Overview of low birth weight and developmental milestones

Ahmed Abdullah Ahmed Hakami, Abdullatif Alhassan A Fathi, Khalid awaji jammali, Albaraa mohamed madkhali, Nassir abdullah maqbol

Abstract:

In this review we discuss incidence and consequence of low birth weight and it is also one of the reasons for preterm birth and developmental milestones, which can lead to death. MIDLINE, Google Scholar, and EMBASE databases were comprehensively searched for low birth weight and developmental milestones related articles published before to December 2017. Low birth weight (LBW) is among the main predictors of infant mortality. There are many known risk aspects, the most essential of which are socio-economic factors, medical risks prior to or during gestation and maternal way of lives. Nevertheless, although interventions exist to avoid many of these aspects prior to and while pregnant, the occurrence of LBW has not decreased. The first years of development are important for long-lasting learning and development. Milestones follow predictable courses in infants and kids, and later developmental skills build on previous ones achieved. Understanding normal development is essential for the pediatrician to be able to recognize delayed development. Developmental screening identifies developmental delays at a time period where official assessment and intervention would be beneficial. Kids with worldwide developmental delay have delays in several domains of development, while children with particular delay may have a delay in only one region of development such as language or motor skills.

Introduction:

Advances in healthcare and neonatal medicine have led to changes in survival pattern of high threat neonates [1].Among the difficulties that have been found in these high risk neonates is LBW (< 2500 grams). According to World Health Organization (WHO) statistics, the rate of LBW is 17% around the world (6% in developed countries and 21% in establishing countries).

One of one of the most usual neonatal complications of prematurity and LBW is respiratory system failures like Respiratory Distress Syndrome (RDS) which often requires using mechanical ventilation (MV) for boosting the neonatal survival, specifically for early neonates born much less compared to 30 weeks gestation with immature lung function [3].Studies showed that MV in LBW neonates, and especially Extremely Low Birth Weight (ELBW), is connected to poor neurodevelopmental outcomes [4]. These risk elements increase with boosted duration of MV [5].

Although the primary percentages of LBW neonates are birthed in creating nations [2], most of research studies on developing outcomes of prematurity have been done in established countries. Considering the results of different societies and socioeconomic standing on development and the importance of performing developing assessments in creating nations, close attention needs to be paid to such kinds of research studies in these countries. The evidence can be applied in future developmental treatment preparation.

In this review we discuss incidence and consequence of low birth weight and it is also one of the reasons for preterm birth and developmental milestones, which can lead to death.

Methodology:

MIDLINE, Google Scholar, and EMBASE databases were comprehensively searched for low birth weight and developmental milestones related articles published before to December 2017, the literature searched included most of studies that are evidence based supported, and discussing low birth weight and developmental milestones, moreover references list of each identified study were searched for more relevant articles to our concerned topic. We also restricted our search for English language trails.

Discussion:

Incidence and consequences of LBW

The study of LBW is essential, considering that sub-optimal birth weight could have consequences in the perinatal duration, throughout infancy, as well as in the adult years. To begin with, perinatal morbidity and mortality are more constant in LBW babies than in regular infants; LBW has come to be the 2nd reason of fatality in this duration, after premature birth [6].Additionally, term babies evaluating in between 1500 and 2500 g at birth have a perinatal mortality rate 5-30 times more than infants with birth weights in between the 10th and 50th percentile, while babies born nearly at term weighing less compared to 1500 g have 70-100 times greater death rates [7].The consequences of LBW on the subsequent development of these babies depend on the specific reason giving rise to the fetal growth limitation, its time of event and the duration of the impairment. It has lately been reported [8] that the intellectual ratio (IQ) of infants with IUGR, at 5 years old, standards 3.3 factors below that of typical infants; if they were also premature, the IQ averages 6.7 points reduced on intelligence examinations. Hack et al. [9] discovered that youngsters with a small head area at birth that do not gain back regular growth have a greater risk of having damaged neurological features.

However, infants with intra-uterine growth constraint yet with a regular head area at birth, or those in whom typical head area is quickly attained, are not most likely to endure subsequent neurological sequelae. They may, however, be slower to develop language capabilities and could have troubles in school [15].Finally, a number of epidemiological researches have recommended that infants born with IUGR, particularly those who had a huge placenta, have a greater danger of developing hypertension in adulthood [11].For all these reasons, it is essential to know the incidence of LBW babies. The researches that have gauged the occurrence of this procedure have produced variable quotes: from mean values of 25% LBW in nations like India [11] to a lot lower values, for instance, 7.6% in the United States [12], 5- 6% in the Scandinavian nations, and 6% in the United Kingdom [13].In Spain, the incidence of LBW was around 5.7% during the decade 1980- 1989. A lot more current populace data from the National Statistics Institute [14] describe an occurrence of virtually 6.1% of LBW in 1998.

Table1. Risk factors for low birth weight

Socio-demographic risk factors	Marital status	Chronic hypertension
Constitutional factors	Educational level	Renal diseases
Maternal age	Socio-economic level	Glucose metabolism disorders
Chronic cardiorespiratory disease and other disorders that involve hypoxemia	Genitourinary anomalies	Autoimmune diseases and inherited or acquired thrombophilia
Obstetrical history	Gestational hypertension	Gestational diabetes
Weight gain	Maternal nutrition	Birth intervals
Multiple pregnancies	Placental causes	Bleeding
Increased a-fetoprotein	Anemia	Infections
Fetal congenital anomalies	Health care	Prenatal care
Maternal work and psychosocial stress	Smoking	Alcohol consumption
Drug consumption	Exposure to toxic substances	Environmental exposures

· DEVELOPMENTAL MILESTONES

Developing milestones have been developed in gross and fine motor skills, self-help, analytical, social/ emotional, and responsive and expressive language domains [16], [17], [18].

Neonatal

The 4 weeks after birth established the stage for the infant's first year. Parents are learning to care for their baby, and very early patterns of feeding, sleeping, and sharp times are established. Infants discover how to consider faces, discriminate parents' voices from others', cry, make sounds with their throats, and raise their chins when susceptible. During this time, along with prenatally, babies hear their parents' voices, starting the accessory process. Infants are discovering that their caregivers meet their needs, launching a complacency in these very early days. All babies should obtain hearing screenings in the neonatal duration, and older babies or young children who do not alert to sounds or visually focus on objects within a few inches of their face should be referred for additional hearing and vision analyses. Babies whose muscle tone is also reduced to permit sufficient feeding or motion need to be referred for assessment. Neonatal protective reflexes are an useful way for the clinician to evaluate neurologic and motor function.

Two Months

The major milestone of 6 weeks is the social smile, additional endearing the infant to the parents. Around 2 months of age, infants coo and make noises responsively to caretakers. At this age, babies could bring their hands together at midline. When in a prone position, babies begin to lift their chests off the table at 2 months, however they could still exhibit head bobbing when supported in a seated position.

Four Months

By 4 months of age, head-lag disappears when infants are pulled to sitting. The infant is learning to roll from prone to supine positions. However, due to the existing recommendation that all infants be put to rest on their backs to prevent unexpected baby fatality syndrome, rolling from front to back is occasionally delayed. Sometimes, babies discover how to curtail to front first, despite it being generally simpler to roll prone to supine. Infants at this age can grab things continually, placed them in their mouths, and drink a rattle. Communication with others blossoms and babies laugh aloud.

Six Months

From 5 to 6 months old, babies learn to roll supine to prone and sit with hands propped in front of them. They can sit upright for a quick time, and when resting is sustained, they could use their hands to move an item from one hand to the other. They reach for items and can hold two objects concurrently. Babies start to feed themselves easy foods such as crackers and could hold a bottle. At this age, youngsters move from cooing (utilizing vowel sounds such as aaah and oooo) to babbling (utilizing consonants to make replicating sounds with sounds such as ba, ma, and da). They smile and make sounds in front of a mirror. At this age, babies begin "stranger anxiousness;" 6-month-old infants are most likely to be wary of strangers and be comforted by familiar caregivers.

Nine Months

Around 9 months old, youngsters pull to stand and could begin sneaking or travelling. Babies could play with toys from their sittinged placement and take things in and out of containers, bang playthings or blocks with each other, and hold food to take bites. At this age, gaze monitoring (complying with the grown-up look with the youngster's own eyes) begins. Nine-month-olds want

exactly what others around them find intriguing and aspire to engage. These babies react to easy commands and may start utilizing dada/papa and mama nonspecifically in babble.

TABLE 2. Risk Factors for Developmental/Behavioral Concerns Following Preterm Birth [20].

Prenatal	Very low birthweight (<1500g) Extremely low gestational age (birth<28 weeks gestation) Intrauterine growth restriction Male gender
Postnatal	Neonatal seizures (before 28 days of age) Abnormal brain imaging (white matter injury/periventricular leukomalacia, grade 3 or 4 intraventricular hemorrhage) Chronic lung disease/bronchopulmonary dysplasia Prolonged mechanical ventilation (>96 hours) Bacteremia, meningitis, or sepsis Necrotizing enterocolitis Feeding problems beyond 36 weeks postmenstrual age Extracorporeal membrane oxygenation
Social	Low socioeconomic status Low parental educational achievement Language barrier with family Parental depression

· CONSEQUENCES OF IUGR AND PRETERM BIRTH

Effects on Mortality

Despite the absence of dependable data on the risks of morbidity and mortality associated with IUGR and preterm distribution in developing country settings, numerous patterns are clear. The least-developed nations typically have the highest possible rates of IUGR and of baby mortality. Yet since normal-weight babies are at fairly high danger of infant death (compared to those in most

industrialized countries), the family member risk (RR) related to IUGR (and with preterm birth) are considerably less than in more-developed countries.

Hence, for instance, a 1982 research from southern Brazil reported a general infant mortality rate of 38.1 per 1,000 real-time births, an IUGR rate of 9.0 percent, and a preterm birth rate of 6.3 percent. Relative dangers of infant death were 4.5 for IUGR and 10.2 for preterm birth [22].In Bangladesh, on the various other hand, a 1993-1996 research reported a baby mortality rate of 107.3 each 1,000, and IUGR and preterm birth rates of 69.2 and 17.1 percent, respectively [21].In the last setup, the family member threats of infant fatality related to IUGR and preterm birth were just 1.2 and 1.6, respectively.

Industrialized countries have been successful in lowering infant mortality without a big decrease in prevalence of LBW. Population-based data from southerly Brazil (Pelotas) suggest a similar picture. In between 1982 and 1993, baby death fell by HALF (from 39 to 19 per 1,000) despite a rise in the LBW rate from 9.0 to 9.8 percent [23]. Modest decreases in IUGR in developed countries seem attributable mainly to an increase in the dimension of term infants [24] which parallels boosts in maternal height, prepregnancy BMI, and gestational weight gain and a reduction in maternal cigarette smoking [6].With the feasible exemption of France [25] and Finland [26], established countries have not reported reductions in preterm birth. In truth, recent information from Canada [27] and the United States [28] reveal a significant rise. In Canada, part of the rise seems an artifactual outcome of the usage of ultrasound (adjustment of earlier errors of gestational age dating based on the last menstrual period) and increased registration of births weighing <500 g. A true smaller rise in preterm birth appears to be associated with boosting obstetric treatment (induction

and cesarean section), multiple gestation (additional to therapy of inability to conceive), and group adjustments (older maternal age, more unmarried mothers) [7].

Effects on Morbidity, Growth, and Development

IUGR, particularly when severe, could lead to hypoglycemia, hypocalcemia, and polycythemia in the very early neonatal period [6].These metabolic repercussions of fetal malnutrition and hypoxia need monitoring for detection and timely treatment to prevent fatality and significant neurologic sequelae. Such monitoring and therapy are feasible, however, just in health care facilities with the requisite personnel and tools, and are for that reason infeasible for births occurring at house or in primary care settings, which predominate in the creating world.

A lot of IUGR babies survive the very early neonatal duration without these complications. Yet data recommend that they stay at raised risk for infection [29] Moreover, although they reveal some catch-up growth in the initial 6 months of life, the catch-up is insufficient in many afflicted children; undoubtedly, also in developed countries, IUGR infants remain shorter, usually, throughout childhood years and into their adult years loved one to their normal-birth-weight peers [30].The resulting brief stature and minimized muscular tissue mass and stamina might have negative effects for manual labor capability [32], a crucial financial factor to consider in numerous developing nations. Furthermore, a recent study reports that Guatemalan females with heights of 146 centimeters (1 common discrepancy listed below the mean) were at a 2.5-fold higher threat of nonelective cesarean area compared to those with heights of 160 centimeters (1 typical inconsistency above the mean) [33].Lastly, IUGR in ladies raises the risk of IUGR in the girls' own offspring, and numerous generations could be needed to accomplish optimal fetal growth.A current research study reports that Filipino babies with reduced gestational age-adjusted birth weight had

later menarche, on average, whereas those with lower birth size (adjusted for both birth weight and gestational age) had earlier menarche [31].

Mild neurocognitive deficits and behavior troubles have likewise been regularly reported in youngsters and teenagers that were growth-restricted in utero [34]. Nevertheless, most released researches report data from developed nations; more study is needed to resolve the long-term neurocognitive results of IUGR in developing countries.

Conclusion:

Low birth weight (LBW) is among the main predictors of infant mortality. There are many known risk aspects, the most essential of which are socio-economic factors, medical risks prior to or during gestation and maternal way of lives. Nevertheless, although interventions exist to avoid many of these aspects prior to and while pregnant, the occurrence of LBW has not decreased. The first years of development are important for long-lasting learning and development. Milestones follow predictable courses in infants and kids, and later developmental skills build on previous ones achieved. Understanding normal development is essential for the pediatrician to be able to recognize delayed development. Developmental screening identifies developmental delays at a time period where official assessment and intervention would be beneficial. Kids with worldwide developmental delay have delays in several domains of development, while children with particular delay may have a delay in only one region of development such as language or motor skills.

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