

A study on maternal factors affecting low birth weight in institutional deliveries

Chaithra A.¹, Mahantappa A. Chiniwar^{2*}, Sharada B. Menasinkai³

¹7th term UG student, AIMS and RH BG Nagara, Nagamangala, Mandya, Karnataka, India

²Department of Obstetrics and Gynecology, ³Department of Anatomy, Adichunchanagiri Institute of Medical Sciences and Research Center, BG Nagara, Nagamangala, Mandya, Karnataka, India

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***Correspondence:**

Dr. Mahantappa A. Chiniwar,
E-mail: drmachiniwar@gmail.com

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ABSTRACT

Background: Low birth weight is defined as birth weight below 2500 mg. WHO states prevalence of LBW is 26%. LBW babies are more prone for neonatal morbidity and mortality. 1) To assess various factors like maternal age, height, education, socioeconomic status on the birth weight of the baby. 2) To assess obstetric factors like parity, gestational age, antenatal care, anemia, hypertension on the birth weight of the newborn.

Methods: A hospital bound cross sectional study done at the tertiary care centre. Study was done for a period of 2 months from 1st June to 30th July 2019 in Adichunchanagiri Institute of Medical Sciences and Research Hospital a rural medical college in Karnataka. Maternal data were collected and baby weight was recorded soon after birth on weighing scale.

Results: There were 65 births during the study period. There were 13 babies weighing less than 2500 gm. Prevalence of LBW was 20%. 43.47% mothers were aged between 18 to 25 years and 7.14% were more than 25 years. 30.4% mother's height was between 140 to 150 cm and 14.2% were more than 150 cm. Regarding maternal education, 15.3% degree, 24.1% PUC, 15% High school and 33.3% were primary school level. Regarding socioeconomic status 22.2% low, 25% lower middle, 18.7% middle class, 18.7% belonged to upper middle class. Regarding gestational age 50% were <37 weeks, 15.5% between 37-42 weeks, 10% were 42 weeks. 73.8% women had normal BP, 21.5% were prehypertensive, 4.6% had PIH.

Conclusions: Low birth weight is one of the important factors in infant morbidity and mortality. Maternal health was important factor in delivery of low birth babies. Maternal height, sex of baby, mode of delivery has no role in low birth weight babies.

Keywords: Anemia, Gestational age, Low birth weight

INTRODUCTION

Low birth weight (LBW) is defined by World Health Organization (WHO) as a birth weight less than 2500 g.¹ LBW can result from premature birth (before 37 weeks of gestation) or intrauterine-growth restriction (IUGR), or a combination of the two.² The prevalence of low birth weight in India was found to be 26%. There are numerous factors contributing to LBW, both maternal and foetal.³ Intrauterine growth and development is one of the most vulnerable process in human lifecycle and its

aberration can result in lasting profound influence in later life.⁴

The prevalence of LBW in any population reflects its Socio-economic development and status of public health. It is an indicator of future health and survival of child.⁵ The incidence of LBW varies widely between regions of the world with levels of 32% of southern Asia, 9% in Eastern Asia, 11-16% in Africa and 10-12% in Latin America and Caribbean's. In India, 27% babies are LBW and more than half of these are full term babies. LBW

babies are 5-6 times more likely to die during perinatal period and 3 times more likely to die during infancy compared to normal birth weight babies.⁶

Studies suggest that short maternal stature, very young age, high parity, close birth spacing are associated factors.⁷ In developed countries, predominant cause of LBW is preterm birth, whereas in developing countries, Intra uterine growth restriction (IUGR) is predominant cause of LBW. Mothers who had multiple gestations had higher risk of delivering LBW babies. The physical environment, specific and nonspecific infections, also plays an important role in determining the infant's birth weight and future health status.⁸ Extent of LBW is one of the key vital statistics used as an indicator of the quality of ANC, medical service, and general health service to mother.⁹

For the same gestational age, girls weighing less than boys, first born infants are lighter than subsequent infants, and twins weighing less than singletons.

Mothers in deprived socioeconomic condition frequently have LBW infants. In those setting, the infant's LBW stems primarily from the mother's poor nutrition and health over a long period of time, including during pregnancy, the high prevalence of specific and nonspecific infections, or from pregnancy complications underpinned by poverty. Physically demanding work during pregnancy also contributes to poor foetal growth.¹⁰ Our hospital is attached to rural medical college and few studies reported regarding the birth weight of the baby. Hence the present study was done to know the maternal factors affecting the birth weight.

The objective of the study was to assess the impact of various factors like maternal age, height, education,

socioeconomic factors, parity, gestational age, antenatal care, anaemia, blood pressure on the birth weight of newborn. Hence the present study was done to know the maternal factors affecting the low birth weight babies.

METHODS

A cross-sectional hospital-bound study was conducted at a tertiary care centre. Study was done for a period of 2 months from 1st June to 30th July 2019. Sample size was total number of births during the study period. Inclusion criteria were all singleton normal babies born to both primiparous and multiparous women. Exclusion criteria were multiple births and babies with congenital anomalies and babies born to gestational diabetes mother. Digital weighing scale was used to weigh the babies.

Data was collected from the case sheet of mother and newborn record as well as by interacting with the mothers. Details of investigation reports during ante natal period such as blood group, Hb% and ultrasound reports were collected. Data was collected in prescribed proforma with following details such as maternal age, height, literacy, socioeconomic status, gestational age, LMP, USG reports, mode of delivery, sex and weight of the baby. Statistical analysis was done using statistical package for social sciences software version 20.

RESULTS

The results of the present study were analysed as follows, total number of births during study period were 65. Number of babies who weighed less than 2500 gm were 13, which included 9 female and 4 male. Prevalence of LBW was 20%. Out of 13 LBW babies 5 were delivered by lower segment caesarean section (LSCS) and 8 were normal deliveries.

Table 1: The percentage of LBW in relation to maternal age.

Maternal age	Babies wt<2500 gm	%	Babies wt>2500 gm	%	Total	%
18-25 years	10	43.47	13	56.52	23	100
>25 years	3	7.14	39	92.8	42	100
Total	13	20	52	80	65	100

Table 2: Percentage of LBW in relation to maternal height.

Height in cm	babies with wt <2500 gm	%	Babies with wt >2500 gm	%	Total	%
140-150 cm	7	30.4	16	69.5	23	100
>150 cm	6	14.2	36	85.7	42	100
Total	13	20	52	80	65	100

Regarding Hb% of mother among 23 anaemic mothers (<12 gm %) 9 mothers had LBW babies and out of 42 mothers with Hb % more than 12 gm %, 4 mothers had

LBW babies. This shows that the incidence of LBW was common in both groups.

In the present study 41 mothers (63.1 %) had normal systolic BP, 20 mothers (30.8%) were pre-hypertensive and 4 mothers (60.2%) had high systolic BP. And 48 out

of 65 mothers had normal diastolic BP, 14 were pre-hypertensive and remaining 3 had very high diastolic BP.

Table 3: Percentage of LBW in relation to maternal education.

Maternal education	Baby wt <2500 gm	%	Baby wt >2500 gm	%	Total	%
Primary	1	33.3	2	66.6	3	100
High school	3	15	17	85	20	100
PUC	7	24.1	22	75.8	29	100
Degree	2	15.3	11	84.6	13	100
Total	13	20	52	80	65	100

Table 4: Percentage of LBW in relation to maternal socioeconomic status.

Income status	Baby wt <2500 gm	%	Baby wt >2500 gm	%	Total	%
Lower class	2	22.2	7	77.7	9	100
Lower middle class	5	25	15	75	20	100
Middle class	3	18.7	13	81.2	16	100
Upper middle class	3	18.7	13	81.2	16	100
Upper class	0	0	4	100	4	100
Total	13	20	52	80	65	100

Table 5: Correlation of gestational age and LBW.

Gestational age in weeks	Baby wt <2500 gm	%	Baby wt >2500 gm	%	Total	%
<37 weeks	3	50	3	50	6	100
37-42 weeks	9	15.5	49	84.4	58	100
>42 weeks	1	100	0	0	1	100
Total	13	20	52	80	65	100
Gestational age in weeks	Baby wt <2500 gm	%	Baby wt >2500 gm	%	Total	%
<37 weeks	3	50	3	50	6	100
37-42 weeks	9	15.5	49	84.4	58	100
>42 weeks	1	100	0	0	1	100
Total	13	20	52	80	65	100

DISCUSSION

The prevalence of Low Birth Weight (LBW) in the present study was 20% and is below the National average (27%). In the present study there was no significant relation between maternal height and LBW of babies. 50 % of LBW babies were born to gestational age below 37 wks. 69% of LBW babies were born to anemic mothers.

Chandra S Metgud et al reported a community based study done in 2012 in rural Karnataka.⁴ There were 1131 mothers in the study group and 263 mothers had LBW babies giving the prevalence of 22.9%. A study done in 2018 in North East Assam by Nirmal Gogoi among 300 mothers 78 had LBW babies (26%).⁵

Radhakumari et al reported a study done during 2015 in King Gorge Hospital Vishakhapatnam in Andra Pradesh.⁶

Among 183 mothers delivered, 39 mothers had LBW babies (26%). Anant Pawar et al reported a case control study done in 2017 in KMCT Medical College in rural Kerala.³ There were 60 cases and 124 controls, and the prevalence of LBW was 32.60%.

Similar studies reported from different parts of Ethiopia giving different prevalence rates of LBW. Zelalem Abera et al reported a study from Southern Ethiopia in 2019 among the 358 mothers, the prevalence of LBW was 17.3%.¹

BerhanuGizaw et al analysed a case control study from central Ethiopia, 94 cases and 376 controls and the prevalence of LBW was 20%.² Meresa Gebremedhin et al reported in 2015, a hospital based cross sectional mixed study in Tigray, Northern Ethiopia and the prevalence of LBW was 14.6%.⁷

Table 6: Comparison of prevalence of LBW babies with other studies.

Authors	Sample size	No. of LBW babies	%
Abera et al ¹	358	62	17.3
Gizaw et al ²	470	94	20
Pawar et al ³	184	60	32.6
Metgud et al ⁴	1131	260	22.9
Gogoi et al ⁵	308	45	14.6
Radhakumari et al ⁶	183	39	21.3
Gebremedhin et al ⁷	308	45	14.6
Present study	65	13	20

In the present study out of 13 cases 10 were born to mothers aged between 18-25 yrs and 3 babies to mothers aged \geq 25 yrs. According to study reported by Radha Kumari et al 21.4% of LBW babies were born to mothers age \geq 20 yrs and 20.8% were born to mothers aged $<$ 20 yrs.⁶ According to study reported by Chandra S Metgud et al 19.9% LBW babies were born to mothers aged between 20 – 24 yrs, 33.3% to mothers aged between 30 – 34 yrs and 50% in mothers aged more than 35 yrs.⁴ According to NirmaliGogoi et al prevalence of LBW was 50% in age group less than 18 yrs, 25% in mothers age between 18 to 34 yrs and 10% in more than 35 yrs age.⁵

In our study 10.7% LBW babies were born to mother's height between 140 -150 cm and 9.30% were born to mother's height \geq 150 cm. According to study reported by Meresa Gebremedhin et al⁷28.6% LBW babies were born to mother's height $<$ 150 cm and 13.2% in \geq 150 cm.

In the present study 92.3% mothers who gave birth to LBW babies completed secondary education. According to Meresa Gebremedhin et al 14 mothers were illiterates, 11 women done primary and 14 done secondary education.⁷

Socioeconomic status is one of the important factor in LBW babies, in our study 84.62% were middle class. In study reported by Radhakumari et al 21.8% belonged to BPL and 18.75% belonged to APL.⁶ According to study reported by Anant Pawar et al annual income of mothers of LBW babies was 36,766 \pm 2.58 and mothers of normal baby wt was 48,806 \pm 29.19.³ According to Zelalem Abera et al among the 62 LBW babies 35 were born to mothers belonging to middle and poor and 27 were born to higher socioeconomic status.¹

Maternal nutrition is one of most important factor in LBW babies. In the present study 9LBW babies were born to mothers Hb% less than 12 and 4 LBW babies were born to mothers Hb% more than 12. According to Zelalem Abera et al among the 62 LBW babies, 29 were born to mother's Hb% less than 11 gm and 33 babies to more than 11 gm.¹ According to Radha Kumari et al 22.6% of LBW babies were born to mother's Hb% less than 10 gm and 6.6% to more than 10gm.⁶ According to

Anant Pawar et al 11.1 \pm 1-01 Hb% in 60 LBW babies.³ According to Nirmali Gogoi et al Hb% of mother in cases and controls is same and overall Hb% level in both group is low.⁵

In the present study out of 13 LBW babies 9 (13.84%) were born at gestational age between 37 – 42 wks and 3 (13.84%) after 42 wks. According to study reported by Meresa Gebremedhin et al 71.4% were born $<$ 37 wks and 11.9% were born \geq 37 wks.⁷

CONCLUSION

In the present study the prevalence of low birth weight babies was 20% and lower than the National average. Most of them belonged to low socioeconomic status. The significant predictors of LBW in our study was maternal education, socioeconomic status and haemoglobin %. Improving the socioeconomic status of the mothers, expansion of utilization of ANC and strengthening the existing maternal services at the basic level of community is required.

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