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Preterm birth: An overview

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Abstract

Preterm delivery before 37 weeks of gestation is a global public health issue, particularly in India, where the rates vary by area. In India almost 7 out of 100 babies die before one year of age and 65% of these infant deaths occur in the neonatal period, the first 4 weeks of life. Prematurity is the most important factor of neonatal deaths occurring among low-birth-weight infants. Understanding risk factors, such as maternal age and comorbidities like hypertension, is critical. Preterm newborns experience greater mortality and morbidity risks, including respiratory distress and intraventricular hemorrhage ^[1].

Keywords: Preterm, newborn, mortality, morbidity

Introduction

Preterm birth, also known as premature birth, occurs when a baby is born before the 37th week of pregnancy. Preterm births are expected to total 13.4 million in 2020. In 2019, over 900,000 children died due to premature birth problems. Many survivors may live with difficulties for the rest of their lives, such as learning disorders and vision and hearing issues. Globally, prematurity is the leading cause of death in children under the age of 5 years ^[2].

In low-income settings, half of the babies born at or below 32 weeks die due to a lack of feasible, cost-effective care such as warmth, breastfeeding support and basic care for infections and breathing difficulties ^[3]. Premature babies may experience a range of health issues as a result of not having had enough time to grow completely in the womb. Because of the reasons of preterm birth and the immaturity of many organ systems, preterm newborns are more likely to suffer certain disorders. Some common complications associated with preterm birth include respiratory problems, feeding difficulties, jaundice, developmental delays, and an increased risk of infection.

Preterm newborn's survival chances have improved because of medical advancement but they may still experience short- and long-term health problems. Preterm babies frequently require specialized medical attention, such as respiratory support, nutritional support, and ongoing monitoring for potential issues. Prenatal care, avoiding recognized risk factors, controlling chronic diseases, and maintaining a healthy lifestyle throughout pregnancy are all steps taken to prevent premature birth.

There are sub-categories of preterm birth, based on gestational age:

- Extremely preterm (less than 28 weeks)
- Very preterm (28 to less than 32 weeks)
- Moderate to late preterm (32 to 37 weeks) ^[4].

Causes

Preterm birth can be caused by a variety of factors, and often it's a combination of multiple factors rather than one single cause. Here are some of the primary contributors:

- **Multiple pregnancies:** Carrying twins, triplets, or more increases the risk of preterm birth.
- **Preterm labor:** Sometimes, the onset of labor and subsequent delivery occurs before the 37th week of pregnancy without a clear cause. This can happen due to hormonal changes, uterine abnormalities, or infections.
- **Infections:** Common infections associated with preterm birth include urinary tract infections, bacterial vaginosis, and sexually transmitted infections (such as chlamydia, gonorrhea, or syphilis)

- **Maternal health conditions:** Certain maternal health issues, such as preeclampsia, gestational diabetes, obesity, thyroid disorders, and autoimmune diseases, can increase the risk of preterm birth.
- **Uterine or cervical abnormalities:** Such as an incompetent cervix or uterine fibroids.
- **Previous preterm birth:** Women who have previously given birth prematurely are at higher risk of experiencing preterm birth in subsequent pregnancies.
- **Lifestyle factors:** Smoking, drug use, excessive alcohol consumption, poor nutrition, and inadequate prenatal care can increase the risk of preterm birth. Prenatal tobacco smoke exposure is a risk factor for preterm delivery, low birth weight, and adverse neurodevelopment outcomes in childhood [5].
- **Environmental factors:** Exposure to environmental toxins, pollutants, or certain medications may contribute to preterm birth.
- **Placental deformity:** Such as placental abruption (early separation of the placenta from the uterine wall) or placenta previa (placenta covering the cervix) can increase the risk of preterm birth [6].

Clinical features

Preterm birth, defined as birth before 37 weeks of pregnancy are completed, can present various signs and symptoms in babies. Here are some common signs and symptoms of a preterm baby:

- **Low Birth Weight:** Preterm babies often weigh less than 2500 grams at birth.
- **Small Size:** Their size is small with relatively large head and crown heel length is less than 47cm.
- **Poor activity:** General activity is poor, struggle with feeding due to weak sucking reflexes, immature swallowing, or coordination issues.
- **Underdeveloped appearance:** Such as thinner skin, minimal body fat, and less muscle tone.
 - Sutures are widely separated and fontanelles are large.
 - Small chin, protruding eyes due to shallow orbit and absent buccal pad of fat.
 - Deficit ear cartilage with poor recoil.
 - Hair appears woolly & fuzzy.
 - Skin is thin, gelatinous, shiny and excessively pink with abundant lanugo and very little vernix caseosa.
- **Eyes:** Remain closed.
 - Eyes are protruding due to shallow orbits.
 - Visualization difficult.
- **Breast Nodules:** These are absent or less than 5mm, nipples and areola are flat.
- **Abdomen:** Abdomen is full, soft and round with prominent veins.
- **Extremities:** Nails are short & not grown till the tip, deep creases over soles and palms are absent or less.
- **Genitalia:** (Male) testes are undescended, scrotum poorly pigmented with few rugae. In Female labia minora does not cover labia minora, clitoris is hypertrophied & prominent [7].

Physiological changes

- **Respiratory Functions:** Respiration is rapid, shallow, and irregular with periods of apnea and cyanosis. Breathing is diaphragmatic with intercostal recessions due to soft ribs, Cough & gag reflex are weak or absent.

- Resuscitation is challenging due to weak respiratory muscle, poor expansion of lungs, inefficient respiratory center & deficient surfactant.
- **Immature CNS:** Baby is inactive & lethargic, difficulty in feeding due to in coordinated sucking & swallowing reflex, babies are prone to Kernicterus, brain damage, retrolental fibroplasia, intraventricular or periventricular hemorrhage.
- **Circulatory Disturbances:** May have delayed closure of Ductus Arteriosus, peripheral circulation is inadequate, complications like Thromboembolism, Intracranial Hemorrhage, Hemorrhagic problems due to hypofunctional Bone Marrow may occur.
- **Insufficient Gastro-Intestinal & Hepatic:** Poor intake of food is due to poor sucking & swallowing reflex. Regurgitation & aspiration occurs due to less stomach capacity & incompetent cardiac sphincter. Carbohydrate & protein is digested well but not fats.
 - Complications like Necrotizing enterocolitis, Hyperbilirubinemia, Hypoglycemia, Malnutrition, Anemia, Vitamin deficiencies, Hemorrhagic diseases may occur.
- **Metabolic Disturbances:** Poor metabolic activities may lead to hypoglycemia, hypocalcemia, hypoxia, acidosis and hypoproteinemia.
- **Thermoregulation:** Hypothermia is invariable, excessive heat loss due to relatively large surface area due to paucity of brown fat in the baby who is equipped with an inefficient thermostat.
- **Infection:** Infections are the important cause of neonatal mortality, the low levels of IgG antibodies and insufficient cellular immunity
 - Excessive handling, humid and warm atmosphere, contaminated incubators and resuscitators expose them to infecting organisms.
- **Renal immaturity:** Blood urea nitrogen is high due to low glomerular filtrate rate.
 - The renal tubular ammonia mechanism is poorly developed thus acidosis occurs early.
 - Concentration of urine is poor.
 - The solute retention and low serum proteins explain occurrence of edema in preterm infants.
- **Toxicity of drugs:** Poor hepatic detoxification and reduced renal clearance make a preterm baby vulnerable to toxic effects of drugs.

Management

Managing a preterm baby involves a multidisciplinary approach and specialized care to address their unique needs and vulnerabilities.

- Preterm infants frequently require specialized care in the NICU. This unit features modern monitoring and life-support systems.
- Many premature babies have undeveloped lungs, which makes breathing difficult. They may require breathing support, such as oxygen treatment, CPAP, or mechanical ventilation.
- Body temperature regulation is a challenge for preterm infants. To maintain their ideal body temperature, they could need radiant warmers or incubators.
- Proper nutrition is crucial for the growth and development of preterm babies. Initially, they may receive nutrition intravenously until they can tolerate feeding. Breast milk is preferred due to its numerous benefits, including immune support [8].

- Continuous monitoring of vital signs such as heart rate, respiratory rate, temperature, and oxygen saturation is essential.
- Strict infection control measures, including hand hygiene and aseptic techniques, are crucial to prevent infections in the NICU.
- Preterm newborns are more likely to experience neurodevelopmental disorders such as cerebral palsy, developmental delays, and learning challenges. Early intervention programmes and developmental evaluations are critical for achieving the best long-term outcomes.
- Involving parents in their preterm child's care provides benefits such as bonding and improved parental well-being. Neonatal care must provide both emotional and educational support to parents.
- Preterm newborns frequently require long-term follow-up to monitor their growth, development, and potential issues. This could include regular visits to a newborn follow-up clinic or a developmental pediatrician.
- Kangaroo care encourages bonding, regulates body temperature, and improves nursing outcomes.
- Developmental Care: Provide opportunities for sensory stimulation and interaction to support your baby's development. Engage in gentle touch, talking, and singing to promote bonding and cognitive development.
- Immunizations: Keep up-to-date immunizations according to the recommended schedule. Vaccinations help protect preterm babies from serious infections that they are particularly vulnerable to.
- Prepare for emergencies by learning NNR and having emergency contact information readily available. Recognize the symptoms of respiratory distress or other medical issues, and know when to seek immediate medical assistance^[9].

Prevention

Primary prevention

The goal of primary prevention is to lower the risk of preterm delivery by targeting all pregnant women before or during their pregnancies. Primary interventions, which include optimizing weight, quitting smoking, taking nutritional supplements, and preventing late-preterm babies, are good for a woman's general health. Clinically, the pre-pregnancy body mass index (BMI) can be used to assess nutritional health.

Secondary prevention

Secondary preventive initiatives focus on women who are already at a higher risk of preterm birth. The most significant and frequently recognized risk factor for preterm birth is a woman's previous preterm birth^[10].

Conclusion

Preterm birth is a significant burden in health care, accounting for the majority of perinatal mortality. Multiple factors contribute to the etiology of preterm labour, including maternal risk factors, pregnancy-related problems, and social and environmental variables. Developing more advanced preventive and therapeutic strategies to lower preterm birth will be made easier with a deeper comprehension of the causes of preterm birth and how they interact. Prematurity burden can be minimized by identifying women who are at-risk, putting targeted treatments into place, and improving management of obstetric complication.

Conflict of Interest

Not available

Financial Support

Not available

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