

Original Research Article

A retrospective review of low-birth-weight cases in a tertiary care hospital in Shimla district of Himachal Pradesh

Rakesh Sharma, Pancham Kumar, Ambika Sood*, Vipin Roach

Department of Paediatrics, IGMC, Shimla, Himachal Pradesh, India

Received: 27 July 2021

Revised: 02 September 2021

Accepted: 03 September 2021

*Correspondence:

Dr. Ambika Sood,

E-mail: drambikasood@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Low birth weight (LBW) is a serious public health problem and a leading cause of death in the first month of life. The present study aimed to study the trends of low birth weight in Shimla district of Himachal Pradesh, India.

Methods: Retrospective review of records of Kamla Nehru Hospital, Shimla covering the period January 2016 to December 2020 was done. The total number of low-birth-weight babies each year were retrieved.

Results: A total of 34769 live births took place in Kamla Nehru Hospital, Shimla from 2016 to 2020. Among the total live births, 8479 (24.39%) were having low birth weight (<2500 gm) while 26290 (75.61%) were having normal birth weight (>2500 gm). Out of total 8479 LBW Babies, 7148 (84.3%) were LBW (<2500 gm), 1167 (13.76%) were very low birth weight (1000-1500 gm) and 164 (1.93%) were of extremely low birth weight. There was continuous decrease in low birth weight from 35.14% in 2016 to 17.51% in 2019. After that it start increasing slightly to 18.9% in 2020.

Conclusions: Over the span of five years, there was continuous decrease in incidence of LBW. Nutritional education during pregnancy and proper Antenatal care (ANC) services needs to be addressed to reduce prevalence of LBW in Himachal Pradesh

Keywords: Trends, Low birth weight, Kamla Nehru Hospital, Shimla

INTRODUCTION

The weight of the baby measured immediately after birth or within a few hours after birth, is termed as the Birth weight. The World Health Organization (WHO) defined low birth weight (LBW) as weight less than 2500 g at birth, this definition is used for live births only. Low birth weight is further categorized into very low birth weight (VLBW, <1500 g) and extremely low birthweight (ELBW, <1000 g).¹ LBW includes both appropriately grown preterm neonates (<37 completed weeks of gestation) and term and preterm growth-restricted neonates (<10th centile of weight for gestational age and sex).² Low birth weight is a public health indicator of healthcare delivery, maternal

health, nutrition, and poverty. Neonates with low birth weight have a >20 times greater risk of dying than neonates with birth weight of >2500 g.^{3,4}

LBW is a serious public health problem in low- and middle-income countries and a leading cause of death in the first month of life. In India, about 18% of children are born with LBW (<2500 grams) in 2015–16.⁵

LBW newborns also have a higher risk of morbidity, stunting in childhood, and long-term neurological and developmental disabilities, physical ill health including adult-onset chronic conditions such as cardiovascular disease and metabolic syndrome.⁶

Factors influencing LBW include extremes of maternal age (especially younger than 16 years of age or older than 40 years), high parity, multiple pregnancy, obstetric complications, chronic maternal conditions (example, hypertensive disorders of pregnancy), infections (example, malaria), and nutritional status. Other contributors include exposure to environmental factors, such as indoor air pollution, and tobacco and drug use.⁷

“Born too soon” is a recent global action report on pre term birth brought out by WHO. 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 almost as vulnerable as the preterm babies. More than 20million infants worldwide, representing 16% of all births in developing countries, are born with LBW. Almost 95 % of these births are in developing countries.⁸

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.^{6,8}

LBW infants has a significant association with perinatal survival, infant morbidity, mortality, and lifetime risk of developmental disabilities and diseases among infants. Reducing the prevalence of LBW by 30% is a public health priority and global health commitment.⁹

There is a paucity of data regarding low-birth-weight rates in Shimla. Against this backdrop, the study was conducted to study the trends of low-birth weight deliveries at Kamla Nehru Hospital associated with Indira Gandhi Medical College and Hospital from the year 2016 to 2020.

METHODS

Our study is a retrospective review carried out in Kamla Nehru Hospital, Shimla, over a period of 5 years, from January 2016 to December 2020. We did a retrospective analysis of all pregnant women who delivered at Kamla Nehru Hospital during this period, irrespective of the gestation and mode of delivery. All live births were included and still births, and abortions were excluded from the study. Ethical approval was obtained from the institute’s ethics committee. Data analysis was conducted using Epi Info V7 software.

Birth weight of the neonate was taken within 1 hour of the birth, using a digital electronic scale, measuring to the nearest 10 gms. The electronic scale was placed on a flat, hard surface, tared to zero before each measurement and weight recorded to the nearest 10 gms. The scale was calibrated once a year as per the hospital policy.

RESULTS

A total of 34769 live birth took place in Kamla Nehru Hospital, Shimla from 2016 to 2020. Among the total live births, 8479 (24.39%) were low birth weight (<2500gm) while 26290 (75.61%) were having normal birth weight (>2500 gm). (Table 1)

Table 1: Trend of low-birth-weight babies in Kamla Nehru Hospital, Shimla.

Birth weight	2016	%	2017	%	2018	%	2019	%	2020	%	Total	%
≥2500 gm	4193	64.86	4345	66.11	5600	81.47	6055	82.49	6097	81.10	26290	75.61
<2500 gm (LBW)	2272	35.14	2227	33.89	1274	18.53	1285	17.51	1421	18.90	8479	24.39
Total live birth	6465	100.0	6572	100.0	6874	100.0	7340	100.0	7518	100.0	34769	100.0

Table 2: Trend of Category of low-birth-weight babiesdelivered in Kamla Nehru Hospital, Shimla.

Birth weight	2016	%	2017	%	2018	%	2019	%	2020	%	Total	%
1500-2499 gm	1619	71.26	2025	90.93	1129	88.62	1128	87.78	1247	87.76	7148	84.30
1000-1499 gm	612	26.94	172	7.72	129	10.13	122	9.49	132	9.29	1167	13.76
<1000 gm	41	1.80	30	1.35	16	1.26	35	2.72	42	2.96	164	1.93
Total LBW	2272	100.0	2227	100.0	1274	100.0	1285	100.0	1421	100.00	8479	100.00

Upon further analysis it was found that there has been a continuous decline in low-birth-weight babies from 35.14% in 2016 to 17.51% in 2019. After that there is a slight increase to 18.9% in 2020.

The LBW are divided into three categories namely, LBW as first weight recorded within the first hour of birth of: <2500 g. VLBW as <1500 g and Extremely low birth weight (ELBW) as <1000 g, upon analysis it was found that out of total 8479 LBW babies, 7148 (84.3%) were LBW (<2500 gm), 1167 (13.76%) were VLBW (1000-1500 gm) and 164 (1.93%) were of Extremely low birth weight (<1000 g). (Table 2)

Upon further analysis it was found that, in the LBW category there was increase in incidence from 71.26% in year 2016 to 90.93% in 2017 but after that there was continuous decline from 88.62% in year 2018 to 87.76% in year 2020. In VLBW category there was decline from 26.94% in year 2016 to 7.72% in year 2017, after that, the incidence shows an increase to 10.13% in year 2018 and then again decreases to 9.29% in year 2020. In ELBW category, there is a decline in incidence from 1.8% in year 2016 to 1.26% in year 2018, but thereafter, there was slight increase in its incidence to 2.96% in year 2020.

DISCUSSION

LBW is a substantial public health problem in every country and is an important predictor of infant mortality and morbidity.¹⁰ More than 80% of neonatal deaths occur in LBW newborns, of which two thirds are preterm and one third are term small-for-gestational-age (IUGR). ALBW newborn can have intrauterine growth restriction (IUGR), prematurity or both. In the developed countries, most of the LBW babies are preterm while in India, IUGR babies contribute to the burden of LBW babies. As LBW has strong association with both maternal and infant mortality, it can serve as a surrogate marker for both these indices.

In our study we found that, among the total of 347769 live births in Kamla Nehru Hospital, Shimla from 2016 to 2020, 8479 (24.39%) were low birth weight (<2500 gm) while 26290 (75.61%) were having normal birth weight (>2500 gm) which is comparable to the national average. More than one-fourth (27%) of newborns in India are LBW, which subsequently increases their death rate during the first year of life.

We also found that out of total 8479 LBW babies, 7148 (84.3%) were LBW (<2500 gm), 1167 (13.76%) were Very low birth weight (1000-1500 gm) and 164 (1.93%) were of Extremely low birth weight (<1000 g). There was continuous decline in low-birth-weight babies from 35.14% in 2016 to 17.51% in 2019. After that, there is a slight increase in incidence to 18.9% in 2020. This is a matter of concern and need to be addressed by adopting appropriate measures.

The problem of LBW is multidimensional. Previous studies have high-lighted that the socioeconomic status, nutritional status of the mother, multiple pregnancies and gestation period, high physical workload, maternal infections, maternal anemia, high blood pressure, high parity, short gap between pregnancies, all determined the outcome of delivery including LBW, higher risk of death, morbidity, and disability.^{11,12}

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 out-weigh short-term benefits.¹¹⁻¹³

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.¹¹⁻¹³

To grow a healthy baby, mothers need good nutrition and adequate rest, accessible and good quality antenatal care. These factors for a healthy pregnancy can help prevent, identify, and treat the conditions that cause low birthweight and keep babies alive and thriving.¹³

Reaching the low-birth-weight target, would save lives and fuel the achievement of other nutritional targets as well, such as those focusing on reducing stunting, wasting and other forms of malnutrition. Yet today, the world is still far from achieving these objectives. 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.^{6,13}

Limitations

The major limitation of our study is that it was conducted in a tertiary institute which serves as a referral centre for the entire state of Himachal Pradesh. Most of the deliveries conducted here were high risk deliveries with maternal or fetal risk factors which predisposes to LBW babies. Since it is not representative of the general populace and deals

with mostly high-risk cases the data cannot be extrapolated to the general population.

CONCLUSION

Over the span of five years, there was continuous decline in the incidence of LBW. Continuous implementation of multifaceted health promotion interventions is needed to address the factors leading to LBW. Women education and empowerment, nutritional status, good peripheral ANC services need to be addressed to reduce prevalence of LBW in Himachal Pradesh. These vital determinants need to be adopted to reduce the prevalence of low birth weight. ANC services are key services to monitor the pregnant women's health status. Priority to the regular monthly weighing and growth monitoring for children may be adopted as the effective public health strategy.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. WHO. International statistical classification of diseases and related health problems, tenth revision, 2nd ed. World Health Organization. 2004. Available at: <https://apps.who.int/iris/handle/10665/42980>. Accessed on 10 May 2021.
2. Quinn JA, Munoz FM, Gonik B, Frau L, Cutland C, Mallet-Moore T et al. Brighton Collaboration Preterm Birth Working Group Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. *Vaccine*. 2016;34(49):6047-56.
3. Kramer MS. Determinants of low birth weight: methodological assessment and meta-analysis. *Bull World Health Organ*. 1987;65(5):663-737.
4. Badshah S, Mason L, McKelvie K, Payne R, Lisboa PJ. Risk factors for low birth weight in the public-hospitals at Peshawar, NWFP-Pakistan. *BMC PubHealth*. 2008;8:197.
5. Zaveri A, Paul P, Saha J, Barman B, Chouhan P. Correction: Maternal determinants of low birth weight among Indian children: Evidence from the National Family Health Survey-4, 2015-16. *PLOS ONE*. 2021;16(4):e0250140.
6. FHB, Ministry of Health. Strategies to promote optimal fetal growth and minimize the prevalence of LBW in Sri Lanka: health sector response: Family Health Bureau ministry of health. 2013.
7. Blencowe H, Krusevec J, de Onis M. National, regional, and worldwide estimates of low birthweight in 2015, with trends from 2000: a systematic analysis. *Lancet Glob Health*. 2019;7(7):e849-60.
8. Bhat BV, Adhisivam B. Trends and Outcome of Low Birth Weight (LBW) Infants in India. *Indian J Pediatr*. 2013;80(1):60-2.
9. Kumari N, Algur K, Chokhandre PK, Salve PS. Low birth weight among tribal in India: Evidence from National Family Health Survey-4. *Clinical Epidemiology and Global Health*. 2021;9:360-6.
10. Jain V, Singhal A. Catch up growth in low birth weight infants: striking a healthy balance. *Rev Endocr Metab Disord*. 2012;13(2):141-7.
11. Lawn JE, Davidge R, Paul VK, Soon BT. Care for the preterm baby. *Reprod Health*, 2013;10(1): S5.
12. UNICEF. Low birth weight estimates levels and trends. Available at: <https://data.unicef.org/resources/unicef-who-low-birthweight-estimates-levels-and-trends-2000-2015/> Accessed on 17 June 2021.
13. Kim D, Saad A. The social determinants of infant mortality and birth outcomes in western developed nations: across country systematic review. *Int J Environ Res Public Health*. 2013;10(6):2296-335.

Cite this article as: Sharma R, Kumar P, Sood A, Roach V. A retrospective review of low-birth-weight cases in a tertiary care hospital in Shimla district of Himachal Pradesh. *Int J Contemp Pediatr* 2021;8:1680-3.