.	To get accurate measurement.
8.	Keep baby on the cloth pieces and give a knot diagonally two ends and on another knot over.	To make a bag to hang from spring balance.
9.	Hold the bag on mother lap and supporting one hand with another hand on spring balance.	To avoid any fall or injury.
10.	Measure weight from eye level.	To take accurate measurement.

Contd...

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Contd...

11.	Take off clothes and handed over baby to the mother	To give comfort to the baby.
12.	Take weight of the cloth and garments if any of the baby and deducted from measured weight.	To find accurate result.
13.	Clean the spring balance with spirit swab	To avoid cross infection.
14.	Ask family member, the place of pit for discarding the used cotton swab or burnt it.	To prevent contamination.
15.	Wash the hand and dry.	To prevent cross infection.
16.	Document the procedure.	To keep the record.
17.	Place the articles in the bag and zipped it.	To keep ready the bag for next visit.
18.	After giving thanks to the client and family members, leave the house.	To get cooperation in follow up visit.

NAPKIN CHANGING

Napkin changing is a procedure of baby to maintain cleanliness of the baby and to minimize infection from wet clothes.

Purpose

- To provide cleanliness to the baby.
- To give comfort.
- To prevent rash and allergy due to wet clothes.
- To reduce sore in buttocks.

Principles

- Prepare napkin with clean and old soft cotton cloth.
- Change wet napkin as early as possible it become soiled.
- Clean and wash the soiled napkin with soap and water.
- After washing, soak napkin in 5% Dettol lotion and dry in sunlight.
- Avoid drying the napkin in the ground level. It should be dried hanging from a row.
- Utilize one swab for one stroke.



ARTICLES REQUIRED

Sl. No.	Articles	Purpose
1.	Articles of hand washing.	To wash hand.
2.	One bowl with boiled water.	To dip and wet the swab.
3.	Cotton swab pocket or clean soft cotton cloth.	To clean the baby.
4.	Oil or powder according to season.	To give after cleaning.
5.	One set of napkin.	To replace the wet napkin
6.	Plastic sheet or rubber sheet	To protect bed from becoming soiled.
7.	A medium plastic bowl from home or kidney tray.	To keep used napkin.
8.	Paper bag	To discard waste.

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