Premature baby

**Premature:** is live born infants delivered before 37 wk from the 1st day of the last menstrual period.

**Low birth weight (LBW):** (birth weight <2500g) is due to either prematurity, poor intrauterine growth (IUGR, SGA), or both. Prematurity and IUGR are associated with increased neonatal morbidity and mortality than gestational age-matched infants.

**Very Low birth weight (VLBW):** infants weigh <1,500g, and are predominantly premature, their survival is directly related to birth weight. VLBW neonates have a higher incidence of re-hospitalization during the 1st yr of life for sequelae of prematurity, including; infections, neurologic complications, and psychosocial disorders.

**Factors Related to Premature Birth and Low Birth weight:**
A strong positive correlation exists between both preterm birth, IUGR and low socioeconomic status. Families of low socio-economic status have higher rates of maternal under nutrition, anemia, illness, inadequate prenatal care, drug misuse, obstetric complications, and maternal histories of abortions, stillbirths, premature or LBW infants. Other associated factors include single-parent families, teenage pregnancies, short inter-pregnancy interval, maternal smoking.
Premature birth of infants whose weight is appropriate for their preterm gestational age is associated with medical conditions; inability of the uterus to retain the fetus, premature rupture of the membranes, premature separation of the placenta.
The etiology of preterm birth is multifactorial and involves a complex interaction between fetal, placenta, uterine, and maternal factors.
**Identifiable Causes of Preterm Birth**

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<tr>
<th>1-<strong>FETAL</strong></th>
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<td>Fetal distress</td>
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<td>Multiple gestation</td>
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<td>Erythroblastosis</td>
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<td>Nonimmune hydrops</td>
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<tr>
<th>2-<strong>PLACENTAL</strong></th>
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<td>Placental dysfunction</td>
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<td>Placenta previa</td>
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<td>Abruplio placentae</td>
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<th>3-<strong>UTERINE</strong></th>
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<td>Bicornuate uterus</td>
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<td>Incompetent cervix (premature dilatation)</td>
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<th>4-<strong>MATERNAL</strong></th>
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<td>Preeclampsia</td>
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<td>Chronic medical illness (e.g., cyanotic heart disease, renal disease)</td>
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<td>Infection (e.g., Listens monocytoes, group B streptococcus, urinary tract infection, bacterial vaginosis, chorioamnionitis)</td>
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<td>Drug abuse (e.g., cocaine)</td>
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<th>5-<strong>OTHER</strong></th>
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<tr>
<td>Premature rupture of membranes</td>
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<td>Polyhydramnios</td>
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<td>Iatrogenic, Trauma</td>
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IUGR is associated with medical conditions that interfere with the circulation and efficiency of the placenta, with the development or growth of the fetus, or with the general health and nutrition of the mother.
Factors Often Associated with Intrauterine Growth Restriction

1. Fetal
   - Chromosomal disorders (e.g. autosomal trisomies)
   - Chronic fetal infections (e.g. cytomegalic inclusion disease, congenital rubella, syphilis)
   - Congenital anomalies
   - Irradiation
   - Multiple gestation
   - Pancreatic hypoplasia
   - Insulin deficiency and Insulin-like growth factor type I deficiency

2. Placental
   - Decreased placental weight or cellularity, or both
   - Decrease in surface area
   - Villous placentitis (bacterial, viral, parasitic)
   - Infarction
   - Tumor (chorioangioma, hydatidiform mole)
   - Placental separation
   - Twin transfusion syndrome

3. Maternal
   - Toxemia
   - Hypertension or renal disease, or both
   - Hypoxemia (high altitude, cyanotic cardiac or pulmonary disease)
   - Malnutrition or chronic illness
   - Sickle cell anemia
   - Drugs (narcotics, alcohol, cigarettes, cocaine, antimetabolites)
Spectrum of disease in low-birth weight infants; immaturity increases the severity but reduces the distinctiveness of the clinical manifestations of most neonatal diseases. Among VLBW infants, morbidity is inversely related to birth weight.

Problems of LBW Infants; These include; Respiratory distress syndrome, pulmonary hemorrhage, aspiration syndrome, pneumothorax, apnea, hypoglycemia, hypocalcemia, hyperbilirubinemia, anemia, hypothermia, feeding problems, bacterial sepsis, necrotizing enterocolitis and DIC.

Causes of death in LBW; Morbidity is inversely related to birth weight. These include; respiratory distress syndrome, intraventricular hemorrhage (IVH), sepsis, asphyxia, birth injuries, and congenital malformations.

Problems associated with IUGR LBW infants are; Perinatal asphyxia (↓ placental perfusion during labor, chronic fetal hypoxia–acidoisis; meconium aspiration syndrome), hypoglycemia, polycythemia-hyperviscosity (fetal hypoxia, erythropoietin production), hypothermia, pulmonary hemorrhage, meconium aspiration, necrotizing enterocolitis and illnesses related to congenital anomalies and syndromes.

Causes of death in term infants; asphyxia, infection, anomalies and aspiration pneumonia.

Complications of prematurity as classified by systems
Respiratory; Respiratory distress syndrome, Broncho-pulmonary dysplasia, Pneumothorax, pneumomediastinum, Pulmonary hypoplasia, Pulmonary hemorrhage and apnea.
Cardiovascular; Patent ductus arteriosus, Hypotension, Hypertension, Bradycardia
Hematologic; Anemia (early or late onset), Disseminated intravascular coagulopathy, Vitamin K deficiency.
Gastrointestinal; Poor function and motility, Necrotizing enterocolitis, Hyperbilirubinemia (direct, indirect). Spontaneous gastrointestinal isolated perforation.
Metabolic-Endocrine; Hypocalcemia, Hypoglycemia, Hyperglycemia, Late metabolic acidosis, Hypothermia.
Central Nervous System; Intraventricular hemorrhage, Periventricular leukomalacia, Seizures, Retinopathy of prematurity, Deafness, Hypotonia, and Kernicterus.
Renal; Hyponatremia, Hypernatremia, Hyperkalemia, Renal tubular acidosis, Renal glycosuria, Edema.
Infections; congenital, perinatal, nosocomial (bacterial, viral, fungal, protozoal)

Apnea; Apnea is defined as the cessation of airflow. Apnea is pathologic if absent airflow is prolonged (≥ 20 seconds) or accompanied by bradycardia (heart rate <100 beats per minute) or cyanosis. Bradycardia and cyanosis are usually present after 20 seconds of apnea, although they can occur more rapidly in the small premature infant. Causes include; Central nervous system, Respiratory, sepsis, meningitis, Metabolic (↓ Glucose, ↓ calcium, ↓↑ sodium, ↑ ammonia, ↑ organic acids), ↑ ambient temperature, hypothermia, cardiovascular, and immaturity of respiratory center.

Cyanosis at birth; 1. Central or peripheral nervous system hypoventilation (Intracranial hypertension, hemorrhage, oversedation, diaphragm palsy, seizures)
2. Respiratory causes; Airway: Choanal atresia/stenosis, laryngeal/tracheal stenosis, vascular compression). Lung: Respiratory distress syndrome, Transient tachypnea, Meconium aspiration, Pneumonia (sepsis), Pneumothorax, Congenital diaphragmatic hernia, Pulmonary hypoplasia.

**Retinopathy of prematurity (ROP):** This retinal vasculopathy occurs almost exclusively in preterm infants; vaso-proliferation, scarring, and potentially blinding retinal detachment. Prematurity is the risk factor. **Hypoxia** is a major factor, but other problems, such as respiratory distress, apnea, bradycardia, infection, hypoxia are contributory factors. Generally, the lower the birth weight and the sicker the infant, the greater the risk for ROP. Use of supplemental vitamin E as antioxidant has no proven efficacy. No safe level of oxygen has yet been determined but each infant must be treated with whatever is necessary to sustain life and neurologic function. Ophthalmologic examination for ROP of infants (less than 1,500 g at birth and those born before 28 wk) at risk is recommended and performed at 4-6 wk of life. Treatment in selected cases is cryotherapy or laser photocoagulation.

**Nursery care of premature;** At birth, measures to clear the airway, initiate breathing, care for the umbilical cord and eyes, and administer vitamin K are the same as for normal weight and maturity infants. Additional considerations;

1- **Thermal Control.** the insulating layer of subcutaneous fat is thinner in low-birth weight infants than term infants. The survival rate of LBW and sick infants is higher when they are cared for near their neutral thermal environment. Incubators or radiant warmers can be used to maintain body temperature. The optimal environmental temperature for minimal heat loss and minimal oxygen consumption for an unclothed infant is one that maintains the infant's core temperature at 36.5-37.0°C. It depends on an infant's size and maturity; the smaller and more immature the infant, the higher the environmental temperature required.

2- **Administering oxygen.** to reduce the risk of injury from hypoxia and circulatory insufficiency must be balanced against the risk of hyperoxia to the eyes (retinopathy of prematurity) and oxygen injury to the lungs. Oxygen is administered via a head hood, nasal cannula, continuous
positive airway pressure apparatus, or endotracheal tube. The concentration of inspired oxygen is adjusted in accordance with the oxygen tension of arterial blood (PaO₂) or noninvasive methods such as continuous pulse oximetry.

3- Prevention of Infection. Premature infants have an increased susceptibility to infection. Prevention includes: hand-washing, avoiding crowding, meticulous skin care, and surveillance of nosocomial infection. Routine immunizations should be given on the regular schedule at standard doses.

Post-term infants; are those born after 42 wk of gestation, as calculated from the mother's last menstrual period, regardless of birth weight.

Post-mature infants; are infants whose gestation exceeds the normal 280 days by 7 or more days. The cause of post-term birth or post-maturity is unknown. These post-term, post-mature infants often have increased birth weight and are characterized by the absence of lanugo, vernix caseosa, long abundant scalp hair, white desquamating skin, and increased alertness.

Infants born post-term in association with presumed placental insufficiency may have various physical signs. Desquamation, long nails, abundant hair, pale skin, alert faces, and loose skin, especially around the thighs and buttocks, give them the appearance of having recently lost weight; meconium-staining (nails, skin, and vernix, umbilical cord, and placental membranes)
may also be noted. When delivery is delayed 3 wk or more beyond term, mortality is significantly increased.

Management; Careful obstetric monitoring, including non-stress testing, biophysical profile usually provides a rational basis for choosing the course of delivery.

**Large for gestational age;** Neonatal mortality rates decrease with increasing birth weight until approximately 4,000 g, after which mortality increases. These oversized infants are usually born at term, but preterm infants with high weights for gestational age also have a significant higher mortality than do infants of the same size born at term; maternal diabetes and obesity are predisposing factors. Infants, who are very large, regardless of their gestational age, have a higher incidence of birth injuries such as cervical and brachial plexus injuries, phrenic nerve damage with paralysis of diaphragm, fractured clavicles, cephalohematomas, and subdural hematoma. The incidence of congenital anomalies, particularly congenital heart disease, intellectual and developmental retardation is statistically more common in high-birthweight term and preterm infants.

*Kangaroo mother care*