



PROPORTION OF MATERNAL RISK FACTORS AND ITS ASSOCIATION WITH LOW BIRTH WEIGHT: A PROSPECTIVE STUDY IN RURAL MYSURU

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ABSTRACT

Background: Low birth weight (LBW) is one of the most serious challenges in both developed and developing Countries. Low birth weight infant is defined as one whose birth weight is less than 2500g irrespective of gestational age. Presence of high risk factors during antenatal period influences both maternal and neonatal outcomes to a greater extent. **Methodology-** A Community based Longitudinal study was conducted for the period of one year. All the antenatal mothers who completed 24 weeks of gestation, who were available for follow-up till 1 week after the delivery were included in the study. During the first visit, a pretested semi structured proforma was administered which includes details regarding socio demographic background, major risk factors etc. Mothers were followed up till the delivery and details regarding delivery and birth weight were collected. **Results-** Out of 257 registered mothers, Proportion of low birth weight was 10.2(95% CI = 6.35-14.05%). Proportion of various high risk factors among antenatal mothers found to be Anaemia was 54% (95% CI=47.6-60.35%), Previous still birth, IUD, previous LSCS was 27% (95% CI=7.0-14.8%), Elderly Primi was 1.2% (95% CI=0.18-2.58%), Short Statured Primi was 2% (95% CI=0.22-3.78%), Malpresentations was 3.2% (95% CI=0.96-5.44%), Pre-eclampsia & Eclampsia was 2.8% (95% CI=0.7-4.9%), Twins and Hydramnios was 0.8% (95% CI=0.33-1.27%), Grand Multipara was 4.4% (95% CI=1.79-7.01%). However none of the risk factors show any significant association with low birth weight. Proportion of the low birth weight is nearly double in the group whose total weight gain is less than 9 kgs (15%) in comparison with the group whose total weight gain is more than or equal to 9 kgs (6.2%). This difference is statistically significant with p value < 0.05 **Conclusion:** Maternal risk factors are found to be not associated with adverse pregnancy outcome such as low birth weight. But maternal weight gain during the pregnancy adversely affect the possibility of low birth weight.

KEYWORDS : Low birth weight, Maternal risk factors, adverse pregnancy outcomes, Eclampsia.

INTRODUCTION

Ensure healthy lives and promote well-being for all at all ages is one of the key goal of Sustainable development goals.¹

In any community, mothers and children not only constitute a large group but they are also a special risk group. So, identifying this vulnerable group and providing them a special care is the important objective of maternal and child care services.

High risk pregnancy is defined as one where pregnancy is complicated by factor or factors that adversely affects the outcome-maternal or perinatal or both.²

About 20-30% of the pregnancies belong to high risk category. Presence of high risk factors during antenatal period influences both maternal and neonatal outcomes to a greater extent. Over 50% of all maternal complications and 60% of all primary caesarean sections arise from high-risk group.²

Pregnancy is termed high risk if the woman is having one of the following high risk factors, elderly primi, short statured primi, mal presentations, antepartum haemorrhage and threatened abortion, pre-eclampsia and eclampsia, anaemia, twins and hydramnios, previous stillbirth, intrauterine death, manual removal of placenta, elderly grand multipara, prolonged pregnancy, history of previous caesarean or instrumental delivery, pregnancy associated with general diseases, viz. cardiovascular disease, kidney disease, diabetes, tuberculosis and liver disease, malaria, asthma, convulsions, HIV, RTI, STI treatment for infertility and three or more spontaneous consecutive abortions.³

Low birth weight (LBW) is one of the most serious challenges in both developed and developing Countries. According to UNICEF(2011), burden of low birth weight was 28%⁴ but recent UNICEF (2020) data reports prevalence of low birth weight to be 14.7%.⁵ According to National Family Health Survey -5 (NFHS-5) prevalence of low birth weight babies is 17.4%.⁶

Hence The Present Study Intended

1. To estimate the proportion of high risk pregnancies in study area.
2. To determine the factors affecting the low birth weight.
3. To evaluate the association between Risk factors and low birth weight.

Methodology

A Community based Longitudinal study was conducted for the period of 1 year (June 2022-May 2023). All the antenatal mothers who completed 24 weeks of gestation, registered under rural field practice area of a tertiary care hospital of Mysuru district and who were available for follow-up were included in the study. Antenatal mothers who did not want to participate in the study were excluded. Institutional Ethics Committee clearance was obtained before the start of the study.

All the mothers belonging to the above mentioned inclusion criteria attending the PHC's were contacted and enrolled for the present study. Mothers who gave consent were contacted at the residence pretested semi structured proforma which includes the details of the socio-demographic background, details of the past pregnancy, major risk factors of the present pregnancy were collected. Expected date of delivery was calculated based on 1st ultrasonography report. Mothers were examined for pallor, edema, and were measured height, weight, blood pressure, fundal height. Respiratory and cardiovascular system examination was done. Basic investigations reports were collected.

Mothers were followed up till the delivery. During subsequent visits, development of any risk factor was noted and investigation reports were reviewed. Routine antenatal examination was done. Mothers were followed up till 1st week of delivery and details regarding birth weight and other delivery details were collected. Minimum of 2 visits were made before declaring lost follow up. Data collected was entered in MS office excel sheet and analyzed using Statistical Package for Social Sciences (SPSS) software version 22.0.

Descriptive Statistical like proportion and Inferential statistical test like chi-square test and Multivariate analysis like Logistic regression was done, P-value less than 0.05 was taken as statistically significant.

RESULTS

Out of 257 registered mothers, 246 mothers had live birth. 11 mothers lost to follow-up. Total number of low birth weight out of 246 deliveries were 10.2(95% CI = 6.35-14.05%). Proportion of various high risk factors among antenatal mothers found to be Anaemia was 54% (95% CI=47.6-60.35%), Previous still birth, IUD, previous LSCS was 27% (95% CI=7.0-14.8%), Elderly Primi was 1.2% (95% CI=0.18-2.58%), Short Statured Primi was 2% (95% CI=0.22-3.78%), Malpresentations was 3.2% (95% CI=0.96-5.44%), Pre-eclampsia &

Eclampsia was 2.8% (95% CI=0.7-4.9%), Twins and Hydramnios was 0.8% (95% CI=0.33-1.27%), Grand Multipara was 4.4% (95% CI=1.79-7.01%).

Factors like Short statured primi, Preeclampsia, Eclampsia, Anaemia, Gestational diabetes mellitus, Twins and Hydromnios, Previous still births, Intra uterine deaths, previous caesarean delivery and Grand multipara did not show any significant association with low birth weight.

Proportion of the low birth weight is nearly double in the group whose total weight gain is less than 9 kgs (15%) in comparison with the group whose total weight gain is more than or equal to 9 kgs (6.2%). This difference is statistically significant with p value<0.05

Relationship between elderly primi and low birth weight could not be studied with the help of odds ratio, as odds ratio could not be calculated as the frequency of the variables were found to be less ('0' frequency in one of the cells).

DISCUSSION

Proportion of antenatal mothers with Anaemia was 54%, Previous still birth, IUD, previous LSCS was 27%, Grand Multipara was 4.4%. Least high risk factor was reported with Twins and Hydromnios (table-1)

According to Anup G et al, prevalence of anaemia among the rural pregnant women was 51.33%.⁷ This is similar to results obtained in the present study.

Factors like Short statured primi, Preeclampsia, Eclampsia, Anaemia, Gestational diabetes mellitus, Twins and Hydromnios, Previous still births, Intra uterine deaths, previous caesarean delivery and Grand multipara did not show any significant association with low birth weight. (table-1)

In the present study proportion of the Low birth weight is about 10.2%. According to UNICEF(2011), burden of low birth weight was 28%⁴ but recent UNICEF (2020) data reports prevalence of low birth weight to be 14.7%.⁵ According to National Family Health Survey -5 (NFHS-5) prevalence of low birth weight babies is 17.4%.⁶ However all these adverse outcomes are enormously decreasing from past 5 years even at the national level. This is attributed to the increased awareness and better availability of MCH services.

Factors like Short statured primi, Preeclampsia, Eclampsia, Anaemia, Gestational diabetes mellitus, Twins and Hydromnios, Previous still births, Intra uterine deaths, previous caesarean delivery and Grand multipara did not show any significant association with low birth weight. (table-2). In a hospital based study by chaithanya et al, independent risk factors for low birth weight were periodontitis (ARR, 3.38; 95% CI, 1.6 to 6.9), gestational hypertension (ARR, 3.70; 95% CI, 1.3 to 10.8), maternal height <1.50 m (ARR, 2.66; 95% CI, 1.3 to 5.1), and genital infections during the later stages of pregnancy (ARR, 2.79; 95% CI, 1.2 to 6.1).⁸ However, gestational diabetes can act as a major factor that draws these population to the hospital. Early opting of elective caesarean section by health care facilities may lead to higher chances of low birth weight deliveries.

We can also conclude that proportion of the low birth weight is nearly double in the group whose total weight gain is less than 9 kgs (15%) in comparison with the group whose total weight gain is more than or equal to 9 kgs (6.2%). This difference is statistically significant with p value<0.05(table-3). Prospective study conducted by Jyothi et al in Nepal shows significant association between the average rate of gestational weight gain from the second to the third trimester and birth weight. weight gain emerged as a key predictor of neonatal birth weight.⁹ In a study conducted by Manjur et al, it was stated that odds of having low birth weight babies in low BMI is 49% higher which clearly reflects the nutritional status of the women.¹⁰ Proportion of the teenage pregnancy is 14% in the current study which can be one of the determinant of inadequate weight gain during pregnancy.

CONCLUSION

Though presence of 'high risk' factors are attributed to the adverse pregnancy outcomes like low birth weight, nutritional status and weight gain during pregnancy play a vital role. Hence the antenatal mothers should be strictly monitored in this regard.

Recommendation

Effective monitoring of the antenatal mothers for presence of high risk factors and reporting if, any adverse outcome occurs. Strict monitoring of the nutritional status and measures to improve the same during pregnancy will make greater difference in reducing the adverse pregnancy outcomes.

Declarations

Funding: Self funded

Conflict Of Interest: NO

Ethical Approval: Taken

Table 1- Distribution of study participants according to proportion of High risk factors (N=246)

High risk factor	Yes n (%)	95% CI
Elderly Primi	3(1.2%)	(0.18-2.58%)
Short Statured Primi	5(2%)	(0.22-3.78%)
Malpresentations*	8(3.2%)	(0.96-5.44%)
Pre-eclampsia & Eclampsia	7(2.8%)	(0.7-4.9%)
Anaemia	133(54%)	(47.6-60.35%)
Twins and Hydramnios	2(0.8%)	(0.33-1.27%)
Grand Multipara	11(4.4%)	(1.79-7.01%)
Previous still births, Intra uterine death, previous caesarean section	27(10.9%)	(7.0-14.8%)

*=29 (Third trimester ultrasonography reports were available only for 29 pregnant mothers)

Table 2-Relationship between High risk factors and Low birth weight (N=245)**

High risk factors	Level	Low birth weight		Total n (%)	OR(95 %CI)
		Present n(%)	Absent n(%)		
Elderly primi	< 30yrs	25(10.4%)	217(89.6%)	242(100%)	*
	≥30yrs	0(0)	3(100%)	3(100%)	
Short statured primi	≤140cms	1(20%)	4(80%)	5(100%)	2.25(0.24-20.95)
	>140cms	24(10%)	216(90%)	240(100%)	
Pre-eclampsia & Eclampsia	Yes	2(28.6%)	5(71.4%)	7(100%)	3.739(0.66-3.69)
	No	23(9.7%)	215(90.3%)	238(100%)	
Anaemia	Yes	16(12.1%)	117(87.9%)	133(100%)	1.56(0.66-3.69)
	No	9(8.1%)	103(91.9%)	112(100%)	
Gestational Diabetes Mellitus	Yes	1(16.7%)	5(83.3%)	6(100%)	1.79(0.20-15.97)
	No	24(10.1%)	215(89.9%)	239(100%)	
Twins and Hydramnios	Yes	1(50%)	1(50%)	2(100%)	9.12(0.55-150.6)
	No	24(9.9%)	219(90.1%)	243(100%)	
Previous still births, Intra uterine death, Previous caesarean section	Yes	3(11.2%)	24(88.8%)	27(100%)	1.11(0.31-4.00)
	No	22(10.1%)	196(89.9%)	218(100%)	
Grand multipara	Yes	2(8.2%)	9(81.8%)	11(100%)	2.03(0.41-10.01)
	No	23(9.9%)	211(90.1%)	234(100%)	

**N=245 for low birth weight delivery because details on birth weight was not available for 2 deliveries and one was a twin delivery.

* odds ratio could not be calculated as the frequency of the variables were found to be less.

Table 3- Association between Total weight gain during Antenatal period and Low birth weight (N=245)*

Total weight gain (kg)	Low birth weight		Total n(%)
	Yes n (%)	No n (%)	
Inadequate(<9)	17(15%)	97(85%)	114(100%)
Adequate(≥9)	8(6.2%)	123(93.8%)	131(100%)
Total	25	220	245(100)

χ² = 5.15, df=1, p=0.02

*N=245 for low birth weight delivery because details on birth weight was not available for 2 deliveries and one was a twin delivery.

REFERENCES

1. Sustainable development goals- United Nations. (cited on 06 June 2016) Available from the URL: www.un.org/sustainabledevelopment/sustainable-development-goals.
2. Dutta D C. Textbook of Obstetrics. 10th ed. New Central Book Agency Ltd. Kolkata.2023.
3. Park K. Parks textbook of preventive and social medicine. 27th ed. Jabalpur, India. M/s Banarsidas Bhanot. 2023.
4. Statistics[India][UNICEF. (cited on 15 sep 2019). Available from URL <http://www.unicef.org/infobycountry/indiastatistics.html>
5. UNICEF Data. Annual report 2011 – 2012(cited on 25 sep 2024). Available from URL: https://data.unicef.org/wp-content/uploads/2023/10/Technical-note_Low-birthweight-and-preterm-birth-country-consultation_ENGLISHLBW-Country-consultation-2022-ENG.pdf
6. National family health survey-5. Ministry of health and family welfare. Government of India. (cited on 25 sep 2024) Available from URL: https://mohfw.gov.in/sites/default/files/NFHS-5_Phase-II_0.pdf
7. Anup G. Prevalence and Factors influencing Anaemia among Pregnant Women in Rural Mysuru [Dissertation].Mysuru: JSS University; 2016.
8. Tellapragada C, Eshwara VK, Bhat P, Acharya S, Kamath A, Bhat S, Rao C, Nayak S, Mukhopadhyay C. Risk Factors for Preterm Birth and Low Birth Weight Among Pregnant Indian Women: A Hospital-based Prospective Study. J Prev Med Public Health. 2016 May;49(3):165-75.
9. Nepal J, Chaudhary K, Adhikari B, Shrestha A, Shrestha A, Kapri SP, Rawal S. Association of gestational weight gain rate with infant birth weight and cesarean delivery: A prospective cohort study in Nepal. PLOS Glob Public Health. 2024 Nov 11;4(11):e0003546.
10. Kader M, Perera NK. Socio-economic and nutritional determinants of low birth weight in India. North Am J Med Sci. 2014 June;6:302-8.