

Low birth weight is associated with maternal nutrition of Indian women

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Abstract

Low birth weight infants are those born weighing less than 2500g. There are two division such as VLBW <1500g and ELBW < 1000g. Low birth weight (birth weight <2.5kg) has been a problem of constant worry in the world, especially in developing countries like India. LBW is an important indicator of infant health. There are many numbers of risk factors of LBW. VLBW infants are also premature and are very small size. They have decline stores of brown fat, glycoprotein that unable to conserve body heat, prenatal asphyxia, RDS, fluid and electrolyte imbalance, impaired renal functions, hyper bilirubinemia, anemia, feeding difficulties and slow rates of weight gain, immunological immaturity, periventricular leukomalacia, hypotension, sudden infant death syndrome (SIDS) etc. The risk factors also increased the morbid of infants. LBW and risk factors also associated with mental factors like mostly maternal nutrition as well as malnutrition of mothers, second birth to teenage mothers (especially > 15 years old), preterm birth or premature birth (born < 37 weeks gestation and often < 30 weeks), multiple birth, maternal health (which linking with exposed to drugs, alcohol, cigarettes during pregnancy) etc. Mostly women of Indian are suffering with malnutrition and they delivered LBW baby.

Key words: LBW, Maternal nutrition, physical activity.

Introduction

Low birth weight (LBW) is defined by the World Health Organization as a birth weight of a live born infant of 2,499 g or less, regardless of gestational age. Subcategories include very low birth weight (VLBW), which is less than 1500 g (3 pounds 5 ounces) and extremely low birth weight (ELBW), which is less than 1000 g (2 pounds 3 ounces). Normal weight at term delivery is 2500–4200 g (5 pounds 8 ounces – 9 pounds 4 ounces). The

period of intrauterine growth and development is one of the most vulnerable periods in the human life cycle. The weight of the infant at birth is a powerful predictor of infant growth and survival, and is dependent on maternal health and nutrition during pregnancy. Low birth weight (LBW) is defined as weighing less than 2,500 g at birth. In developing countries, including India, the majority of LBW infants because of

intrauterine growth retardation (IUGR) are born small at term (>37 wk of gestation) with only 6.7 per cent born prematurely. Low birth weight leads to an impaired growth of the infant with its attendant risks of a higher mortality rate, increased morbidity impaired mental development and the risk of chronic adult disease. Infants who weight 2,000-2,499g at birth have a four-fold higher risk of neonatal death than those who weight 2,500-3,499g. The more severe the growth restriction within the LBW category, the higher is the risk of death (Muthayya et al., 2006). Low birth weight is a major public health concern but it is not a disease or a diagnosis (McAvoy et al., 2006). The literature generally shows that the risk of adverse birth outcomes—low or very low birth weight, preterm birth and neonatal death—is greater for teenagers than for older women. Women with inter pregnancy intervals of less than 18 months appear to be at greater risk of having a premature birth or a low-birth-weight baby than women with longer intervals (Susan et al., 2009). The ability to identify births to the same woman is necessary to understand the poor health outcomes associated with repeat childbearing. Many birth databases contain information on previous live births, but do not link births to the same mother. The magnitude of LBW problem varies widely from country to country, from 4.5% in most developed countries to almost 50% in some of the least developed countries. It is estimated that worldwide 15.5% of all live births per year are Low Birth Weight and more than 95% LBW infants are born in developing countries, 72% in Asia with striking regional variations - 27% in Southern Asia, 6% in Eastern Asia except Thailand (36%). In India the proportion of baby weighing less than 2.5kg is higher in rural areas (28%) than in urban areas (21%). There are two categories of low birth weight

babies: those occurring as a result of restricted foetal growth and those resulting from pre-term birth. Low birth weight infants have a greater risk of poor health or death, require a longer period of hospitalization after birth, and are more likely to develop significant disabilities (UNICEF, 2007). Low birth weight is considered one of the most important indicators of a newborn's chances of survival, with low birth weight being a major risk factor for prenatal and infant mortality. Low birth weight babies are more likely to have health and developmental problems including learning difficulties, hearing and visual impairments, chronic respiratory problems such as asthma and chronic diseases later in life. Low birth weight is also an important population health indicator as it occurs with greater prevalence in disadvantaged populations.

Risk factors associated with low birth weight include: socio-economic disadvantage, poor health and nutrition of women during pregnancy, smoking while pregnant, consumption of drugs and alcohol while pregnant, experiencing abuse while pregnant. It has been demonstrated that maternal smoking is one of the most modifiable risk factors to prevent low birth weight babies in developed countries. This underscores the importance of programs and policies to prevent women from becoming smokers and encouraging those who do smoke to quit. Public health programs and services provide education and resources to women of child bearing age to promote healthy nutrition prior to conception and during pregnancy, provide prenatal education, encourage pregnant women to access prenatal support services, and provide assessments to at risk pregnant women to help ensure that they receive appropriate medical attention. Public health interventions also address factors that

influence health outcomes such as access to nutritious foods, smoking, substance misuse, and alcohol consumption. In 2007, the rate of singleton live births in Ontario with a birth weight of less than 2500 grams was 47.9 per 1,000 births. Based on 36 public health units in Ontario, the highest rate of live births weighing under 2500 grams was 67.5 and the lowest rate was 20.9 per 1,000 births. Low birth weight is usually defined as birth weight below 2,500g, very low birth weight as birth weight below 1,500g, and extremely low birth weight as birth weight below 1,000g (WHO, 1992). Low birth weight babies have a 40-fold greater chance of dying in the neonatal period. There are several problems such as feeding problems, breathing difficulties, brain damage and infections learning, physical and sensory disabilities (hearing and visual impairments) Preterm birth is the leading cause of neonatal mortality and morbidity and childhood morbidity followed by low birth weight, Whether maternal overweight and obesity is associated with increased, decreased or neutral risks of preterm birth has been debated in the literature, with the uncertainty reflected in the American College of Obstetrics and Gynecology Committee opinion on obesity in pregnancy (Sarah et al., 2010).

Singletons born to underweight women have higher risks of PTB (overall, spontaneous and induced) and LBW than those born to women with normal weight (Zhen et al., 2010). All teenage groups were associated with increased risks for pre-term delivery, low birth weight and neonatal mortality. Infants born to teenage mothers aged 17 or younger had a higher risk for low Apgar score at 5 min. Further adjustment for weight gain during pregnancy did not change the observed association. Restricting the analysis to white married mothers with age appropriate

education level, adequate prenatal care, without smoking and alcohol use during pregnancy yielded similar results (Xi-Kuan Chen et al., 2007). Teenage pregnancy increases the risk of adverse birth outcomes that is independent of important known confounders. This finding challenges the accepted opinion that adverse birth outcome associated with teenage pregnancy is attributable to low socioeconomic status, inadequate prenatal care and inadequate weight gain during pregnancy. Whether maternal underweight is associated with increased, decreased or neutral risks of preterm birth (PTB) is debated in the literature. PTB persists as the leading cause of neonatal morbidity and mortality 8 and low birth weight (LBW) is the second most important. In order to accurately risk-stratify a pregnancy at its start as is routinely required, it is important to know the impact of maternal underweight on PTB and LBW (Zhen et al., 2010).

The weight of the infant at birth is a powerful predictor of infant growth and survival, and is dependent on maternal health and nutrition during pregnancy (Muthayya et al., 2006). Adjusted for demographic, pregnancy and behavioural characteristics, the odds that a second infant was low-birth-weight or preterm were elevated if the mother smoked during pregnancy had inadequate prenatal weight gain had an inter pregnancy interval of less than 18 months Women who had received an adequate level of prenatal care had reduced odds of both outcomes. Women younger than 16 also had increased odds of having a low-birth-weight second infant. Further adjustment for socioeconomic characteristics yielded largely the same results (Susan et al., 2009). A girl, who is malnourished during early childhood and puberty becomes a short stature women

and delivers small baby. The best opportunity of breaking this cycle of 'deprivation' is improving the nutritional status of children and adolescents, with greater equity, supported by care for the mothers. The study of low birth weight is also important since birth weight constitutes a good indicator of the current health status of the child and a good predictor of health problems later in the child's life, which furthermore is rather easily available and reliably measured (more reliable than gestational age). This is important as, while more and more low (<2,500g), very low (<1,500g) and extremely low birth weight (<1,000g) children survive, many of those who do survive – especially the very low and extremely low birth weight children – experience health problems from immediately after birth to later in life. So attempting to use prenatal variables to predict the later development of children has to be valued. It is not only necessary to identify in early childhood factors that cause disabilities in order to change, eliminate or lower their future impact, but also important to identify infants at risk of being disabled (Lampi et al., 2011). However, the prevention of low birth weight remains an explicit part of World Health Organization public health policy to decrease infant mortality. Low birth weight is associated with a number of key developmental, educational and socio-economic outcomes in later life. LBW is either caused by preterm birth (that is, a low gestational age at birth, commonly defined as younger than 37 weeks of gestation) or the infant being small for gestational age (that is, a slow prenatal growth rate), or a combination of both. In general, risk factors in the mother that may contribute to low birth weight include young ages, multiple pregnancies, previous LBW infants, poor nutrition, heart disease or hypertension, drug

addiction, alcohol abuse, and insufficient prenatal care. Environmental risk factors include smoking, lead exposure, and other types of air pollutions. Four different pathways have been identified that can result in preterm birth and have considerable evidence: precocious fetal endocrine activation, uterine over distension, decidual bleeding and intrauterine inflammation/infection. From a practical point a number of factors have been identified that are associated with preterm birth, however, an association does not establish causality. Being small for gestational age can be constitutional, that is, without an underlying pathological cause, or it can be secondary to intrauterine growth restriction, which, in turn, can be secondary to many possible factors. For example, babies with congenital anomalies or chromosomal abnormalities are often associated with LBW. Problems with the placenta can prevent it from providing adequate oxygen and nutrients to the fetus. Infections during pregnancy that affect the fetus, such as rubella, cytomegalovirus, toxoplasmosis, and syphilis, may also affect the baby's weight. While active maternal tobacco smoking has well established adverse prenatal outcomes such as LBW, that mothers who smoke during pregnancy are twice as likely to give birth to low-birth weight infants. Review on the effects of passive maternal smoking, also called environmental tobacco exposure (ETS), demonstrated that increased risks of infants with LBW were more likely to be expected in ETS-exposed mothers. Regarding environmental toxins in pregnancy, elevated blood lead levels in pregnant women, even those well below 10 ug/dL can cause miscarriage, premature birth, and LBW in the offspring. With 10 ug/dL as the Centers for Disease Control and Prevention's 'level of

concern', this cut-off value really needs to arise more attentions and implementations in the future.

Maternal nutrition and social-economic factors as determinants of birth weight

The birth weight is most important determinant of mortality and morbidity in neonatal period and may have an influence on health in adult life. The high rate of LBW in developing countries is therefore a major health problem (Roland and Staffan, 1997). Maternal weight was most important independent determinant of birth weight with birth increasing by 20g for each kg maternal weight and by 15g for each kg gestational weight gained 88g of the 153g socio-economic difference in birth weight remained unexplained after adjusting for differences in maternal weight, parity and gender. The gestation weight gain and mean birth weight were 5.6kg and 2.8kg respectively. Maternal malnutrition is usually assumed to be a casual factor but other environment factors are also involved.

Physical activity and different food intake with Pregnancy

If your provider says it's OK for you to exercise, pick activities you think you'll enjoy. If you didn't exercise before you were pregnant, start slowly, try to build up your fitness little by little. Physical activity is most important factor during pregnancy, Healthy pregnant woman need at least 2.5 hours exercise each week. This is about 30 minutes each day. It can keep your heart, body and mind healthy, help you feel good and find the extra energy you need, help you stays fit and gain the right amount of weight during pregnancy, prevent health problems like preeclampsia and gestational diabetes, help your body get ready to give birth, help reduce

stress. Not every woman should exercise during pregnancy. Don't exercise if you have heart problems, preterm labor, lung disease, vaginal bleeding during 2nd and 3rd trimesters, preeclampsia, etc. Regular physical activity is associated with improved physiological, metabolic and psychological parameters with reduces risk of morbidity and mortality (Katarina et al., 2010). Some specific physiological changes induced by pregnancy, which are primarily developed to meet the increased metabolic demands of mother and fetus. Physical activity also is a good for healthy pregnancy with good for intrauterine baby. Diets intake in pregnancy is powerful that maintain health status of mothers and baby. Deficiency in diet causing morbidity of fetus, such as rickets, hypoplasia of the teeth, tetany and anemia, may be corrected in every infancy, yet, the first opportunity has been lost in not preventing the condition before it had a chance to develop. To correct these disorders of fetus, emphasis should be placed on the proper maternal diet during the last trimester, providing of an adequate supply of milk is dependent on an optimum diet during last trimester of pregnancy.

Govt. programme with maternal nutrition

For maintains and developed of maternal nutrition some services most important; Integrated Child Development Services (ICDS) is an Indian government welfare programme which provides food, pre-school education, primary healthcare to children under 6 years of age and their mothers. There services are provided from Anganwadi Centres established mainly in rural areas and staffed with frontline workers. During the 2012 – 2013 financial years, the Indian central Govt. spent 159 billion on the pregnancy. The infant mortality rate of Indian children are underweight among five mortality rate is 93 and 25% of

newborn children are underweight among other nutritional, immunization and educational deficiencies of the children in India. LBW can be prevented while maternal nutrition is well.

Conclusion

LBW is closely associated with fetal and Prenatal mortality and Morbidity, inhibited growth and cognitive development, and chronic diseases later in life. At the population level, the proportion of babies with a LBW is an indicator of a multifaceted public-health problem that includes long-term maternal malnutrition, ill health, hard work and poor health care in pregnancy. On an individual basis, LBW is an important predictor of newborn health and survival and is associated with higher risk of infant and childhood mortality. Low birth weight constitutes as sixty to eighty percent of the infant mortality rate in developing countries. Infant mortality due to low birth weight is usually directly causal, stemming from other medical complications such as preterm birth, poor maternal nutritional status, lack of prenatal care, maternal sickness during pregnancy, and an unhygienic home environment. According to an analysis by University of Oregon, reduced brain volume in children is also tied to low birth-weight.

Being younger than 17 or older than 35 makes you more likely than other women to have a low-birth weight baby. And race/ethnicity is a risk factor, too. In the United States, black women are more likely than others to have a low-birth weight baby. A little more than 13 percent of black babies are born with low birth weight each year. As for other races/ethnicities in this country, 8.4 percent of Asian babies, 7.6 percent of Native American babies, and about 7 percent of Hispanic and white babies are born with low

birth weight. We don't know why race plays a role in having a low-birth weight baby; researchers are working to learn more about it (2017 March of Dimes Foundation).

WHO strongly advocates for skilled care at every birth, which is the foundation for all good care for preterm babies. WHO also promotes essential newborn care for all babies, and has developed clinical guidelines and training tools for this purpose. In addition, WHO promotes basic newborn resuscitation, which has helped to make resuscitation broadly available in developing countries? In May 2012, WHO and partners—The Partnership for Maternal, Newborn & Child Health, Save the Children, and the March of Dimes—published a report *Born Too Soon: The global action report on preterm birth* that included the first ever estimates of preterm birth by country. A study by the Agency for Healthcare Research and Quality (AHRQ) found that of the 3.8 million births that occurred in the United States in 2011, approximately 6.1% (231,900) were diagnosed with low birth weight (<2,500 g). Approximately 49,300 newborns (1.3%) weighed less than 1,500 grams (VLBW). Infants born at low birth weight are at a higher risk for developing neonatal infection.

Socio-economic status with maternal nutrition Malnutrition of mother is directly link with LBW. Malnutrition has a great relation with social and economical status.

Low birth weight baby is major problems for a population because it associated with increased risk of morbidity and mortality of infants. The cause of LBW baby was investigates by different project but in West Bengal about this cause have a lacking data. This is linking with nutritional status and socio-economical factors. In 2005, India embarked on the National Rural Health Mission, an extraordinary effort to strengthen

the health systems. However, coverage of priority interventions remains insufficient and the content and quality of existing interventions were suboptimum.

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