2025

TRAINER'S MANUAL

NEONATAL RESUSCITATION

Professional Skill Development Centre
University of Health Sciences Lahore

EMERGENCY NEONATAL CARE
TRAINER'S MANUAL

UNIVERSITY OF HEALTH SCIENCES LAHORE

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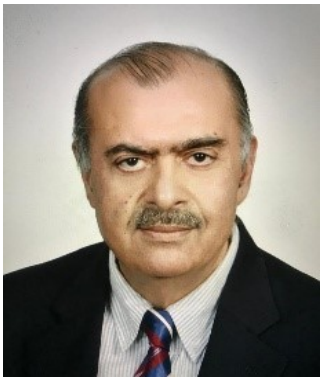
Welcome Messages



Prof. Ahsan Waheed Rathore
Vice Chancellor

It gives me great satisfaction to announce that the University Syndicate, in its 82nd meeting held on November 28, 2024, has approved the induction of mandatory training in six essential life support courses for all MBBS, BDS, Nursing, Pharmacy, and Allied Health Sciences students of the University of Health Sciences (UHS), Lahore. This strategic decision reflects our unwavering commitment to producing healthcare professionals who are not only academically competent but also proficient in delivery timely, lifesaving interventions.

The inclusion of these courses ranging from Cardiac First Response to Emergency Obstetrics and Neonatal Care underscores our recognition of the vital role that rapid and effective emergency response plays in healthcare delivery. These trainings will not only enhance the clinical competence of our graduates but also ensure they are better prepared to meet international standards of emergency care.

I commend the team at the Professional Skills Development Centre for meticulously preparing comprehensive training manuals for both students and instructors. I am confident that this initiative will prove to be a milestone in the transformation of healthcare education in Pakistan.

Prof. Nadia Naseem
Pro-Vice Chancellor

Healthcare professionals must be prepared to act swiftly and competently in emergency situations, where seconds can mean the difference between life and death. With this in mind, the University of Health Sciences has taken a significant step by mandating certified training in key life support skills for all students across our health sciences disciplines.

These manuals have been developed with careful attention to international standards and local needs, providing both students and trainers with structured, evidence-based guidance. They represent an important shift in our educational philosophy—one that prioritizes not only knowledge but also the ability to translate that knowledge into immediate, practical action.

I extend my appreciation to all those involved in the development of this initiative, and I urge our students and faculty to approach these courses with the seriousness and dedication they demand. Together, we can ensure that every UHS graduate is a confident and capable responder in any medical emergency.

Prof. Shane Knox

Director of Paramedics, National Ambulance Service College, Ireland

The National Ambulance Service College of Ireland has enjoyed a long-standing and productive partnership with the University of Health Sciences (UHS), spanning nearly two decades. Together, we have collaborated on numerous initiatives aimed at strengthening first response, emergency care, and pre-hospital services.

We are now proud to introduce our Emergency Neonatal Care programme, along with a suite of other life-saving short courses, for integration across the health sciences disciplines at UHS. These evidence-based programmes provide a vital foundation for all healthcare professionals, equipping them with essential skills to deliver effective and timely care.

This new initiative—guided by the leadership of UHS and coordinated through the Professional Development Centre—benefits from the expertise of its distinguished faculty and a robust quality assurance framework, both internal and external. As a result, it offers a world-class educational experience designed to meet the highest standards in healthcare training.

We are confident that these programmes will empower students to deliver exceptional care to the communities they serve. The Irish National Ambulance Service, together with our faculty members from both Pakistan and Ireland, is honoured to continue this collaboration with UHS, and we extend our best wishes for the successful delivery and uptake of these programmes..

Prof. Sarah Ghafoor

Director, Professional Skills Development Centre

The Professional Skills Development Centre (PSDC) at UHS is proud to lead the implementation of this landmark initiative—mandatory life support training for all students of MBBS, BDS, Nursing, Pharmacy, and Allied Health Sciences programs. These courses have been carefully curated to address critical areas of emergency care, ranging from cardiac and trauma response to neonatal and obstetric emergencies.

Each manual developed under this program is a product of extensive research, peer consultation, and alignment with global best practices. They are designed not only to build core competencies but also to instill confidence and readiness among our future healthcare providers.

Course Rationale and Overview

This course provides participants with the knowledge and skills they need to assess, recognize and care for neonates who require resuscitation to act quickly and confidently. The course emphasizes providing high-quality newborn resuscitation by integrating cognitive and psychomotor skills with critical thinking and problem solving to achieve the best possible patient outcomes.

Course Objectives:

It is the course facilitator responsibility to ensure that participant meets the following learning objectives.

Ensure understanding; Make sure participants understand the rationale behind each intervention and when to use them.

Demonstrate Techniques: Demonstrate proper techniques for various skills such as positive pressure ventilation (PPV) CPAP and other resuscitation steps.

Simulation Practice: Use simulation to practice and reinforce skills in a controlled environment

Provide feedback: Offer constructive feedback on techniques and decision-making during practice scenarios.

Encourage questions: Foster an environment where participants feel comfortable asking questions and discussing resuscitation strategies.

Course Outcomes

After completing the course, participants should be able to:

1. Demonstrate neonatal resuscitation skills, including providing initial steps of Positive Pressure Ventilation (PPV), corrective steps, chest compressions, and drug administration.
2. Perform both as a member and a leader of the team during newborn resuscitation.
3. Apply a systematic approach in evaluation and management of neonatal resuscitation.
4. Effectively recognize any special conditions due to which the neonate may require resuscitation.

Course Modules: The training is organized into Eight modules that progressively build skills (see Session Plan below). Each module includes interactive activities and emphasizes teamwork across disciplines.

Course Participants:

It includes professional health care providers who directly care for neonates in a variety of settings and who could be called on to resuscitate a new born,

- Paediatrician
- Emergency physician
- Other doctors:
    - Obstetrician
    - Anaesthetist

Instructor Qualification

Certified facilitators from among the following:

- Neonatologist
- Paediatrician
- Obstetrician
- Anaesthetist

9-Hour Session Plan

Below is a structured session plan for the 9-hour day. It allocates time for each module, including breaks and Group Practice:

Time	Module / Activity/Session	Facilitator
08:00– 08.20 (20 mins)	Registration and welcome	
0820 – 08:45 (25 min)	**Module 1**: **Setting the scene** Introduction of training course, facilitators & participants Allocation of tables for supervisions, Setting up manikins and equipment	
08.45-9.00 (15 min)	Knowledge check (pre-test)	
09.00-09.15 (15 min)	Introduction to neonatal resuscitation	
09.15-09:30 (15 min)	**Physiology of transition from intra- to extrauterine life**	
09.30 – 09.50 (20 min)	**Preparation for birth** • Review of mother's medical history • Parental counselling • Organizing team and reviewing plan • Preparing the area for resuscitation • Hand hygiene • Checking equipment	
09.50-10.10 (20 min)	Group Practice	

10.10-10.30 (20 min)	**Initial steps of neonatal resuscitation** • Initial assessment • Drying and stimulation • Assessment of breathing/crying & heart rate • Routine care – Keeping warm with skin-to-skin contact – Monitoring breathing and temperature – Delayed cord clamping – Helping initiate breastfeeding	
10.30-10.50	Group practice	
10.50-11.00 (10 min)	Tea	
11:00-11:40 (40 min)	**Management of airway & breathing** • Keeping warm • Airway opening and clearing • Ventilating with bag and mask • Oxygen supplementation • CPAP **Improving ventilation** • Mask adjustment • Reposition head and neck • Suction of mouth and nose • Open the mouth • Pressure increase • Alternate airway	
11:40-12:00 (20 min)	**Group practice**	Respective Facilitators
12:00-12:12:30 (30 min)	**Chest compressions** • Assessment of heart rate • Indication of CC • Technique – Position of rescuer – Position of hands – Depth of compressions – Rhythm and compression to ventilation ratio • Oxygen supplementation	
12:30-12:50(20 min)	**Group practice**	Respective Facilitators

12:50-13:10 (20 min)	**Drugs & vascular access**
	• Drugs and indications
	• Dose of drugs
	• Routes of administration
	• Vascular access
	  o UVC
	  o Intraosseous
	  o Peripheral venous	

13:10-13:30 (20 min)	**Post resuscitation care and ethical consideration**	
13:30-13:50(20 min)	**Special conditions** Extremely pre-term babies Pneumothorax Congenital diaphragmatic hernia Hypoxic ischemic encephalopathy Congenital heart disease Omphalocele Meningomyelocele Airway malformation Meconium-stained amniotic fluid	
13:50-14:30 (40min)	**Tea, refreshment and prayers**	
14:30-14:50 (20 min)	**Resuscitation of neonatal outside delivery room** • Resuscitation at birth outside delivery room • Resuscitation within neonatal unit • Resuscitation outside a healthcare facility	
14:50-15:20 (30 min)	**Integrated approach**	
15:20-16:00 (40 min)	**Group practice**	Respective Facilitators
16:00-16:15 (15 min)	**Knowledge check (Post-test)**	All Facilitators
16:15-16:45 (30 min)	**OSCE**	All Facilitators
16:45-17:00 (15 min)	**Open discussion (feedback), clarification of any issues & remediation**	All Facilitators

Note: Times can be adjusted by the trainer as needed. This plan includes instructions and exercises, plus breaks. The **pre-test and post-test MCQs** help gauge knowledge gain. Throughout, emphasize interprofessional collaboration.

COURSE STRUCTURE

Module .1 Setting the scene

- Duration: 25 minutes
- Items required:
  Equipment:
- Neo Natalie set, Preemie Natalie set, Plastic bags, CPAP device with accessories air-oxygen blender, humidifier,

The session is conducted by a Lead Facilitator.

Learning objectives:

- To apprise the participants about the course, its need, importance, and format.
- To formally introduce the facilitators and participants and build rapport between them for fruitful facilitation and understanding.
- Arrange the seating of participants for clear viewing of facilitator and screen and for comfortable communication and learning.
- Introduce each item of equipment used in training, its use and to get manikins ready for use.
- This session also allows the Lead Facilitator to allocate the tables and distributes the work between facilitators, in front of participants as an example, to make the potential facilitators among the participants develop an understanding of how the work is distributed, what needs to be done before the start and during formal teaching sessions to conduct a high-quality and effective training course.

  Facilitators roles
  - Briefly introduce themselves and welcome participants to the course.
  - Ask participants to introduce themselves, their names and occupations briefly, the level of neonatal care their institution provides and their expectations from the course.
  - Review the following information:
    - Mobile usage and smoking policies and procedures
    - Restrooms, and break areas
    - Emergency exits and first-aid kits location
    - Ask participants to share any physical disability or limitations.
    - Explain that the purpose of the course is to provide participants with the knowledge and skills they need to assess, recognize and care for a neonate who requires resuscitation.
    - The course emphasizes providing high-quality evidence-based latest newborn resuscitative care by integrating cognitive and psychomotor skills with critical thinking and problem solving to achieve the best possible patient outcomes.
    - Explain the learning methodologies that will be used in the course including didactic lectures, interactive discussions, skill practice sessions and simulation-based case scenario and debriefing.
    - Explain that group practice sessions are an opportunity for participants to demonstrate the cognitive knowledge acquired during the lecture portion of the course.

- The group practice sessions are critical to prepare them for simulation-based case testing scenarios and meet course completion requirements.
- Review the course agenda, the scheduled breaks and when the class is scheduled to end.
- Inform the participants about course completion requirements. They must:
  - Attend and participate in all course sessions.
  - Actively participate in all course activities, including assuming various roles during skill practice and practice scenarios.
  - Demonstrate competency in all required skills.
  - Demonstrate competency in leading a team during the practice and testing scenarios.
  - Successfully pass the final exam with a minimum score of 80%.
  - Clarify any queries.

After completing this session, participants should be able to:

- Understand how the course is structured.
- Understand the requirements for successful course completion.
- Recognize that latest guidelines based on the PNRM: Provider Guide will be taught throughout the course.

Key points:

- 1-day training focusses on prevention of asphyxia, that is one of the three major causes of neonatal mortality.
- Recognize the responsibilities and roles of everyone involved.
- Understand the requirements of a successful high-quality course.
- PNRM: Provider Guide is to be used as resource material for newborn resuscitation.
- Preventing asphyxia, not only saves the neonate, but also has significant impact on family's and nation's well-being.

b. Knowledge check (Pre-test)

- Duration: 15 minutes
- **Items required:** 23 & 24 *(Annexures 5.7 & 5.8) (Pre-test)*

Learning objective:

- Objective is to recognize the concepts and level of understanding of participants about neonatal resuscitation in the Golden Minute and care of baby during the Golden Hour, prior to the course.

Key point:

- The MCQ is 'one most appropriate answer out of five' to a given question/scenario. Performance of participants is knowledge check before the start of formal sessions that enables the facilitators to recognize participants' concepts and understanding of the subject as well as those participants that may require more attention than others. In addition, comparison of results of knowledge check during pre- & post-tests enable the facilitators to assess the improvement in knowledge of participants. It also indirectly shows the effectiveness of the course facilitators and helps in overall improvement.

c. **Introduction to neonatal resuscitation**

- Duration: 15 minutes
- Items required: 29 *(Handout as annexure 5.13)*

Learning objectives:

- To provide background to the participants about the importance of neonatal resuscitation.
- To share knowledge and impart skills to improve:
  - Neonatal morbidity and mortality
  - Newborn care immediately after the birth
- To develop a logical approach and understand the sequence of steps in resuscitation of newborn.

Key points:

- Pakistan is one of the countries with highest NMR in the world
- Complications related to preterm births, infections and birth asphyxia constitute 85% to NMR
- Majority of neonatal deaths are preventable
- At birth about 85% of babies initiate spontaneous breathing. Identify and timely help following 15% who require support and respond to achieve this transition.
  - 10% by drying and stimulation
  - 3% by positive-pressure ventilation (PPV)
  - 2% through use of alternate airways
  - 0.1% by chest compressions and/or epinephrine
- Knowledge sharing and skill development through hands-on practice are required to reduce preventable deaths

Module. 2: Physiology of transition from intra- to extrauterine life

- Duration: 15 minutes
- Items required: 30 *(Handout as annexure 5.14)*

Learning objectives:

After completing this lesson, participants will be able to:

- Understand the physiologic changes that occur during and transition after birth.
- Respiratory transition. The importance of breathing and, changes in pulmonary vascular resistance and pulmonary blood flow.
- Cardiovascular transition. Closure of vascular shunts, changes in and improvement of ventricular output.
- Interdependence of respiratory and cardiovascular transition.
- Change from fatal to neonatal circulation.
- Effect of delayed or deranged transition.

Key points:

- With fluid filled lungs and open ductus venosus and arteriosus, oxygenated blood bypasses the lungs, hence, there is 'parallel' circulatory system in utero which needs to become continuous system once the lungs are aerated and the ducts close.
- The aeration of lungs (establishing breathing) is the fundamental critical event that establishes successful transition whether the baby does it him/herself or it is achieved through neonatal resuscitation.

- Fatus has an intra-uterine saturation between 50-70 % and needs to quickly (within 5 minutes) achieve a saturation of at least 80%. The reason it takes this time is that with every breath more alveoli are recruited (anterior first, then posterior).
- As this is achieved, pulmonary blood flow increases (i.e. pulmonary vascular resistance falls, cardiac output increases).

Module 3: Preparation for birth

- Duration: 20 minutes
- Items required: 31 *(Handout as annexure 5.15), and* 16, 40 – 43

Learning objective:

- To learn basic requirements for safe and effective neonatal resuscitation.

Key points:

- Make sure the environment is safe for the baby and yourself.
- Identify a team leader and allocate tasks clearly to team members.
- Collect as much information as possible about the mother and fetus.
- Anticipate any possible problems and devise a plan of management.
- Communicate effectively with obstetrician, neonatal resuscitation team members and parents.
- Be compassionate and understanding when counselling parents.
- Use available resources effectively and wisely.
- During resuscitation, give instructions loudly and clearly.
- Always maintain professional behaviour.
- Do not be shy to call for help when required.
- Ensure hand hygiene
- Check equipment for availability, sterilization, and function
- Prepare an area for resuscitation of newborn

Group practice:

- Duration: 20 minutes
- Items required: 28 *(Annexure 5.7), and* 16, 40 – 43

Objective:

- To give the participants hand-on practice of steps of preparation for resuscitation under supervision of respective facilitator.

Module 4: Initial steps of neonatal resuscitation

- Duration: 20 minutes
- Items required: 32 *(Handout as presentations attached),* and 16, 40 – 43

Learning objective:

- To learn how to assess and manage a newborn that does not require cardio-respiratory resuscitation at birth i.e., how to give routine care.

Key points:

- Start the timer when baby is completely delivered.
- Quickly assess the newborn for gestational age, tone and breathing status. It gives information about condition of baby and determines the need for any active resuscitation.
- Initially, dry and stimulate if a baby is > 32 weeks gestation with pre-warmed dry towel but if < 2 weeks gestation, do not dry with towel but deliver the baby in polyethylene bag/wrap.
- Assess baby's breathing by watching for chest movements or listening to crying sound, grunting or breath sound.
- Assessment of heart rate is done after effective ventilation is established by palpating accessible arteries, auscultation of heart sounds or using medical instruments.
- Give routine care to a baby who has established breathing.
- Delayed cord clamping in a baby who does not require active resuscitation for at least 60 – 90 seconds after birth.
- Skin-to-skin contact and breastfeeding started within Golden Hour is beneficial for both baby and mother.

Group practice

- Duration: 20 minutes
- Items required: 28 *Annexures 7), and* 16, 40 – 43 *(*

Objective:

- To give the participants supervised hand-on practice of assessment of a neonate after birth and routine care during the Golden Hour where active cardio-respiratory resuscitation is not required.

Module. 5: Management of airway & breathing, improving ventilation & CPAP

- Duration: 40 minutes
- Items required: 33 *(Handout as presentations attached),* and 16, 40, 41, 43

Learning objectives:

- To learn the action steps required in the first minute after birth and the technique of delivering air to the lungs in newborns requiring help in initiating breathing.
- To understand the steps of improving ventilation i.e., MR. SOPA, its sequence and technique.
- To learn the indications and technique of instituting CPAP

Key points:

- In a neonate who has not initiated spontaneous breathing after birth, first open the airway through positioning of head and neck.
- If there is no response, proceed to clear the airway through suctioning, only if secretions are visible.
- Suction mouth first, and then nose

- Consider nasal CPAP in preterms having laboured breathing
- Start bag-mask PPV within Golden Minute, if neonate does not initiate its own breathing efforts or if heart rate is < 100 bpm despite of spontaneous ventilation in room air or if there is central cyanosis.
- Learning correct technique of bag-mask ventilation is the key to successful resuscitation.
- Provide oxygen according to gestational age.
- Use pulse oximeter, if available.
- After 5 PPV breaths check heart rate. Improvement in heart rate is the first sign of effective PPV.
- If heart rate is > 100 bpm or is increasing and there is good chest rise with each PPV, continue bag-mask PPV and reassessment of heart rate & breathing every 30 seconds till regular breathing is established. After that provide post-resuscitation care.
- If heart rate < 100 - > 60 bpm and there is no chest rise with each PPV, perform corrective steps to improve ventilation to rectify any error in the technique of delivering breaths. If chest movement is achieved after any of the corrective steps, continue PPV for 30 seconds before reassessing HR. Consider other possibilities e.g., pneumothorax, if chest movement is not achieved.
- If heart rate is < 60 bpm but there is good chest movement, continue bag-mask PPV for 30 seconds before reassessment. If heart rate is improving, continue bag-mask ventilation and continue reassessing every 30 seconds till regular breathing is established before providing post-resuscitation care.

Group practice

- Duration: 30 minutes
- Items required: 28 *(Annexures 7), and* 16, 40 – 43

Objective:

- To give the participants hand-on practice of steps of resuscitation involved in management of airway and breathing, improvement in technique of bag-mask PPV and managing laboured breathing in preterm babies under supervision of respective facilitator.

Module. 6: Chest compressions

- Duration: 30 minutes
- Items required: 34 *(Handout as presentations attached),* and 16 and 40

Learning objective:

- To learn the indications and technique of chest compressions for establishing adequate blood circulation.

Key points:

- Chest compressions also known as external cardiac massage improves coronary blood flow and left ventricular outflow.
- It is time for teamwork.
- Initiate chest compressions if heart rate remains < 60 bpm after at least 30 seconds of effective PPV, given preferably through endotracheal tube or laryngeal mask, along with 100% oxygen.

- Cardiac monitors, if available, are useful at this stage of resuscitation.
- Compress at lower third of sternum, one finger breadth below the line joining both nipples.
- The depth of compressions is 1/3rd of AP diameter of chest, using two thumb technique, accompanied by PPV in a ratio of three compressions to one breath.
- Remember rhythm of 'One AND two AND three AND breathe…..'
- After heart rate improves to > 60 bpm and SpO_2 > 85 – 90%, reduce FiO2 to maintain SpO_2 between 90 – 95%.
- Continue chest compressions for 60 seconds before reassessment of heart rate.
- Stop chest compressions when the heart rate is over 60 bpm. Continue PPV at a rate of 40 to 60 breaths per minute.
- If the baby's heart rate remains less than 60 bpm despite 60 seconds of effective ventilation and high-quality, coordinated chest compressions, epinephrine administration is indicated, and emergency vascular access is needed.
- Stop resuscitation if there is no spontaneous breathing and heart rate is undetectable after 20 minutes of adequate measures to resuscitate.

Group practice

- Duration: 20 minutes
- Items required: 28 *(Annexure 7),* 16 & 40

Objective:

- To give the participants supervised hand-on practice of technique of chest compressions along with PPV.

Module. 7 Drugs and vascular access

Duration: 20 minutes

Items required: 35 *(Handout as presentations attached),* 16 and 40

Learning objective:

- To learn about indications, doses and routes of administration of drugs recommended for use during resuscitation.

Key points:

- Adrenaline/Epinephrine in 1:10,000 dilution is the recommended first line drug to be used when the baby's heart rate remains less than 60 bpm despite 60 seconds of effective ventilation and high-quality, coordinated chest compressions. Umbilical venous catheterization is the preferred route for its administration.
- If there is delay in placement of UVC then intra-tracheal adrenaline should be given once.
- Volume expanders e.g., normal saline may be indicated in newborns who do not respond to PPV, CC and adrenaline or have signs of hypovolemia or shock. Umbilical venous catheterization is the preferred route for its administration.
- Dextrose should only be given to correct proven hypoglycaemia.
- There is no role of sodium bicarbonate in neonatal resuscitation in the delivery room.

- Intraosseous and peripheral venous access are alternate routes of drugs administration that can be used if umbilical venous access in not possible.

7.1 Post resuscitation care and ethical considerations

- Duration: 15 minutes
- Items required: 36 *(Handout as presentations attached)*

Learning objectives:

- To learn how to care for a baby in post-resuscitation period.
- To emphasize the importance of record keeping and documentation.
- To learn about importance of communication with health professionals and parents.
- To understand the guidelines for balancing life-saving measures with quality of life

Key points:

- Appropriate post-resuscitation care is crucial to consolidate outcome of resuscitation.
- Smooth post-resuscitation transition involves monitoring, support and interventions.
- Document all the events in chronological order.
- Record facts not opinions. Be honest.
- Understand how, what, and when to communicate with the health professionals and parents.
- Prognosis depends upon the severity and duration of insult/degree of insult.
- Decisions about stopping resuscitation should consider shariah, intellect, cultural factors, fatawas, local laws and opinion of parents.

- **7.2. Special conditions**
  - Duration: 20 minutes
  - Items required: 37 *(Handout as presentations attached),* 16, 41, 42, 43

Learning objective:

- To gain knowledge and skills of resuscitation in conditions where different steps need to be incorporated in routine resuscitation at birth.

Key points:

- In resuscitation of preterm at birth, it is important to prevent hypothermia and use lower inflation pressures during PPV. Breathing support in form of nasal high flow therapy or CPAP, surfactant instillation and supplemental oxygen may be required.
- Pneumothorax should be considered in case of heart rate <100 bpm despite adequate ventilatory efforts, no/poor movement of chest on PPV, sudden bradycardia and drop in SpO_2 in a previously stable infant, severe respiratory distress in a normally breathing baby. Quick diagnosis and management is required.
- Congenital diaphragmatic hernia should be diagnosed early (preferably antenatally) to organize multidisciplinary coordinated approach to its management.
- HIE should be timely managed in appropriate level facilities that can employ hypothermia to prevent neuronal injury.

- Congenital heart disease should be suspected in a centrally cyanosed baby not improving with supplemental oxygen or PPV. They should be transferred as soon as possible to health facility offering paediatric cardiology services. The 'hyperoxia (100% oxygen) test' should not be carried out as it may close the duct in a duct dependent congenital heart disease.
- In case of omphalocele and meningomyelocele, avoid sac compression, use protective cover with a sterile, moist dressing and refer respectively to pediatric surgery and neurosurgery for its further management.
- Different types of airway malformations e.g., bilateral choanal atresia, Pierre-Robin sequence, lung hypoplasia and cystic hygroma, can be encountered at birth. Knowledge about their underlying pathologies and their remedial measures help in successful resuscitation.
- Effective ventilation remains the cornerstone of neonatal resuscitation even in the presence of MSAF.

7.3 . Session 10: Resuscitation of neonate outside delivery room

- Duration: 20 minutes
- Items required: 38 *(Handout as presentation attached),* 17 – 18

Learning objective:

- To understand difference in steps of resuscitation and learn to resuscitate a baby born outside delivery room, admitted in later neonatal period or being cared for in a neonatal unit or a bay born outside a healthcare facility.

Key points*:*

- Areas where babies are known to be delivered outside the setting of delivery room include other hospital areas e.g., waiting areas, during transit to delivery room or healthcare facility e.g., on a transport stretcher or in an ambulance or car, a neonatal unit and outside healthcare facility e.g., home.
- Keep yourself together.
- Muster whatever help you can. Call emergency medical services in first opportunity.
- Best use of available resources.
- Basic steps of resuscitation remain the same.
- Unconventional measures like mouth-to-mouth and nose ventilation might be required if bag-mask is not available to help initiate breathing.
- Transfer to NICU or nearest healthcare facility ASAP after initial resuscitation.

Module. 8: Integrated approach to neonatal resuscitation

- Duration: 30 minutes
- Items required: 39 *(Handout as presentation attached),* 16

Learning objective:

- To revise all the steps of resuscitation in sequence with its timeline.

Key points:

- Understanding physiology of transition helps in effective resuscitation.

- Timely preparation results in improved outcome.
- Delivering air to the lungs is key to successful resuscitation.
- Improvement in heart rate is the first sign of effective ventilation.
- Sequence of A, B, C must be strictly followed.
- Post-resuscitation care plays important role in improving outcomes.
- Understanding special conditions leads to appropriate measures.
- Knowledge about shariah, cultural factors, fatawas, local laws help in taking ethical decisions about termination of resuscitative efforts.

Group practice:

- Duration: 40 minutes
- Items required: 28 *(Annexures 7), and* 16 – 18, 40 – 43

Objective:

- To give the participants hand-on practice of all the steps of newborn resuscitation under supervision of respective facilitator

ASSESSMENT:

1.1 .Knowledge check (Post-test)

- Duration: 15 minutes
- Items required: 23 & 24 *(Annexures 3,4)*

Objective:

- To recognize the concepts and level of understanding of participants about neonatal resuscitation in the Golden Minute and care of baby in the Golden Hour after attending the training course.

Key point:

- The test is 'one most appropriate answer out of five to a given question/scenario. Comparison of the knowledge check between the results of pre & post-tests enable the facilitators to see the improvement in knowledge of participants. It also indirectly shows the effectiveness of the course and helps in its improvement.
- 80% marks are required as one of the criteria to 'pass' the test.

1.2 Objective Structured Clinical Examination (OSCE)

- Duration: 30 minutes
- Items required: 25 *(Annexures 5.9)*

Objective:

- To evaluate the participants in application of the skills learned during the training course.

Key point:

- The participant is given a clinical scenario and observed for his/her stepwise response and prompted where required. Correctly done steps are marked ✓ while those missed or done incorrectly are marked x. At the completion of response, he/she is told about the step/s done incorrectly or missed and is asked to repeat them until all the steps are done correctly. In case he/she is unable to perform after three attempts, he/she is asked to repeat the entire training course.

- At least 80% of the steps are required to be done correctly to pass the OSCE.

2. **Open discussion (feedback), clarification of any issues and remediation**
   - Duration: 15 minutes
   - Item required: 26, 27 *(Annexures 6)*

   Objectives:
   - To give the participants time to comment, seek clarity and ask questions related to any of the topics discussed.
   - To share the overall performance report of the participants.

   Key points:
   - Ask the participants about any topic that they feel needs further elaboration or any other topic that may be included in the curriculum.
   - Discuss problems they face in their workplaces that might make implementation of guidelines difficult and what could be the solution.
   - Discuss how could this training course be further improved and made more effective in decreasing newborn morbidity and mortality.
   - Persistent and more than twenty percent of concerning comments about a particular aspect will be taken as significant and forwarded to be discussed among the editors and authors of PNRM who have designed the course. The feedback helps in making the course better and effective.

Assessment Policy

Passing marks will be 70% for post test on Skills stations. Students from 60% -69% will be given a chance to reappear for post test and skill test on the same day .Less than 60% will reappear with next batch .All courses held at different institution will be monitored for quality assurance.

Facilitator's Responsibilities:

Responsibilities as a certified facilitator include :

- Ensuring participant's health and safety by properly cleaning manikins and equipment .
- Ensure that all participants are fit to practice each skill.
- Using course material as it intended in the facilitator's manual
- Informing participants about course completion requirements.
- Creating a friendly and safe environment for all participants .
- Providing timely , positive and corrective feedback during skill stations.
- Provide debriefing at the end of each simulation case scenario.
- Evaluating participants as they perform skills , focusing on critical performance steps .
- Identifying potential facilitator candidates

Criteria for Selection of Facilitators

Any participant can qualify to become a facilitator who has :

- Attended at least one course as a participant
- Attained an aggregate of at least 85% marks in the assessment as participants .
- Shown interest in becoming a facilitator
- Attended at least one course as co-facilitator.
- Demonstrated good communication and teaching skills during the course.
- Recommended by the lead facilitators or course manager after consultation with other facilitators

Instructions for Facilitator

A facilitator is a person who helps the participants learn the skills presented in the course. For facilitators to give enough attention to each participant, a ratio of 1 facilitator to 4-5 participants is desired.

As a facilitator, a person need to be very familiar with the material being taught. It is his/her job to give explanations, demonstrate, answer questions, talk to participants about their answers to exercises, conduct role plays, lead group discussions, organize and supervise practice sessions, and generally give participants any help they need to successfully complete the course. He/ She are not expected to teach the content of the course through formal lectures.

1.Keep the session focused and lively

2. Keep all participants involved in discussions

3. Do not turn your back to the group for long periods as you point to screen or algorithms

4. Reinforce participants' efforts

5.Facilitator’s interaction with participants.

6.Conducting group exercises.

7.Role in assessment and effectively conduct them.

8. Reinforced and reassess a weak participant

9.Mnage any problem.

Annexure-1

Essential Materials and Resources Required
Check list

For 20 – 25 participants/5 tables and 01 head table

[Resource: Pakistan's Neonatal Resuscitation Manual: Facilitator Guide (FG)]

No.	ITEMS	QUANTITY	CHECK
	Logistical arrangements		
1	Venue/hall	1	
2	Seating arrangement (Tables & chairs)	1 (Annexure 5.2)	
3	Flip chart stand for algorithms	6	
	Audio-visual		
4	Multimedia projector	1	
5	Multimedia projector screen	1	
6	Sound system with:		
	i. Hand-held microphones	2	
	ii. Collar microphone	1	
	iii. Speakers	2	
7	Computer along with connecting leads	1	
8	PowerPoint presenter	1	
	Stationery		
9	Document folder (For keeping all printed material for the day)	1	
10	Name badges for facilitators & participants	1/person	
11	Plastic pouch/bag	1/person	
12	Writing pad	1/person	
13	Ball pen	1/person	
	Resource materials for participants		
14	Pakistan's Neonatal Resuscitation Manual: Provider guide (for students)	1/participant	
15	Pakistan's Neonatal Resuscitation Manual: Facilitator Guide (For new facilitators only)	1/new facilitator	
16	Neonatal resuscitation algorithm poster	6	
17	Neonatal resuscitation algorithm for birth outside delivery room	6	
18	Neonatal resuscitation algorithm for resuscitation inside neonatal unit	6	
	Printouts		

19	Attendance sheet for facilitators	1 (Annexure 5.3)	
20	Attendance sheet for participants	1 (Annexure 5.4)	
21	Mentors list	1 for each day (Annexure 5.5)	
22	Faculty & schedule of course	1/person (Annexure 5.6)	
23	Knowledge check (Pre & post-tests)	2/participant (Annexure 5.7)	
24	Key of knowledge check (Pre & post-tests)	1 (Annexure 5.8)	
25	Objective Structured Clinical Examination (OSCE)	1/participant (Annexure 5.9)	
26	Course evaluation & feedback form	1/participant (Annexure 5.10)	
27	Participants' assessment record form	1 (Annexure 5.11)	
28	Practice scenarios	1/facilitator (Annexure 5.12)	
	PowerPoint presentations (With Course Manager. Handouts given in this Facilitator Guide)		
29	Introduction to neonatal resuscitation	1 (Annexure 5.13)	
30	Physiology of transition from intra- to extrauterine life	1 (Annexure 5.14)	
31	Preparation for birth	1 (Annexure 5.15)	
32	Initial steps of neonatal resuscitation	1 (Annexure 5.16)	
33	Management of airway & breathing, improving ventilation & CPAP	1 (Annexure 5.17)	
34	Chest compressions	1 (Annexure 5.18)	
35	Drugs & vascular access	1 (Annexure 5.19)	
36	Post resuscitation care and ethical considerations	1 (Annexure 5.20)	
37	Special conditions	1 (Annexure 5.21)	
38	Resuscitation of neonate outside delivery room	1 (Annexure 5.22)	
39	Integrated approach to neonatal resuscitation	1 (Annexure 5.23)	
	Equipment		

40	Neo Natalie set	6	
41	Preemie Natalie set	6	
42	Plastic bags	6	
43	nCPAP device with accessories (Blender, humidifier, breathing circuits, Hudson prongs)	1/table	
44	Disposable T-piece resuscitator with PIP & PEEP controllers	1/table	

Annexure .2

1 day training on neonatal resuscitation

Data: _____

Venue: _____

Faculty & schedule

1. Dr _____ Lead Facilitator)
   Designation: _____
   Placement: _____

2. Dr _____ (Course Manager)
   Designation: _____
   Placement: _____

3. Dr _____
   Designation: _____
   Placement: _____

4. Dr _____
   Designation: _____
   Placement: _____

Below is a structured session plan for the 8-hour day. It allocates time for each module, including breaks and Group Practice:

Time	Module / Activity/Session	Facilitator
08:00– 08.20 (20 mins)	Registration and welcome	
0820 – 08:45 (25 min)	**Module 1**: **Setting the scene** Introduction of training course, facilitators & participants Allocation of tables for supervisions, Setting up manikins and equipment	
08.45-9.00 (15 min)	Knowledge check (pre-test)	
09.00-09.15 (15 min)	Introduction to neonatal resuscitation	
09.15-09:30 (15 min)	**Physiology of transition from intra- to extrauterine life**	
09.30 – 09.50 (20 min)	**Preparation for birth** • Review of mother's medical history • Parental counselling • Organizing team and reviewing plan • Preparing the area for resuscitation • Hand hygiene Checking equipment	
09.50-10.10 (20 min)	Group Practice	
10.10-10.30 (20 min)	**Initial steps of neonatal resuscitation** • Initial assessment • Drying and stimulation • Assessment of breathing/crying & heart rate • Routine care – Keeping warm with skin-to-skin contact – Monitoring breathing and temperature – Delayed cord clamping – Helping initiate breastfeeding	
10.30-10.50	Group practice	
10.50-11.00 (10 min)	Tea	

11:00-11:40 (40 min)	**Management of airway & breathing** • Keeping warm • Airway opening and clearing • Ventilating with bag and mask • Oxygen supplementation • CPAP **Improving ventilation** • Mask adjustment • Reposition head and neck • Suction of mouth and nose • Open the mouth • Pressure increase • Alternate airway	
11:40-12:00 (20 min)	**Group practice**	Respective Facilitators
12:00-12:12:30 (30 min)	**Chest compressions** • Assessment of heart rate • Indication of CC • Technique – Position of rescuer – Position of hands – Depth of compressions – Rhythm and compression to ventilation ratio • Oxygen supplementation	
12:30-12:50(20 min)	**Group practice**	Respective Facilitators
12:50-13:10 (20 min)	**Drugs & vascular access** • Drugs and indications • Dose of drugs • Routes of administration • Vascular access o UVC o Intraosseous o Peripheral venous	
13:10-13:30 (20 min)	**Post resuscitation care and ethical consideration**	

13:30-13:50(20 min)	**Special conditions** Extremely pre-term babies Pneumothorax Congenital diaphragmatic hernia Hypoxic ischemic encephalopathy Congenital heart disease Omphalocele Meningomyelocele Airway malformation Meconium-stained amniotic fluid	
13:50-14:30 (40min)	**Tea. refreshment and prayers**	
14:30-14:50 (20 min)	**Resuscitation of neonatal outside delivery room** • Resuscitation at birth outside delivery room • Resuscitation within neonatal unit • Resuscitation outside a healthcare facility	
14:50-15:20 (30 min)	**Integrated approach**	
15:20-16:00 (40 min)	**Group practice**	Respective Facilitators
16:00-16:15 (15 min)	**Knowledge check (Post-test)**	All Facilitators
16:15-16:45 (30 min)	**OSCE**	All Facilitators
16:45-17:00 (15 min)	**Open discussion (feedback), clarification of any issues & remediation**	All Facilitators

Annexture.3

1-Day Training on 'Neonatal Resuscitation'

Date: _____

Venue: _____

KNOWLEDGE CHECK

Name: _____
I am taking this knowledge check:
[ ] Pre-course [ ] Post-course

Please select one most appropriate answer.

1. What is the established current definition of viability in Pakistan?
   a) 26 weeks
   b) 28 weeks
   c) Undetermined
   d) Depends on individual institution
   e) Depends on perception of senior consultant

2. Which of the following signs may suggest an abnormal transition from intrauterine to extrauterine life in a newborn?
   a) Bradycardia
   b) Irregular breathing
   c) Hypotonia
   d) Cyanosis
   e) All of the above

3. What is the most important measure for infection prevention during neonatal resuscitation?
   a) Hand hygiene
   b) Wearing caps and shoe covers
   c) Maintaining a clean environment
   d) Administering prophylactic antibiotics to the mother
   e) Using disposable resuscitation equipment

4. What should be the ambient temperature range at the delivery and resuscitation area for a newborn?
   a) 20 – 22°C
   b) 22 – 25°C
   c) 26 – 28°C
   d) 29 – 32°C
   e) 33 – 37°C

5. Which size of self-inflating bag will you choose for bag-mask ventilation of a newborn?
   a) 100 ml
   b) 150 ml
   c) 250 ml
   d) 500 ml
   e) 1000 ml
6. What is first assessed at birth to determine if the newborn needs resuscitation?
   a) Heart rate
   b) Skin color
   c) Muscle tone
   d) Gestational age
   e) Breathing/crying
7. If a newborn is not breathing or crying after birth, what should be the first step in resuscitation?
   a) Administering oxygen
   b) Drying and stimulating the baby
   c) Providing bag-mask ventilation
   d) Performing chest compressions
   e) Suction of nose and mouth
8. If a newborn's heart rate remains unresponsive after five initial breaths, what should be the next step?
   a) Perform steps of 'improve ventilation'
   b) Begin chest compressions
   c) Administer intravenous fluids
   d) Perform endotracheal intubation
   e) Increase the oxygen concentration
9. Which of the following is the first sign of successful PPV?
   a) Spontaneous breathing
   b) Return of spontaneous circulation
   c) Improved O2 saturation
   d) Increase in heart rate
   e) Change in skin color
10. When providing positive pressure ventilation, what is the recommended ventilation rate?
    a) 20 to 30 breaths per minute
    b) 30 to 40 breaths per minute
    c) 40 to 60 breaths per minute
    d) 60 to 80 breaths per minute
    e) 80 to 100 breaths per minute
11. Benefits of delayed cord clamping in preterm babies include:
    a) Increases the risk of intraventricular hemorrhage
    b) Prevention of infection
    c) Prevention of hypothermia
    d) Prevention of hypocalcemia
    e) Improved bonding with mother

12. Skin-to-skin contact between mother and newborn immediately after birth:
    a) Increases the risk of infection
    b) Hinders breastfeeding
    c) Reduces maternal milk production
    d) Stabilizes the newborn's heart rate and temperature
    e) Delays expulsion of placenta

13. The purpose of receiving a preterm baby in a polyethylene bag at birth is to:
    a) Prevent a sterile environment
    b) Prevent heat loss and maintain body temperature
    c) Reduce the risk of infection
    d) Facilitate early skin-to-skin contact
    e) Enhance respiratory support

14. When coordinating positive-pressure ventilation with chest compressions, what is the recommended duration for completing a cycle of 3 chest compressions and one breath?
    a) 2 seconds
    b) 3 seconds
    c) 4 seconds
    d) 5 seconds
    e) 7 seconds

15. What should be the next step if after establishing effective ventilation and performing chest compressions for 60 seconds there is no increase in heart rate?
    a) Reassess the airway and ventilation
    b) Stimulate the baby
    c) Continue chest compressions for an additional 60 seconds
    d) Administer epinephrine
    e) Discontinue further resuscitation

16. What is the recommended concentration and dose of intravenous epinephrine for use in newborns during resuscitation?
    a) 1:1,000 at 0.01 to 0.03 ml/kg
    b) 1:1,000 at 0.05 to 0.1 ml/kg
    c) 1:10,000 at 0.01 to 0.03 ml/kg
    d) 1:10,000 at 0.05 to 0.1 ml/kg
    e) 1:10,000 at 0.1 to 0.3 ml/kg

17. The preferred route to give drugs during resuscitation is:
    a) Peripheral intravenous
    b) Umbilical vein
    c) Intraosseous
    d) Intratracheal
    e) Intracardiac

18. If the newborn shows no improvement, after what duration can the resuscitation be stopped?
    a) After 10 minutes
    b) After 20 minutes
    c) After 30 minutes
    d) After 40 minutes
    e) Any time

19. A newborn is meconium stained, but is breathing, well, has a heart rate of 120 bpm, and is pink. What is the most appropriate next step?
    a) Insert an endotracheal tube and suction the trachea
    b) Clear the mouth and nose with a bulb or suction catheter
    c) Start 100% oxygen
    d) Provide routine care
    e) Initiate chest compressions

20. During resuscitation in babies ≤ 28 weeks gestational age, initiate oxygen supplementation with:
    a) 21%
    b) 30%
    c) 40%
    d) 70%
    e) 100%

Number done correctly: _____

Facilitator's initials: _____

Annexture.4

1-Day training on “Neonatal resuscitation”
Date ----------
Venue ----------

KEY TO KNOWLEDGE CHECK

QUESTION	KEY	QUESTION	KEY
1	C	11	a
2	E	12	d
3	A	13	b
4	C	14	a
5	C	15	d
6	E	16	e
7	B	17	b
8	A	18	b
9	D	19	d
10	B	20	b

Annexture.5

1-Day Training on 'Neonatal Resuscitation'

Date: _____

Venue: _____

OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)

The facilitator communicates with the participant as follows:
"I am going to read a scenario. Please listen carefully and show me the actions you would take. I will prompt where asked to indicate the baby's responses (shown in *italics*). There will be no other feedback until the end of the case."

Scenario: You are called to attend birth of a baby, about to be delivered by a mother in preterm labor at 34 weeks of gestation. You are the team lead and have an assistant with you. You have discussed and divided duties and actions, seen the medical notes of the mother, talked to parents, prepared an area for resuscitation of the baby, washed your hands, put on sterile gown and gloves, and checked your equipment.

Now, the baby is born by SVD, and the amniotic fluid is clear. Show how you will manage the baby:

1. Starts the timer/clock ☐
2. Places the baby on the towel on mother's abdomen, dries thoroughly and stimulates ☐
3. Removes wet towel ☐
4. Keeps warm by placing baby skin-to-skin on mother's abdomen and covers with dry pre-warmed towel ☐
5. Assesses for breathing/crying ☐

Prompt: The baby is not crying or breathing

6. Opens the airway by making neutral position of the head ☐

Prompt: There are no secretions in the baby's mouth or nose and the baby is still not breathing or crying

7. Clamps and cuts the cord and moves the baby to resuscitation area ☐
8. Initiates bag-mask PPV ☐
9. Assesses heart rate and breathing after 5 assisted breaths ☐

Prompt: The heart rate is 90 per minute and there is no spontaneous breathing

10. Readjusts mask ☐
11. Repositions head ☐

12. Provides PPV breaths through bag-mask or T-piece resuscitator ☐
13. Assesses for heart rate and chest movement after 5 assisted breaths ☐

Prompt: The heart rate is 80 per minute and there is no chest movement

14. Looks for and clears secretions from the mouth and nose (if needed) ☐
15. Opens mouth slightly ☐
16. Provides PPV breaths through bag-mask or T-piece resuscitator ☐
17. Assesses for heart rate and chest movement after 5 assisted breaths ☐

Prompt: The heart rate is 70 per minute and there is no chest movement

18. Continues bag-mask PPV by squeezing the bag harder/increasing T-piece pressure ☐
19. Assesses for heart rate and chest movement after 5 assisted breaths [ ] ☐

Prompt: The heart rate is 50 per minute and the chest is not moving with PPV

20. Uses alternate airway i.e., ETT, LMA ☐
21. Increases oxygen to 100% ☐
22. Starts chest compressions and asks the assistant to continue PPV in a ratio of 3:1 using rhythm 'one and ... two ... and ... three ... and ... breathe...' ☐
23. Continues chest compressions and PPV for 60 seconds and then reassesses heart rate and breathing ☐

Prompt: The heart rate is 120 per minute and the chest is moving with PPV

24. Stops chest compressions and continues PPV with rhythm of 'breathe, two, three' ☐
25. Reassesses heart rate and breathing after 30 seconds ☐

Prompt: The heart rate is 140 per minute and baby has started crying

26. Stops PPV ☐
27. Puts cap on baby's head and keeps the baby warm ☐
28. Transfers for advanced care ☐
29. Communicates with parents ☐
30. Records the events in baby's notes ☐

Successful completion requires a total of 24 of 30 (80%) steps to be done correctly and marked [✔]. The steps marked [✘] must be discussed with the participant, reinforced, and given a chance to perform correctly.

Number done correctly: _____
Facilitator's initials: _____

Annexure.6

1-Day Training on 'Neonatal Resuscitation'

Date: _____

Venue: _____

COURSE EVALUATION AND FEEDBACK FORM

Instructions:

- Circle your position:

  - Consultant | SR | MOVRegPG | HO | Nurse | Paramedic | Student | Other

- Rate each item using the scale below by circling the appropriate letter:

  - A = Strongly agree | B = Agree | C = Cannot decide | D = Disagree | E = Strongly disagree

1. Introduction of facilitators and participants					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was useful	A	B	C	D	E
2. Introduction to neonatal resuscitation					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was useful	A	B	C	D	E
3. Physiology of transition from intra- to extrauterine life					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
4. Preparation for birth					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
5. Initial steps of neonatal resuscitation					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E

6. Management of airway and breathing, improving ventilation and CPAP					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
7. Chest compressions					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
8. Drugs and vascular access					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
9. Post-resuscitation care and ethical considerations					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
10. Special conditions					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
11. Integrated approach					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
12. Resuscitation of neonate outside delivery room					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The session was appropriate	A	B	C	D	E
13. Knowledge check (Post-test)					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
14. OSCE					
a) The content was relevant	A	B	C	D	E
b) The duration was adequate	A	B	C	D	E
c) The facilitators were polite and non-biased	A	B	C	D	E
15. Refreshments/meals					

a) The menu was suitable	A	B	C	D	E
b) The quality was good	A	B	C	D	E
c) The quantity was adequate	A	B	C	D	E
16. Overall Course Evaluation					
a) The course was well planned	A	B	C	D	E
b) It effectively communicated the principles of neonatal resuscitation	A	B	C	D	E
c) Information follows a logical sequence from lesson to lesson	A	B	C	D	E
d) This course adequately prepares health workers to practice neonatal resuscitation					

17.Any other comments or suggestion

1-Day Training on 'Neonatal Resuscitation'

PRACTICE SCENARIOS

SCENARIO 1: PREPARATION

Situation:
While working in a health facility, you are called to attend a normal delivery of a term baby. The mother complained of decreased fetal movements.

Tasks: Demonstrate how you will proceed with preparation for resuscitation.

Steps:
1. Visit the obstetric unit.
2. Review antenatal history to assess:
   - Maternal health and pregnancy status.
   - Perinatal risk factors.
   - Possible reasons for decreased fetal movements.
3. Counsel the parents, explaining the anticipated plan for their baby.
4. Organize a team and confirm roles, discussing possible interventions.
5. Ensure the resuscitation area is ready:
   - Warm, clean, and well-lit.
   - Equipment and supplies are accessible.
6. Perform hand hygiene (see detailed methods below).
7. Put on sterilized gown and gloves.
8. Check resuscitation equipment, including:
   - Suction devices.
   - Self-inflating bag and mask (check procedure below).
   - T-piece resuscitator (if available).
   - Oxygen and pulse oximeter.

Prompt: How will you check the self-inflating bag and mask?

1. Connect the mask to the bag:
   - Insert the connector neck of the mask into the patient outlet of the self-inflating bag.
   - Apply thumb pressure at the connector nozzle to ensure a secure fit.

2. Test the pop-off valve:
   - Squeeze the bag and observe if the pop-off valve opens.
   - Listen for the sound of air escaping from the valve.

3. Check for leaks:
   - Place the mask tightly against your palm and squeeze the bag.
   - Ensure the bag re-inflates after each squeeze.
   - Press/lock the pressure release valve and squeeze again to check for leaks.

Prompt: How will you perform hand hygiene?

There are two methods for hand hygiene:

a) Washing hands with soap and clean water

1. Wet hands with water and apply enough soap to cover all surfaces.
2. Rub hands together in the following sequence for 20–30 seconds:
   - Palm to palm.
   - Right palm over left dorsum with interlaced fingers, and vice versa.
   - Palm to palm with fingers interlaced.
   - Back of fingers to opposing palms with fingers interlocked.
   - Rotational rubbing of left thumb clasped in right palm, and vice versa.
   - Rotational rubbing of clasped fingertips on the opposite palm.
3. Rinse hands thoroughly with water.
4. Dry hands with a single-use towel or air-dry for 20–30 seconds.

b) Hand hygiene using an alcohol-based hand rub

1. Apply 3–5 mL of alcohol-based hand rub to the palm.
2. Spread it over all surfaces of both hands.
3. Follow the same rubbing sequence as above for 10–15 seconds.
4. Allow hands to air-dry for 10–15 seconds to air dry.

SCENARIO 2: INITIAL STEPS OF NEONATAL RESUSCITATION

You are called to attend the delivery of twins at 35 weeks of gestation. You have arranged two teams for resuscitation. You are the team lead and have an assistant with you for team A. You have discussed and divided duties and stations, sent the file of mother, talked to parents, prepared an area for resuscitation for the babies, washed your hands, put on sterile gown and gloves, and checked your equipment. You have received the first twin. Demonstrate how you will proceed.

- Calls out the time and starts the clock.
- Places the baby on the dry and pre-warmed towel placed on mother's abdomen.
- Rapidly assesses the baby for general condition, likely gestation, tone and breathing/crying.
- Dries thoroughly with the help of towel placed over mother's abdomen.
- Replaces the soiled, wet towel with fresh, dry and pre-warmed towel.
- Assesses whether baby is breathing/crying.

Prompt: How will you assess breathing/crying?

- If the baby is crying
- Looks for breathing efforts
- Looks for equal and symmetrical chest movements
- Listens to breathing sounds (using stethoscope)
- Counts respiratory rate

Prompt: How will you assess heart rate?

- Palpates (Umbilical artery. Mentions that brachial and femoral arteries can also be used as alternates)
- Auscultates pre-cordial heart sounds (Listen with a stethoscope)
- Assesses pulse oximeter or cardiac monitor, if available

Prompt: After drying and stimulation, the baby is breathing/crying, what would be your next step?

- Provides routine care
    1. Keeps the baby with the mother
    2. Provides skin-to-skin contact
    3. Monitors for activity, breathing and temperature
    4. Clamps/ties and cuts the cord after 60–90 seconds
    5. Encourages mother to breastfeed within an hour

SCENARIO 3: MANAGEMENT OF AIRWAY AND BREATHING

A feverish 23-year-old mother went into labor at 37+4 weeks of gestation. You were called to attend the delivery well in time. As the team leader, you had made all necessary preparations for resuscitation. At birth, the baby appeared limp and cyanosed. On assessment of breathing/crying, even after performing the initial steps of resuscitation, there is 'No breathing.' Demonstrate the steps you would take to proceed.

- Opens the airway by making neutral position (sniffing) of the head
- Assesses for breathing/crying

Prompt: The baby is not breathing/crying

- Looks for secretions in mouth and nose
- Clears secretions, if needed, using sucker (bulb/penguin/mechanical), first from mouth and then nose
- Assesses for breathing/crying

Prompt: The baby is still not breathing/crying

- Clamps and cuts the cord and moves the baby to resuscitation area
- Initiates bag-mask PPV
- Assesses heart rate and breathing after 5 assisted breaths

Prompt: the heart rate is 120 per minute with good chest movements but there is no spontaneous breathing

- Continues bag-mask PPV as 'breathe – two – three……'
- Assess heart rate and breathing every 30 seconds

Prompt: The heart rate is 120 per minutes and there is spontaneous breathing

- Stops PPV
- Provides post-resuscitations care

SCENARIO 4: IMPROVING VENTILATION

Due to uncontrolled complications of pre-eclampsia, an emergency C-section is planned for a 32-year-old gravida 4 mother at 34 weeks of gestation. You were requested to attend the delivery. You have completed the steps of preparation in time. The baby is born limp and cyanosed. After drying and stimulation, the assessment of breathing revealed the baby is not breathing/crying. How will you proceed?

- Opens the airway by making neutral position (sniffing) of the head
- Reassesses for breathing/crying

Prompt: There are no secretions in the baby's mouth or nose and the baby is still not breathing or crying

- Clamps and cuts the cord and moves the baby to resuscitation area
- Initiates bag-mask PPV
- Assesses heart rate and breathing after 5 assisted breaths

Prompt: The heart rate is 90 per minute and there is no spontaneous breathing or movement of chest with bag-mask PPV

- Readjusts mask
- Repositions head
- Provides bag-mask PPV breaths through bag and mask or T-piece resuscitator
- Assesses for heart rate and chest movement after 5 assisted breaths

Prompt: The heart rate is 80 per minute and there is no chest movement

- Looks for and clears secretions from mouth and nose (if needed)
- Opens the mouth slightly
- Provides bag-mask PPV breaths through bag and mask or T-piece resuscitator
- Assesses for heart rate and chest movement after 5 assisted breaths

Prompt: The heart rate is 70 per minute and there is no chest movement

- Continues bag-mask PPV by squeezing the bag harder/increasing T-piece pressure
- Assesses for heart rate and chest movement after 5 assisted breaths

Prompt A: The heart rate is 110 per minute and there is chest movement with bag-mask PPV

- Continues PPV with rhythm of 'breathe, two, three'
- Assesses heart rate and chest movement every 30 seconds

Prompt: The heart rate has become 120 per minute after giving PPV for some time and the baby has started crying

- Stops PPV
- Provides post-resuscitation care

Prompt B: The heart rate is 70 per minute and there is no chest movement with bag-mask PPV

- Considers alternate airways i.e., ETT, LMA
- Continues PPV

Prompt: The heart rate is 70 per minute and there is no chest movement with PPV

- Considers other possibilities e.g., DOPE (Displacement of airway, Obstruction, Pneumothorax, Equipment or user error)

SCENARIO 5: PPV WITH GOOD CHEST MOVEMENT AND HEART RATE < 60 BPM

A newborn with absence of spontaneous breathing but good chest movement is being resuscitated at birth. Heart rate is 50 beats per minute. How will you proceed?

- Continues PPV as 'breathe – two – three ...'
- Assesses heart rate and breathing after 30 seconds

Prompt: The heart rate is 110 per minute but there is no spontaneous breathing

- Continues PPV as 'breathe – two – three ...'
- Assesses heart rate and breathing every 30 seconds

Prompt: The heart rate is 110 per minute and baby starts crying

- Stops PPV
- Provides post-resuscitation care

SCENARIO 6: CHEST COMPRESSIONS

A newborn requires resuscitation at birth. He does not have spontaneous breathing, but good chest movements are achieved after performing steps of improving ventilation, including insertion of an alternate airway in the form of ETT. Assessment of heart rate showed it to be 40 beats per minute. How will you proceed further with resuscitation?

- Continues PPV as 'breathe – two – three ...'
- Assesses heart rate and breathing after 30 seconds

Prompt: The heart rate is 40 per minute with good chest movements achieved by PPV given through ETT but no spontaneous breathing

- Increases oxygen to 100%
- Starts chest compressions as 'One-and-Two-and-Three-and-Breathe...'
- Asks helper to apply cardiac monitor, if available
- Assesses heart rate after 60 seconds

Prompt: After 60 seconds, the heart rate is 110 per minute but there is no spontaneous breathing

- Stops chest compressions
- Reduces FiO2 to keep SpO2 90–95% (if pulse oximeter available)
- Continues PPV as 'breathe – two – three ...'
- Assesses heart rate and breathing every 30 seconds

Prompt: The heart rate is 110 per minute but the baby starts breathing

- Stops PPV
- Provides post-resuscitation care

SCENARIO 7: DRUGS

A newborn requires resuscitation at birth. He does not have spontaneous breathing, but good chest movements are achieved after performing steps of improving ventilation, including insertion of alternate airway in the form of ETT. Assessment of heart rate showed it to be 50 beats per minute which did not improve with PPV given for 30 seconds. How will you proceed further with resuscitation?

- Increases oxygen to 100%
- Starts chest compressions as 'One-and-Two-and-Three-and-Breathe...'
- Asks helper to apply cardiac monitor, if available
- Assesses heart rate after 60 seconds

Prompt: After 60 seconds, the heart rate is still 50 per minute and there is no spontaneous breathing

- Continues PPV and chest compressions in 1:3
- Asks helper to give adrenaline (epinephrine) through vascular access, preferably UVC, but if not available, the dose can be given through ETT
- Reassesses heart rate and breathing after 30 seconds

Prompt: After 30 seconds, the heart rate is 120 bpm but there is no spontaneous breathing

- Stops chest compressions
- Reduces FiO2 to keep SpO2 90–95% (if pulse oximeter available)
- Continues PPV as 'breathe – two – three ...'
- Assesses heart rate and breathing every 30 seconds

Prompt: After 30 seconds, the heart rate is 125 bpm and baby has started breathing

- Stops PPV
- Provides post-resuscitation care

Prompt: How will you prepare and administer epinephrine

- Routes: Umbilical vein, intraosseous, or intravenous route
- Dose: 0.1–0.3 ml/kg of 1:10,000 preparation, followed by 3.0 ml of normal saline flush
- Can be repeated after every 3 to 5 minutes

Prompt: After 10 minutes, if the heart rate is 40 per minute, what will you consider?

- Hypovolemia, displaced/obstructed airway, pneumothorax, equipment failure

SCENARIO 8: PRETERM WITH LABOURED BREATHING

You are called to attend the SVD of a preterm baby at 28+1 weeks of gestational age. What steps will you take?

- Visit the obstetric unit
- Review antenatal history to assess health, pregnancy status, and perinatal risk factors.
- Counsel the parents explaining the anticipated plan for newborn care.
- Attend the case with 2 or more members and assign their roles, discussing possible interventions.
- Ensure that the resuscitation area for preterm neonate is ready, i.e., it is warm, clean, well-lighted and the resuscitation equipment and supplies, including polyethylene bag or plastic wrap, radiant warmer, CPAP machine and surface warmer readily accessible.
- Perform hand hygiene.
- Put on sterilized gown and gloves.
- Check the resuscitation equipment including suction devices, self-inflating bag, face masks, oxygen, CPAP, and pulse oximeter. Check to ensure they are properly working.

Prompt: The baby is delivered

- Calls out the time and starts the clock.
- Puts the baby in polyethylene/plastic bag up to his/her neck. Does not dry with a pre-warmed towel.
- Gently stimulates the baby, if required.
- Rapidly assesses the baby for general condition, likely gestation, tone and breathing/crying.
- Transfers the baby to radiant warmer.
- Gives 30% supplemental oxygen to maintain time matched SpO2.
- Assesses whether baby is breathing/crying.

Prompt: The baby has laboured breathing (respiratory rate 66/min), what will you do?

- Starts nasal CPAP using pressure of 5–6 cm H2O
- Monitors and adjusts oxygen supplementation.
- Transfers to NICU.
- Counsels the parents.
- Completes documentation.

SCENARIO 9: MECONIUM-STAINED AMNIOTIC FLUID

You are called to attend SVD of a mother at 41 weeks of gestation. The membranes have ruptured and there is discharge of meconium-stained liquor. You have completed the steps of preparation. The baby is just delivered. Demonstrate how will you proceed:

- Calls out the time and starts the clock.
- Puts the baby on the dry and pre-warmed towel placed on mother's abdomen.
- Rapidly assesses the baby for general condition, likely gestation, tone and breathing/crying.
- Dries thoroughly with the help of towel placed over mother's abdomen.
- Replaces the soiled, wet towel with fresh, dry and pre-warmed towel.
- Assesses whether baby is breathing/crying.

Prompt: The baby is not breathing/crying

- Opens the airway by making neutral position (sniffing) of the head.
- Assesses for breathing/crying.

Prompt: The baby is not breathing/crying

- Looks for secretions in mouth and nose.

Prompt: There are secretions in the baby's mouth and nose and the baby is still not breathing/crying

- Clears secretions using sucker (bulb/penguin/mechanical), first from mouth and then nose.
- Assesses for breathing/crying.

Prompt: The baby has started crying

- Keeps the baby with mother.
- Monitors for activity, breathing and temperature.
- Cuts the cord at 60–90 seconds.
- Maintains skin-to-skin contact.
- Encourages mother to breastfeed within an hour.

SCENARIO 10: MECONIUM-STAINED AMNIOTIC FLUID AND OTHER POSSIBILITIES

You are called to attend SVD of a mother at 41 weeks of gestation. The membranes have ruptured and there is discharge of meconium-stained liquor. You have completed the steps of preparation. The baby is just delivered. Demonstrate how will you proceed:

- Calls out the time and starts the clock.
- Puts the baby on the dry and pre-warmed towel placed on mother's abdomen.
- Rapidly assesses the baby for general condition, likely gestation, tone and breathing/crying.
- Dries thoroughly with the help of towel placed over mother's abdomen.
- Replaces the soiled, wet towel with fresh, dry and pre-warmed towel.
- Assesses whether baby is breathing/crying.

Prompt: The baby is not breathing/crying

- Opens the airway by making neutral position (sniffing) of the head.
- Assesses for breathing/crying.

Prompt: The baby is not breathing/crying

- Looks for secretions in mouth and nose.

Prompt: There are secretions in the baby's mouth and nose and the baby is still not breathing/crying

- Clears secretions using sucker (bulb/penguin/mechanical), first from mouth and then nose.
- Assesses for breathing/crying.

Prompt: The baby is still not breathing/crying

- Clamps and cuts the cord and moves the baby to resuscitation area.
- Initiates bag-mask PPV.
- Assesses heart rate and breathing after 5 assisted breaths.

Prompt: The heart rate is 90 per minute and there is no spontaneous breathing or movement of chest with bag-mask PPV

- Performs steps of 'improve ventilation' (MR. SOPA).
- Continues PPV.
- Observes for chest movement and checks for HR after 30 seconds.

Prompt: The heart rate is 70 per minute and there is no chest movement with PPV given through ETT

- Considers other possibilities e.g., pneumothorax, diaphragmatic hernia and manages accordingly.

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