

## Trends and Outcome of Low Birth Weight (LBW) Infants in India

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“Born too soon” is a recent global action report on preterm birth brought out by WHO [1]. Born too light is as crucial as being born too soon. In fact, the “too light group” i.e. the low birth weight (LBW) babies constitute a larger cohort and yet are as vulnerable as the preterms. More than 20 million infants worldwide, representing 16 % of all births in developing countries, are born with LBW. Almost 95 % of these births are in developing countries [2]. In India, almost eight million LBW infants are born each year which accounts for nearly 40 % of the global burden—the highest for any country. LBW babies have 11–13 times higher risk for poor outcome during neonatal period when compared to normal weight babies. They continue to have higher morbidity and mortality beyond the neonatal period and are at risk of developing variety of adult onset diseases [3]. A LBW newborn can have intrauterine growth restriction (IUGR), prematurity or both. In the developed countries, most of the LBW babies are preterm while in India they are predominantly termed intrauterine growth retardation (IUGR). However with increasing preterm births in India, this scenario is likely to change. As LBW has strong association with both maternal and infant mortality, it can serve as a surrogate marker for both these indices.

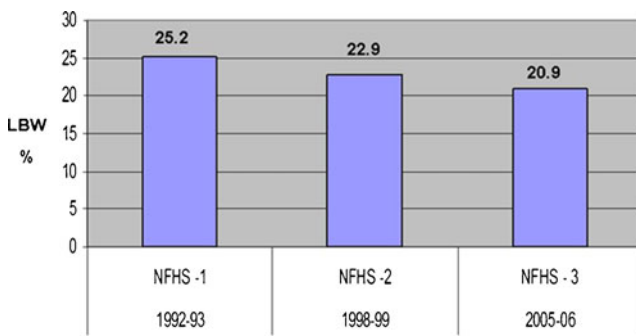
The trend of prevalence of low birth weight babies in India from 1992 to 2006 as per the three National Family Health Surveys (NFHS) is depicted in Fig. 1. Though it may be appreciated as a decreasing trend, the fall in prevalence is sluggish over a decade despite the magnitude of maternal and child health programmes implemented during the same period. An analysis of NFHS data shows that in almost all high fertility states, except Bihar there is a gradual decline in

LBW babies over the past 15 y. Bihar had higher percentage of LBW babies in 2005–06 than the earlier periods. In low fertility states, mothers who were illiterate belonged to poor and poorest category of wealth index, with severe/moderate anemia level, with BMI lower than or equal to 25 kg/m<sup>2</sup>, received no antenatal care and those who suffered from any pregnancy complications had higher chance of giving birth to LBW babies. Interestingly female babies were less likely to be born with LBW compared to their male counterparts [4].

Several factors related to the mother or fetus or both may contribute to LBW. A multicenter matched pair case control study by Mumbare et al. showed that birth spacing <36 mo, maternal height ≤145 cm, pre-delivery weight ≤55 kg, pregnancy weight gain <6 kg, exposure to tobacco, inadequate antenatal care, maternal hypertension, low socio-economic status, maternal anemia and less maternal education were associated with delivery of LBW infants [5].

In a prospective observational study for 17 mo by Tagare et al. (in this issue), out of 1,801 target population of neonates, 87 (4.8 %) had extremely low birth weight (ELBW). Among ELBW babies 45.9 % expired which accounted for 27.2 % of the total neonatal mortality of the unit. Babies with birth weight less than 750 g and gestational age less than 28 wk had poor survival. Respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), pulmonary hemorrhage and sepsis were the major causes of death, while RDS, sepsis and hyperbilirubinemia were the most common morbidities during the neonatal period [6]. These findings could be of value to intensive care neonatologists. Ideally intensive care for a newborn, especially for a LBW baby starts with effective resuscitation followed by timely and meticulous transport. The survival rate of ELBW babies in this study reflects not only on the quality of intensive care after reaching the NICU but also on the well monitored transport of these sick babies. However, these infants

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**Fig. 1** Trend of prevalence of LBW babies in India

reaching a hospital could be just the tip of the iceberg and more LBW babies may have been lost in the community where other socioeconomic factors may be operating. Most LBW babies can be made to survive in home settings with simple, low cost interventions delivered by community health care workers and only a small percentage may require intensive care.

Late preterm neonates form an important group among LBW babies and require special attention. They have significantly higher mortality and morbidity compared to term controls. Maternal hypertension and lower gestational age are strong predictors of their morbidity [7]. Oxygen administration by CPAP, surfactant therapy and innovative methods like INSURE technique have significantly improved survival among preterm babies [8]. Early weaning from mechanical ventilator support in very low birth weight (VLBW) infants has been shown to reduce morbidities such as chronic lung disease and infections. A study by Yadav et al. suggests that bubble CPAP may be more effective in preventing extubation failure in VLBW neonates [9]. Interestingly, ventilator modality at 24 h of age independently can also predict the long term neurodevelopmental outcome in ELBW [10]. Metabolic problems including rickets of prematurity and calcium homeostasis are other areas of concern in sick VLBW babies [11, 12].

Apart from immediate survival, long term outcome in relation to growth and development is also intriguing among LBW babies. A study by Chaudhari et al. revealed that preterm small for gestational age (SGA) children were shorter, lighter, had lesser head circumference and lower IQ at early adolescence [13]. According to Pune LBW study, a follow up of babies less than 2,000 g till 18 y of age showed that preterm SGA males were significantly shorter than controls. There was no difference in the weight, BMI and measurements for adiposity in the LBW and control group. Preterms showed a smaller head circumference and there was no evidence of adiposity or hypertension [14]. A follow up of a VLBW cohort by Sharma et al. at 18 mo of corrected age had shown that half were stunted and one-fourth had microcephaly [15].

In India the optimal growth pattern for LBW infants is uncertain. Although catch-up growth in the first few months of life by small for gestational age babies is desirable, it may predispose to an increased risk of later adiposity, insulin resistance and cardiovascular disease. In view of the high rates of infectious morbidities, undernutrition and stunting in children, the current policy is to promote rapid growth in infancy. However, with socioeconomic transition and urbanization making the Indian environment more obesogenic, and the increasing prevalence of type II diabetes and cardiovascular disease among youth, the long term adverse programming effect of excessive weight gain in infancy on later body composition and metabolism may outweigh short-term benefits [16].

Reducing the incidence of LBW and increasing mean birth weight are now considered seriously in the national action plans. Evidence based interventions if scaled up appropriately, can save millions of newborns including LBW babies in the next few years. Translating knowledge into action is the key for meeting this challenge and realizing the goal.

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