



MODULE IV : NEONATAL RESUSCITATION

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

LEARNING OBJECTIVES

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

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

The components of the module include:

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

1. INTRODUCTION

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

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

2. WHAT IS ASPHYXIA?

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





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

3. WHICH BABIES ARE AT HIGHER RISK FOR ASPHYXIA?

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

Conditions predisposing baby to asphyxia

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

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

4. PREPARATION FOR NEWBORN RESUSCITATION

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

4.1 Warmth

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

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

4.2 Resuscitation place

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





NEONATAL RESUSCITATION SUPPLIES AND EQUIPMENT

Suction equipment

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

Bag and mask equipment

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

Intubation equipment

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

Medications

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

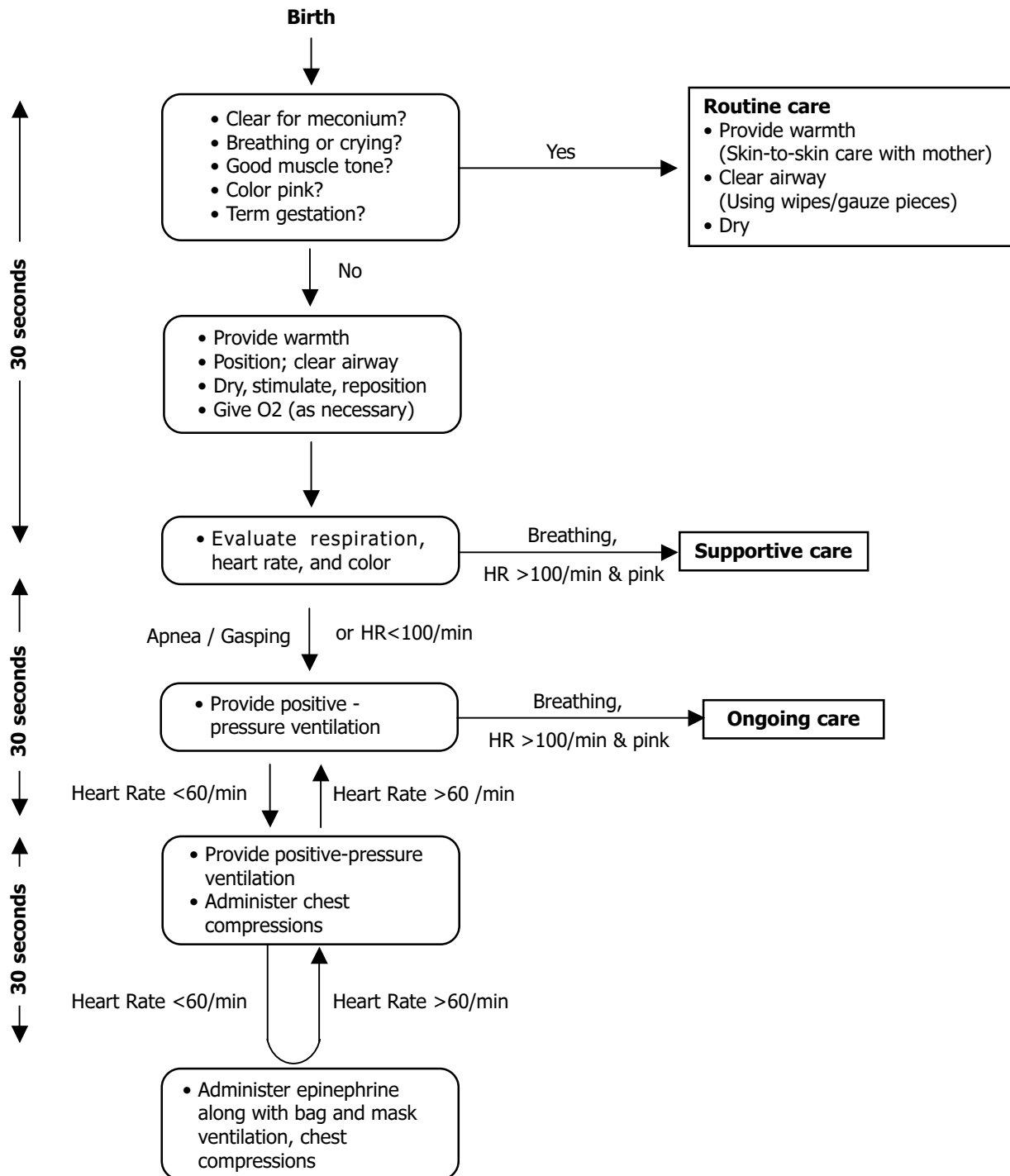
Miscellaneous

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





FLOW DIAGRAM FOR NEONATAL RESUSCITATION



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



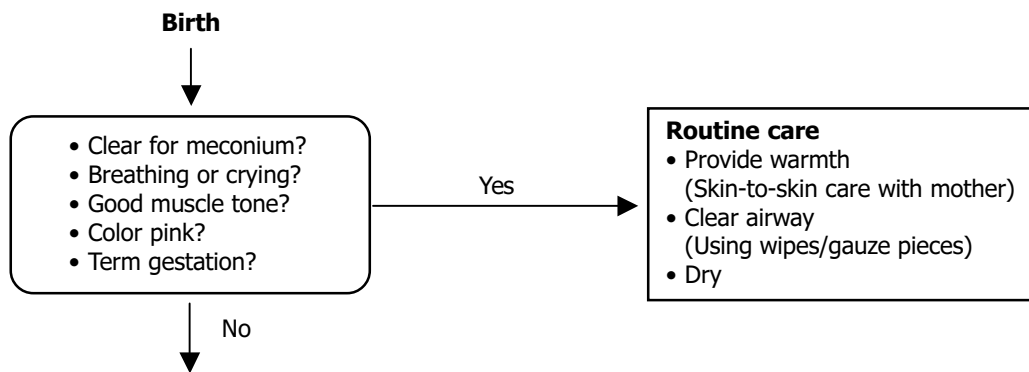


1. Routine Care

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

Assess for the five questions (refer to algorithm)

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



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





DEMONSTRATION

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

Routine Care

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

Initial Steps

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

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





2. INITIAL STEPS

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

2.1 Preventing heat loss

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

Following steps are undertaken for preventing heat loss :

2.1.1 Drying the infant

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

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

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

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

2.2 Positioning



Correct position of the head for ventilation





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

2.3 Suctioning

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

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

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

Inform skilled person for assistance in meconium stained amniotic fluid.

2.4 Evaluation

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

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

2.5 Providing tactile stimulation

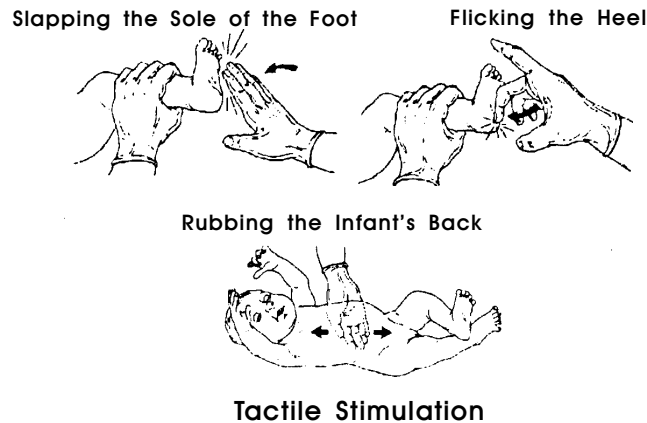
Both drying and suctioning the infant produce stimulation, which for many baby is enough to induce respirations.





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

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



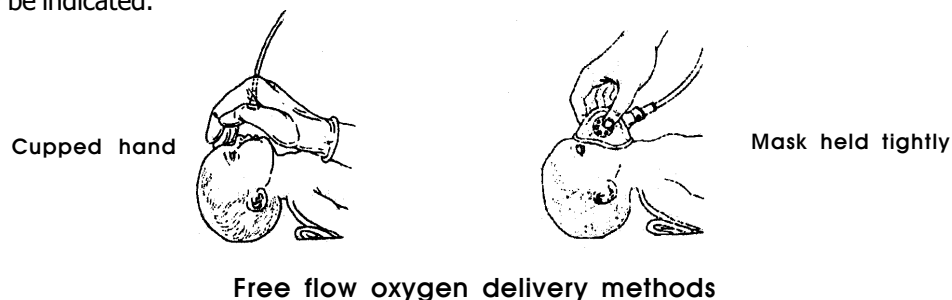
- One or two slaps or flicks to the soles of the feet or rubbing the back once or twice will usually stimulate breathing in an infant with apnea. However, if the infant remains apneic, tactile stimulation should be abandoned and bag and mask ventilation initiated immediately.
- Continued use of tactile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

Harmful ways of stimulation

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

2.6 Using free-flow oxygen

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



Free flow oxygen delivery methods





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

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

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

