DEDER GENERAL HOSPITAL

PREMATURE BIRTH MANAGEMENT PROTOCOL

PREPARED BY: HSQU

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Deder, Eastern Ethiopia

PROTOCOL APPROVAL SHEET

TIT

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AUTHOR

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Name	Position	Role	Sign
Abdi Tofik (BSc, MPH)	Quality Director	Team leader	
Mahammad Aliyi (BSc N)	Quality Officer	Member	
Abdella Aliyi (BSc MW)	Quality Officer	Member	

SMT APROVAL

Name	Position	Role	Sign
Nuredin Yigezu (BSc, MPH)	CEO	Chair person	
Dr. Derese Gosa (GP)	Medical director	Member	
Dr Isak Abdi (G/Surgeon)	Staff Representative	Member	
Dr. Dawit Seifu (GP)	IPD Director	Member	
Hamza Jamal (BSc N)	Metron	Member	
Abrahim Tahir (BSc N)	HR Head	Secretary	
Obsa Usma'il (BA)	Finance and procurement head	Member	
Bellisa Usma'il (BSc Pharm)	Pharmacy head	Member	
Alamudin Usma'il (BSc Lab)	Laboratory head	Member	
Dine Bakar (BA)	Internal Auditor	Member	
Redwan Sharafuddin (BSc Pharm)	Planning Head	Member	
Mahammad Aliyi (BSc N)	Reform Head	Member	
Nure Jamal (BA)	General service head	Member	
Mahammad Shamshaddin (BSc)	Qondaala Naamusaa	Member	

REVIEW

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1. INTRODUCTION

Prematurity, defined as birth before 37 completed weeks of gestation, is a significant contributor to neonatal mortality and morbidity worldwide. Globally, preterm birth accounts for approximately **35% of all neonatal deaths**. In Ethiopia, the burden is further compounded by limited neonatal intensive care resources, delayed referrals, and inadequate antenatal care coverage.

Premature newborns have immature organ systems, making adaptation to extra-uterine life difficult. They face a higher risk of respiratory distress, feeding intolerance, hypothermia, hypoglycemia, infections, and long-term neurodevelopmental impairment. These challenges necessitate a **standardized, evidence-based clinical protocol** to guide healthcare workers in providing optimal care, improving survival, and reducing long-term disability.

2. PURPOSE

This protocol aims to:

1. Provide a **standardized approach** to prevention, early detection, and management of prematurity and related complications.
2. Improve **survival rates** and **long-term outcomes** for preterm infants admitted to Deder General Hospital.
3. Serve as a **practical guide** for all healthcare professionals involved in maternal and newborn care.

3. SCOPE

This protocol applies to:

- **Settings**: Delivery wards, NICU, postnatal wards, and outpatient follow-up clinics at Deder General Hospital.
- **Patients**: All preterm infants delivered at, or referred to, the hospital.
- **Staff**: Midwives, nurses, pediatricians, general practitioners, obstetricians, and allied healthcare workers.

4. OBJECTIVES

General Objective

- To standardize care for premature newborns to reduce morbidity and mortality.

Specific Objectives

- Identify risk factors for preterm birth during antenatal visits.
- Implement antenatal and intrapartum preventive measures.
- Guide clinical decision-making for managing common complications.
- Promote parental involvement and **Kangaroo Mother Care (KMC)**.
- Establish safe referral and transport systems for unstable preterm infants.

5. DEFINITIONS

Term	Definition
Prematurity	Birth before 37 completed weeks gestation.
Late Preterm	34–36+6 weeks GA.
Moderate Preterm	32–33+6 weeks GA.
Very Preterm	28–31+6 weeks GA.
Extremely Preterm	<28 weeks GA.
Low Birth Weight (LBW)	<2500 g.
Very Low Birth Weight (VLBW)	<1500 g.
Extremely Low Birth Weight (ELBW)	<1000 g.

6. EPIDEMIOLOGY AND LOCAL CONTEXT

In Ethiopia, preterm birth contributes to an estimated **one-third** of neonatal deaths. At Deder General Hospital, preliminary NICU data from the past year suggests that **~28–32%** of admissions are preterm infants, with mortality rates significantly higher than in term newborns. The majority of these births are associated with preventable causes such as **hypertensive disorders in pregnancy**, **untreated infections**, and **poor ANC attendance**.

7. CAUSES OF PREMATURITY

1. **Maternal Socioeconomic Factors**
   - Low socioeconomic status.
   - Poor maternal nutrition.
2. **Maternal Medical Conditions**
   - Chronic illnesses (HIV, TB, hypertension, diabetes).
   - Acute infections (malaria, urinary tract infections).

3. **Obstetric Factors**
    - Multiple pregnancy.
    - Hypertensive disorders.
    - Antepartum hemorrhage.
    - Cervical incompetence.
    - Uterine anomalies.
4. **Other**
    - Trauma.
    - Excessive physical exertion.
    - Stress.

8. PREVENTION STRATEGIES

Antenatal Prevention

- Early **ANC booking** and at least 4 recommended visits.
- Screening and treating maternal infections.
- Nutritional supplementation (iron, folic acid, balanced diet).
- Antenatal corticosteroids (24–36+6 weeks) for women at risk of preterm delivery.
- Counseling on birth preparedness.

Intrapartum Prevention

- Avoid unnecessary induction of labor before 39 weeks.
- Appropriate monitoring during labor.
- Prompt management of obstetric emergencies.

9. COMMON PROBLEMS OF PREMATURITY AND MANAGEMENT

9.1 Respiratory Problems

A. Respiratory distress syndrome (RDS)

- **Cause**: Surfactant deficiency.

Incidence:

- <28 weeks: 60–80%
- 32–36 weeks: 15–35%
- 37 weeks: 5%

Risk factors:

- Low gestational age,
- low birth weight,
- Male predominance,
- Maternal diabetes,
- Perinatal asphyxia,
- Elective caesarean section

Clinical manifestations

- Respiratory distress (Grunting, flaring, retraction, tachypnea)
- Auscultatory findings – markedly decreased air entry bilaterally
- Cyanosis
- Low oxygen saturation

Investigation

- CBC,
- chest X-ray, if possible blood gas analysis,
- septic work up

Prevention

- Antenatal corticosteroids (at least 24-48 hrs before delivery) given to pregnant women< 37 weeks of gestational age
- Prevention of preterm delivery
- Early identification of pregnancy and access to obstetric ultrasound for gestational age determination

Management

- Maintaining normal temperature after birth
- Assess need for resuscitation- need for positive pressure ventilation
- Initiation of delivery room continuous positive airway pressure is recommended for those less than 32 weeks gestational age or with signs of respiratory distress at birth
- Transfer to NICU- with CPAP and maintaining normal temperature if possible use transport incubator
- Nasal CPAP with continuous monitoring (see Neonatal Procedure)
- Fluid and metabolic management
- Surfactant administration
- Antibiotic should be started for newborn with respiratory distress and can be safely discontinued after sepsis workup is negative.

Complication and Prognosis

- Air leaks (pneumothorax, pneumo-mediastinum)
- Pulmonary haemorrhage
- Bronchopulmonary dysplasia
- Nasal septal injury from the interface/ prong used for CPAP delivery

B. **Apnea of Prematurity**

It is a disorder of respiratory control characterized by cessation of breathing for ≥20 seconds or less than that if it is accompanied by bradycardia (heart rate <100/min) or cyanosis. It is classified into three types:

1. **Central** – no airflow, no respiratory efforts
2. **Obstructive** – no airflow, despite respiratory efforts
3. **Mixed** – often begins as central and later become obstructive

It commonly occurs in premature newborns due to immaturity of brain functions and generally begins 1 or 2 days after birth. In term newborns, it occurs in association with serious identifiable causes.

Etiology:

- Prematurity, infection, metabolic abnormalities
- Hypoxemia, anemia, hypo or hyperthermia
- Gastroesophageal Reflux
- Upper airway malformations
- Nasal blockage from secretions

Evaluation

- It is important that preterm neonates ≤34 weeks of gestational age are commenced on continuous oxygen saturation monitor with alarm set at <90% and time lag for alarm to go off at 20 seconds.
- Prompt response to alarm is required to ascertain cause of any desaturation.
- If no monitor is available it is important to closely observe neonate for cyanosis, mottling, and not breathing.

- Work up for apnea: -FBC, CRP, glucose, blood culture, RBS, serum electrolytes, serum aminophylline level if possible and cranial ultrasound scan to rule out IVH.
- If not tolerating feeds, +/- abdominal distension, consider necrotizing enterocolitis.

Prevention of Apnoea of prematurity

A) When to start caffeine /aminophylline:

- About 25% of neonates <34 weeks have apnea of prematurity. Therefore, it is reasonable to start caffeine/aminophylline prophylactically to all premature infants of gestational age <34 weeks or weight <1500g. If caffeine is available this would be the first choice over aminophylline.
- Very low birthweight (<1500g) babies should receive prophylactic caffeine/ aminophylline orally until they reach 1.5kg or 34 weeks GA, whichever comes first.

B) Dosages of caffeine citrate and aminophylline

Caffeine Dose:

- **Loading dose**: 20mg/kg caffeine citrate IV mainly or NG/PO (depending on the circumstances) stat on from birth on Day 1
- **Then maintenance**: 5-10mg/kg/day caffeine citrate IV or NG/PO given as once daily dose in the morning.
- Can be given orally even if baby is still on IV fluids.

Aminophylline dose (if caffeine citrate is not available)

- **Loading dose**: 5mg/kg aminophylline IV (or PO) given slowly over 20min
- **Then maintenance**: 2mg/kg /per dose twice daily (IV or per oral PO) starting 24hours after loading

Management of Apnoea of prematurity

- **Resuscitate patient first:**
  - Stimulate the baby by rubbing his chest or feet for 10 seconds
  - Suction mouth and nose
  - If the baby does not begin to breathe immediately, position head in a neutral position and ventilate using a bag and mask.
  - If oxygen saturations <90%, commence oxygen
  - Check glucose level with glucometer and correct as indicated
- Establish cause and start treatment for suspected cause.
- Immediate investigations are blood sugar, temperature, PCV, sepsis screening, electrolytes
- Commence CPAP with close monitoring especially if recurrent apnea
- Treat for sepsis if other signs. Change to second line antibiotics if already on 1st line antibiotics
- **KMC** should be continued or started if baby is stable.

9.2 Neurological Problems

- NEC is an acute intestinal necrosis syndrome of unknown etiology Associated with intestinal ischemia and bacterial overgrowth in the gut. Prematurity is the single greatest risk factor.
- It is a most common serious surgical disorder among newborns and is a significant cause of neonatal morbidity and mortality.
- Premature newborns tend to get NEC later compared with full terms.
- The most commonly affected part is the terminal ileum and proximal colon parts of intestine.
- Pick onset of NEC is usually 2 to 3 weeks after birth in preterm newborns; the age of onset decreases as gestational age increases.

Risk Factors

It has multifactorial associations listed as follows the final result being activation of an inflammatory cascade:

- **Prematurity**: immature host defence, immature regulation of circulation
- **Formula feeding**: 90 to 95% affected neonates had been fed formula, decreased risk with breast milk
- **Delayed initiation of trophic feeding**
- **Prolonged and unnecessary** antibacterial utilization

Clinical manifestations

- **Abdominal Signs** - abdominal distension or tenderness, feeding intolerance, feeding residua, vomiting, blood in stool, loose stools, abdominal wall erythema,
- **Systemic signs**- Apnea, bradycardia, respiratory distress, temperature instability, irritability, lethargy, poor feeding, bleeding tendency, and shock.

Investigations

- CBC (Leucopenia, thrombocytopenia)
- Serum Electrolytes (Hyponatremia, hypokalemia, metabolic acidosis)
- Disseminated intravascular coagulopathy(DIC)
- Glucose instability
- Plain abdominal X-ray (prone with lateral or decubitus)
- Pneumatosis intestinalis, dilated loops, thickened bowel wall, ileus, pneumo-peritoneum

Table 1: Management of NEC

Bell staging criteria	**Diagnosis**	**Management (usual attention to respiratory, cardiovascular and hematologic resuscitation** presumed)
Stage I (suspect)	Clinical signs and symptoms- abdominal Non-diagnostic radiography	↓ NPO with IV fluids ↓ Nasogastric Drainage ↓ CBC, electrolytes, Serial Abdominal x-ray ↓ Blood Culture ↓ Stool heme test and Clini test ↓ Ampicillin and gentamicin × 48hours
Stage II (definite)	Clinical signs and symptoms, laboratory signs Pneumatosis intestinalis on radiograph	↓ NPO with parenteral nutrition if available ↓ Nasogastric Drainage ↓ CBC, electrolytes, Abdominal x-ray, Blood culture ↓ Stool heme test and Clinitest ↓ Ampicillin, gentamicin and clindamycin × 14 days ↓ Surgical consultation
Stage III (Advanced)	Clinical signs and symptoms , laboratory signs, Critically ill Pneumatosis intestinalis or pneumoperitoneum on radiograph	↓ PO with parenteral nutrition if available ↓ Nasogastric drainage ↓ CBC, electrolytes, Abdominal x-ray Stool heme test and Clini test ↓ Ampicillin, gentamicin, and clindamycin × 14 days ↓ Surgical consultation with intervention, if indicated: ↓ Resection with enterostomy or primary anastomosis ↓ In selected cases (usually <1,000 g and unstable), bedside drainage under local anesthesia
AP = anteroposterior; CBC = complete blood count, NPO = nothing by mouth.		

N.B. Ampicillin (or penicillin) plus gentamicin plus metronidazole for 10 days is an alternative management (pocket book of hospital care for children; 2nd ed.WHO, 2013)

Complication and prognosis

- Sepsis
- Intestinal strictures,
- Short bowel syndrome,
- Neurodevelopmental delay
- Mortality 30 to40%
- Recurrence (6%)

10. DISCHARGE CRITERIA

- Stable in room air ≥5 days.
- Feeding well.
- Consistent weight gain.
- Parents competent in-home care.

11. FOLLOW-UP PLAN

- Weekly visits until term corrected age.
- Growth, development, and vision/hearing checks.

12. MONITORING & EVALUATION

- Monthly review of prematurity cases.
- Morbidity and mortality audits.
- Use of QI tools for ongoing improvement.

13. APPENDICES

1. RDS Management Algorithm
2. NEC Staging & Treatment Table
3. Apnea Management Flowchart
4. Discharge Readiness Checklist
5. KMC Counseling Guide

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