

## Preterm Births, Whys, Whats and Way Forward

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**Received:** September 04, 2017; **Published:** September 28, 2017

Preterm births (earlier than 37 weeks gestational age), are the most common cause of infant deaths worldwide. In 2013, about one third (36%) of infant deaths were due to causes related to prematurity. Because of neonatal (first 28 days of life), infant deaths, short- and long-term morbidities in later life, preterm births have become a significant public health problem across the world [1].

The problems are because preterm infants are at greater risk for breathing, feeding problems, cerebral palsy, delays in development, hearing, vision problems and many other disorders [2]. Preterm infants, normally have physical signs of prematurity in reverse proportion to the gestational age. So earlier a baby is born during gestation, greater are the risks [2]. In future life they are at greater risks. They also take an emotional toll with financial burden for families and society at large and risk for various medical problems, because of effects on the organs/systems. The brain, lungs, and liver develop fully in the last weeks of pregnancy [3].

With further research it is being recommended that labor should not be induced before 39 weeks unless required because of risk to the life of mother and/or the baby [4].

According to WHO every year around 15 million babies are born preterm, more than 10% of all births globally. However across 184 countries, the rates of preterm births range from 5% to 18% of births. Almost one million children die each year due to complications of prematurity. In India, of 27 million babies born in 2010, 3.5 million (12.9%) were preterm [1]. Prematurity accounted for 10% of neonatal mortality, around 500,000 deaths per year around the world [5].

Risk factors for preterm births include young age, low economic status, various prepregnancy factors, which could be congenital, including uterine anomalies, cervical incompetence or acquired, prior to pregnancy including obesity or underweight, disorders like diabetes, hypertension, renal disease, tobacco smoking, and psychological stress, multiple pregnancy, more or less liquor amni and so on. In one study preterm births decreased a lot from 2007 to 2014, and CDC research revealed that, this decline was partly due, to the declines in the births to teens and young mothers [3]. Researchers have reported cervical vaginal infections [6]. Obesity does not directly lead to preterm birth, however, it is very often associated with diabetes and hypertension which are risk factors by themselves. Women with a low Body Mass Index (BMI) are also at increased risk for preterm birth [7]. Interval between two pregnancies also makes a difference as women with six-months or less interpregnancy span have a two-fold increase in preterm births [8]. Studies on type of work and physical activity reveal conflicting findings, but it is opined that stressful conditions, hard labor, and long hours could lead to preterm births [9]. Pregnancies that are unwanted or unintended are also at risk for preterm birth [10]. Maternal fine particulate matter (PM2.5) exposure has been identified as a possible risk factor for preterm birth. Globally, in 2010, the number of PM2.5-associated preterm births was estimated as 2.7 million [11].

In spite the long list of risk factors the cause in 50% of preterm births is never known, so the exact cause of preterm birth is difficult to determine in many cases and it may be multi-factorial also [4]. Identifying women at high risk of giving birth early, would enable the

health services to provide special care to prolong pregnancy or make sure to have the best place to give birth. Risk scoring systems have been suggested as a possible way for identifying women at risk. However, it is unclear whether the risk scoring systems would prolong pregnancy and reduce the numbers of preterm births or not [12].

### Complications

Preterm births are the world's number one cause of neonatal deaths, and the second leading cause of all child deaths under five, after pneumonia [1]. The shorter the gestation of pregnancy, the greater the risks of mortality and morbidity. Cardiovascular complications may arise from the failure of the ductus arteriosus to close after birth: patent ductus arteriosus (PDA). Respiratory problems are common, specifically the respiratory distress syndrome (RDS). Gastrointestinal and metabolic problems can arise from feeding difficulties and neonatal hypoglycemia, hypocalcemia, necrotizing enterocolitis (NEC). hematologic complications including anemia of prematurity, thrombocytopenia, and hyperbilirubinemia (jaundice) (which can lead to kernicterus), infections, including, pneumonia, and urinary tract infection are all well-known [2]. Prematurely born infants are also at greater risk for having subsequent serious chronic health problems including chronic lung disease [13]. Viability gestation has been reduced to around 24 weeks from 28 weeks [14,15]. As risk of brain damage and developmental delay are significant at that threshold, even if the infant survives, there are ethical controversies over the aggressiveness of the care rendered to such infants [16]. Even in births before 39 weeks neurological problems can occur.

### Prevention and therapy

There are two main categories of preterm births, induced and spontaneous. In modern days induced preterm births, for various reasons are in big numbers. In some cases the cervix dilates prematurely without pain or perceived contractions, so the mother may not have warning signs, until very late in the birthing process which is much earlier than the right time. A review into uterine monitoring at home to detect contractions and likely preterm births in high risk of having preterm baby revealed that, it did not reduce the number of preterm births [17]. Progesterone, may prevent preterm birth. The usefulness of bed rest is controversial [18,19]. Cervical stitch in different ways continues to be used globally as a mode of prevention of preterm births, sometimes, over used also. Sequelae of prematurity can be reduced to a small extent by medication to accelerate maturation of the fetus, and to a greater extent by preventing preterm birth. Corticosteroids improve outcomes, if births occur between 24 and 37 weeks [20,21]. A number of tocolytic drugs including nifedipine are being used. It was reported that the chances of survival at lesser than 23 weeks were close to zero, while around 23 weeks 15%, 24 weeks 55% and 25 weeks about 80% [22]. Keeping the baby warm through skin to skin contact, supporting breathing, breastfeeding, preventing and treating infections, are essential [4]. In the normal human foetus, several organ systems mature between 34 and 37 weeks. One of the main organs greatly affected by premature birth is the lungs. The lungs are one of the last organs to mature in the womb. Preterm babies born near 37 weeks often have no problems relating to prematurity, if their lungs have developed adequate surfactant, which allows the lungs to remain expanded between breaths. Survival of premature babies also depends on where they are born. Almost 9 out of 10 preterm babies survive in high-income countries because of enhanced basic care and awareness, 1 out of 10 in low-income countries [1]. Maternal PM2.5 exposure through emission need to have strategies reduced and should be considered alongside mitigation of other risk factors associated with preterm births. Reduction of preterm births would substantially reduce neonatal and infant mortality, and deleterious health effects in survivors [11]. Attempts need to continue to predict and prevent preterm births and if preterm birth has to occur, it must be at a safe place with safe mode with best possible care of preterm baby.

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**Volume 5 Issue 6 September 2017**

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