Original Article

A Cross Sectional Study on Prevalence and Risk Factors for Low Birth Weight Babies in South India

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Abstract

Background: Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long term consequences. Objectives: 1. To estimate the prevalence of low birth weight babies delivered in GGH Kurnool. 2. To find out the association of risk factors in Low birth weight babies.

Methods: An observational cross sectional study was conducted in GGH, Kurnool, Andhra Pradesh. Prevalence of Low birth weight, exposure to different risk factors was recorded using a preformed questionnaire.

Results: Low birth weight is present in 17.8% of the babies of the study group. Half of the mother's birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets. Occupation of the mother, Height of the mother, Weight gain during pregnancy, History of Infections, Malaria, Dengue were significantly associated and important determinants of low birth weight.

Conclusion: Imparting health and nutrition education by health functionaries to antenatal mothers and early detection of high risk pregnancy and timely referral to higher institutions will reduce the LBW problem.

Key words: Cross sectional, Low birth weight Prevalence, Risk factors.

Introduction

The birth weight of the new born baby is very important for its survival and healthy growth and development. Low birth weight is defined as a weight at birth of less than 2500 g (less than 5.51 lbs), regardless of gestational age. (7) It can be due to Pre term deliveries or due to babies who were born at term but weighing less, called as Small for date which is due to Intra uterine growth retardation.

Low birth weight is defined by the World Health Organization (WHO) as weight at birth less than 2500 g (5.5 lb). Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long term

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consequences. Overall, it is estimated that 15% to 20% of all births worldwide are low birth weight, representing more than 20 million births a year.

The goal is to achieve a 30% reduction in the number of infants born with a weight lower than 2500 g by the year 2025. This would translate into a 3% relative reduction per year between 2012 and 2025 and a reduction from approximately 20 million to about 14 million infants with low weight at birth. (5)

The burden of LBW in India in recent years has remained stable despite impressive economic growth and increased public health spending on food security and nutritional supplementation. Strengthening the quality of ANC services for pregnant women with a focus on sensitization and awareness generation for improving maternal nutrition requires high prioritization.(6)

Malnutrition including anemia is a multifaceted, multidimensional and multi-sectoral problem. Malnutrition in pregnant women is one of the underlying causes of low birth weight (LBW) babies. As per Rapid Survey on Children (RSoC), 2013-14; 18.6% new-born had weight less than 2.5 Kg (out of those weighed). (10)

The UNICEF estimates that almost 30 million children worldwide are born every year with a birth-weight of less than 2500 g. Born with a low weight may elevate subsequent adverse health consequence for the child. The immediate consequence of low birth weight is infant mortality, particularly in the first month of life. (2)

LBW is a public health indicator of maternal health, nutrition, health care delivery and poverty. The present study was conducted to know the prevalence and risk factors of LBW, so that a large number of mortality and morbidity can be prevented by addressing the factors associated with low birth weight.

Objectives:

1. To estimate the Prevalence of low birth weight babies delivered in GGH Kurnool.
2. To find out the association of Risk factors in Low birth weight babies

Methodology

An observational cross sectional study was conducted in GGH, Kurnool. All healthy term new born babies delivered in government general hospital, Kurnool during the study period were the study population. Sample size was calculated using a prevalence of 17.29 which was taken from a study conducted by Girotra S etal, with a CI of 95% and Absolute Precision 5%which is calculated as 220. Inclusion criteria are all healthy term new born babies delivered in government general hospital whose mothers gave consent to participate in study were included. Babies who are sick were excluded. Whose mothers did not give consent also was excluded. The study was conducted from July 2023 to December 2023(6).

Data about maternal exposure to different risk factors were recorded using a preformed questionnaire. The information included a socio demographic profile of the mother and her family, obstetric history of the mother especially about previous births, abortions, pre-pregnancy weight, height, weight gain during pregnancy, antenatal services obtained by the mother including antenatal visits, TT prophylaxis, Iron and Folic acid prophylaxis and presence of any systemic illness like hypertension, cardiovascular disease, chronic renal disease.

Adequate antenatal care was considered when the pregnant women were registered at any time, had at least 3 antenatal checkups, was adequately vaccinated against tetanus, had consumed at least 100 tablets of Iron and Folic acid, was not involved in hard work, and had adequate rest during pregnancy [minimum 2 hours sleep during the day and 8 hours sleep during the night]. Weight gain was calculated by subtracting the weight of the mother at 12 weeks or before from the weight of the mother at term considering negligible weight gain up to 12 weeks of gestation. All the babies were weighed within one hour after birth and birth weight was measured to the nearest 10 grams using a baby weighing scale.

Statistical analysis: The data is entered in Microsoft Excel 2010. For analysis, descriptive statistics used were percentage, mean, and standard deviation (SD). Chi-Square test is done to test the significance. A P-value of less than 0.05 was considered as statistically significant. All the analysis were carried out using SPSS 26.0 version.

Results

Table 1: Distribution of Lbw Babies According to Socio- Demographic Variable

Characteristics	Frequency	Percentage
AGE OF THE MOTHER		
<18 years	4	1.8%
19-29 years	216	96%
>30 years	5	2.2%
RELIGION		
Hindu	163	72.4%
Christian	30	13.3%
Muslim	32	14.2%
EDUCATION OF THE MOTHER		
Illiterate	24	10.7%
Below 5th Class	31	13.8%
10th class or below 10th class	80	35.6%
Inter	70	31.1%
Degree	20	8.9%
OCCUPATION OF THE MOTHER		
Daily labor	55	24.7%
House wife	119	53.4%
Non-Agricultural labor	36	16.1%
Nurse	3	1.3%
Private teacher	2	0.9%
Tailor	6	2.7%
Clerk	2	0.9%
SOCIO ECONOMIC STATUS OF THE FAMILY		
Above poverty line	92	40.9%
Below poverty line	133	59.1%
RESIDENCE		
Urban	143	64.1%
rural	80	35.9%
NUMBER OF FAMILY MEMBERS		
Small (<4)	24	10.7%
Medium(5-10)	171	76%
Large(>10)	30	13.3%
OVER CROWDING		
Yes	187	83.1%
No	38	16.9%
CROSS VENTILATION		
Yes	43	19.1%
No	182	80.9%
BIRTH WEIGHT OF THE BABY		
Normal	178	79.1%
Low birth weight	40	17.8%
Very low birth weight	3	1.3%
Big baby	4	1.8%

Majority of mothers (96%) belong to 19-29 years age group and Hindu Religion (72.4%). Education of the mothers of the study group is below 10th class (35.6%) and Inter (31.1%). Regarding occupation of mothers, house wives are 53.4% and daily laborers are 24.7%. Majority of the study group belong to below poverty line (59.1%). Most of the study participants are coming from urban area (64.1%) and Overcrowding is present in 83.1% houses and also Cross ventilation is not present in 80.9% of houses of the participants. LOW BIRTH WEIGHT is present in 17.8% of the babies of the study group. (Table 1)

Table 2: Distribution of LBW Babies According to Maternal Factors

Characteristics	Frequency	Percentage
Height of the mother		
<140 cm	6	2.7%
>140 cm	219	97.3%
Weight gain during pregnancy		
<9 kgs	103	45.8%
9 -11 kgs	108	48%
>11 kgs	14	6.2%
BOH	80	35.6%
Abortion	132	58.7%
Others Previous LBW/ Previous abortion	6	2.7%
Still birth	7	3.1%
Number of gestations		
0	2	0.9%
1	103	45.8%
2	87	38.7%
3	29	12.9%
4	4	1.8%
History of multiple pregnancy		
Yes	1	0.4%
No	224	99.6%
Birth conception interval		
< 3 years	210	93.3%
>3 years	15	6.6%
History of ante partum hemorrhage		
Yes	8	3.6%
No	217	96.4%
Any habits like Smoking/Alcohol/ Passive exposure to smoking		
Yes	4	1.8%
No	221	98.2%
Number of antenatal visits		
< 4 visits	2	0.9%
>4 visits	223	99.1%
IFA & Calcium tablets taken		
Yes	221	98.2%
No	4	1.8%
Medical disease of mother		
Anemia	1	0.4%
Diabetes	2	0.9%
Hypertension	3	1.3%
Pregnancy induced Hypertension	3	1.3%
Thyroid	9	4%
Nil	207	92%
History of cervical incompetence/ PROM		
Yes	58	25.8%
No	167	74.2%
History of Malaria/ Dengue		
Yes	2	0.9%
No	223	99.1%
History of TB/ Measles/ Mumps/ Rubella/Syphilis/ HIV/Hepatitis B/Rh Incompatibility		
Yes	1	0.4%
No	223	99.1%
others	1	0.4%

In the distribution of LBW babies according to maternal factors majority of the mothers height (Table 2) in the study group is above average, that is >140 cms. Most of the mothers weight gain during pregnancy is > 9 kgs. Half of the mothers birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets.

Table 3: Distribution of LBW Babies According to Fetal Factors

CHARACTERISTICS	FREQUENCY	PERCENTAGE
H/O Chromosomal/Congenital abnormalities		
Yes	1	0.4%
No	224	99.6%
H/O FETAL Abnormalities		
Yes	2	0.9%
No	223	99.1%
H/o intrauterine infection		
Yes	9	4%
No	216	96%

There are negligible fetal factors responsible for Low birth weight. (Table 3)

Table 4: Distribution of LBW Babies According to Social Factors

CHARACTERISTICS	FREQUENCY	PERCENTAGE
Age at marriage		
< 18 years	9	4%
>18 years	216	96%
Age at first pregnancy		
< 18 years	9	4%
>18 years	216	96%
Registered in Anganwadi		
Yes	218	96.9%
No	7	3.1%
Pregnancy is		
Wanted	223	99.1%
unwanted	2	0.9%

It was noted that majority of the mothers age at marriage and age at first pregnancy is >18 years (96%). Most of the mothers 96.9% were registered in Anganwadi centre and 99.1 of pregnancies are wanted pregnancies.(Table 4)

Table 5: Association between Socio Demographic, Maternal Factors and Low Birth Weight

Characteristics	BIG BABY	LBW	NORMAL	VLBW	X^2	P value
AGE OF THE MOTHER						
<18 years	0	0	4	0	2.85	0.828
19-29 years	4	38	171	3		
>30 years	0	2	3	0		
OCCUPATION OF THE MOTHER						
Daily labour	2	7	44	2	67.7	<0.001**
House wife	1	21	96	1		
Non-Agricultural labour	0	9	27	0		
Nurse	0	1	2	0		
Private teacher	0	0	2	0		
Tailor	0	1	5	0		
Clerk	1	1	0	0		
Height of the mother						
<140 cm	0	2	3	1	12.5	0.006*
>140 cm	4	38	175	2		
Weight gain during pregnancy						
<9 kgs	0	26	76	1	22.5	<0.001**
9 -11 kgs	2	14	90	2		
>11 kgs	2	0	12	0		
RELIGION						
Hindu	4	27	129	3	3.38	0.760
Muslim	0	6	26	0		
Christian	0	7	23	0		
EDUCATION OF THE MOTHER						
Illiterate	1	5	17	1	9.60	0.651
Below 5th Class	0	8	23	0		
10th class or below 10th class	1	13	65	1		
Inter	1	11	58	0		
Degree	1	3	15	1		
SOCIO ECONOMIC STATUS OF THE FAMILY						
Above poverty line	1	15	74	2	1.47	0.690
Below poverty line	3	25	104	1		

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RESIDENCE						
Urban	3	26	112	2	0.246	0.970
rural	1	14	64	1		
NUMBER OF FAMILY MEMBERS						
Small	1	4	18	1	3.90	0.691
Medium	3	32	134	2		
Large	0	4	26	0		
OVER CROWDING						
Yes	4	34	147	2	1.53	0.676
No	0	6	31	1		
CROSS VENTILATION						
Yes	0	5	37	1	2.79	0.425
No	4	35	141	2		
History of Malaria/ Dengue						
Yes	0	0	1	1	36.5	<0.001**
No	4	40	177	2		

Association of Socio demographic and other factors with Low birth weight, Occupation of the mother (p = <0.001), Height of the mother (p = <0.006), Weight gain during pregnancy (p = <0.027), History of Infections, Malaria, Dengue (p = <0.001) were significantly associated and important determinants of low birth weight. (Table5)

*Statistically significant at <0.005

**Statistically significant at <0.001

PREVALENCE OF LOW BIRTH WEIGHT- 17.8%

Discussion

Majority of mothers (96%) belong to 19-29 years age group and Hindu Religion (72.4%). Education of the mothers of the study group is below 10th class (35.6%) and Inter (31.1%). Regarding occupation of mothers, house wives are 53.4% and daily laborers are 24.7%. Majority of the study group belong to below poverty line (59.1%). Most of the study participants are coming from urban area (64.1%) and Overcrowding is present in 83.1% houses and also Cross ventilation is not present in 80.9% of houses of the participants. LOW BIRTH WEIGHT is present in 17.8% of the babies of the study group in the present study.

In a study Global nutrition targets 2025, low birth weight policy by WHO, overall it is estimated that 15% to 20% of all births are Low birth weight which is similar to the present study (17.8%).[5]

In a similar study by ministry of health and family welfare posted on 2nd Jan 2018, weight less than 2.5 kgs babies are 18.6% which is comparable to present study. [10]

A cross sectional study conducted by Dubey et al the prevalence of low birth weight was 27% in delhi which was higher than the present study. [3]

In the distribution of LBW babies according to maternal factors majority of the mothers height(Table 2) in the study group is above average, that is >140 cms. Most of the mothers weight gain during pregnancy is > 9 kgs. Half of the mothers Birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets.

There are negligible fetal factors responsible for Low birth weight in the present study.

It was noted that majority of the mothers age at marriage and age at first pregnancy is >18 years (96%). Most of the mothers 96.9% were registered in Anganwadi centre and 99.1 of pregnancies are wanted pregnancies.

Association of Socio demographic and other factors with Low birth weight, Occupation of the mother (<0.001), Height of the mother (<0.006), Weight gain during pregnancy (<0.027), History of Infections, Malaria, Dengue (<0.001) were significantly associated and important determinants of low birth weight in the present study.

A study conducted by Tarik M et al, the strong determinants associated with low birth weight is nutrition(10) which was similar to the present study.[9]

In a study conducted by Sachiko Inoue et al that a newborn's small size was one factor in the relationship between shorter maternal height which was also seen and statistically significant association in the present study.[8]

In a study conducted by Addulai Abubakari et al that weight gain during pregnancy was strong predictor for low birth weight which is comparable to the present study where the weight gain and Low birth weight were significantly associated.[1]

In a study conducted by Amar Devaguru etal the mothers with a height of less than 145 cms and mothers who gained less than 7 Kgs during pregnancy and Lower socio economic status revealed the high prevalence of LBW which was also seen in the present study where the mothers who had less weight gain, height less than 140 cms were showing significant association with LBW babies.[4]

Conclusions

The age group of the study population ranged from 17-35 years. Majority of the study population were literate. A high proportion of the study population was housewives and daily laborers belonging to below poverty line. Occupation, Height of the mother, Weight gain during pregnancy, History of infection with Malaria/ Dengue are significantly associated with the Prevalence of Low birth weight.

Efforts should be made to strengthen the health facilities and to impart health and nutrition education by health functionaries to antenatal mothers and early detection of high risk pregnancy and timely referral to higher institutions and also to prevent preterm deliveries and anemia because these are factors which can prevent low birth weight babies.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Ethical clearance was obtained from IEC committee of Kurnool medical college, Kurnool, with IEC No: 391/2023

Conflict of Interest: There is no conflict of interest.

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References

1. Abubakari A, Asumah MN, Abdulai NZ. Effect of maternal dietary habits and gestational weight gain on birth weight: an analytical cross-sectional study among pregnant women in the Tamale Metropolis. *Pan African Medical Journal*. 2023 Jan 11;44:19. doi: 10.11604/pamj.2023.44.19.38036. PMID: 37013206; PMCID: PMC10066620.
2. Crosse EA, Alder RJ, Østbye T, Campbell MK. Small area variation in low birth weight: looking beyond socioeconomic predictors. *Canadian Journal of Public Health*. 1997;88(1):57–61.
3. Dubey DK,Nath DC. Regional models assessing region specific determinants of low birth weight in India. *Current Science* 2019; 116(10): 25-30.
4. Devaguru A, Gada S, Potpalle D, Dinesh Eshwar M, Purwar D. The Prevalence of Low Birth Weight Among Newborn Babies and Its Associated Maternal Risk Factors: A Hospital-Based Cross-Sectional Study. *Cureus journal*. 2023 May 5;15(5):e38587. Doi : 10.7759/ cureus.38587. PMID: 37288213; PMCID: PMC10241711.
5. Global nutrition targets 2025: low birth weight policy brief [Internet]. [cited 2023 Jul 27]. Available from: https://www.who.int/publications-detail-redirect/ WHO-NMH-NHD-14.5
6. Girotra S, Mohan N, Malik M, Roy S, Basu S. Prevalence and Determinants of Low Birth Weight in India: Findings From a Nationally Representative Cross-Sectional Survey (2019-21). *Cureus journal*. 15(3):e36717.

7. Indicator Metadata Registry Details [Internet]. [Cited 2023 Jul 27]. Available from: https://www.who.int/data/gho/indicator-metadata-registry/imr-details/76

8. Inoue S, Naruse H, Yorifuji T, Kato T, Murakoshi T, Doi H, Subramanian SV. Association between Short Maternal Height and Low Birth Weight: a Hospital-based Study in Japan. *Journal* of *Korean Medical Science.* 2016 Mar; 31(3):353-9. Doi: 10.3346/jkms.2016.31.3.353. Epub 2016 Feb 15. PMID: 26955234; PMCID: PMC4779858.

9. Tarik M, Ramakrishnan L, Sinha S, Sachdev HPS, Tandon N, Roy A, Bhargava SK. Association of birth outcomes and postnatal growth with adult leukocyte telomere length: Data from New Delhi Birth Cohort. *Maternal & Child Nutrition journal*. 2019 Oct;15(4):e12857. doi: 10.1111/mcn.12857. Epub 2019 Jul 17. PMID: 31216382; PMCID: PMC6859967.

10. Schemes For Children Born With Low Birth Weight [Internet]. [cited 2023 Jul 27]. Available from: https://pib.gov.in/pib.gov.in/Pressreleaseshare.aspx?PRID=1514950.