RESEARCH PAPER

A Study of Factors Associated with Low Birth Weight in Rural Area of District Gurugram, Haryana

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ABSTRACT

Background

Low birth weight (LBW), defined as birth weight less than 2500 g, is a major public health concern associated with increased neonatal morbidity and mortality. Maternal nutritional and health factors play an important role in determining birth outcomes.

Objective

To assess the socio-demographic, nutritional, medical, and lifestyle characteristics of mothers of low-birth-weight babies in a rural area of District Gurugram, Haryana.

Methods

A community-based cross-sectional study was conducted among 102 mothers of low-birth-weight babies born in 2021 in six villages of the field practice area of SGT University, Gurugram. Data were collected using a pre-tested structured questionnaire and analyzed using Chi-square and Fisher's exact tests.

Results

Most mothers (97.1%) were aged 15–25 years, and 58.8% were primigravida. Severe anemia was observed in 52.0% of mothers, while 71.6% consumed fewer than 100 iron-folic acid tablets during pregnancy. The majority of babies (88.2%) weighed between 1500–2499 g. Maternal activity during pregnancy was significantly associated with birth weight ($p<0.05$). A significant association was also observed between birth weight and type of delivery ($p=0.02$). No significant association was found between birth weight and IFA consumption, fruit intake, or specific dietary practices during pregnancy.

Conclusion

Maternal anemia was highly prevalent among mothers of low-birth-weight babies. Maternal activity during pregnancy and type of delivery were significantly associated with birth weight. Improving maternal nutrition, anemia control, and antenatal counselling may help improve birth outcomes in rural communities.

Keywords: Low birth weight, maternal anemia, nutrition, pregnancy, antenatal care, rural health.

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INTRODUCTION

The who, on the basis of worldwide data, has recommended that newborns with birth weight less than 2500 grams or 5.5 pounds may be considered as low birth weight (lbw) regardless of gestational age. The low birth weight of newborn baby can be further categorized as very low birth weight which is less than 1500 grams and extremely low birth weight which is less than 1000 gram.[1] It is considered to be a major concern of public health as it is a main risk factor of childhood mortality and morbidity. Approximately 70 % of neonatal deaths occur due to low weight on birth of a child.[2] Every year nearly 20.5 million newborns are born as low birth weight children. Among all low birth weight outcomes 96.5 % were from developing countries. Unfavorable birth outcomes, especially low birth weight (lbw), among infants are considered a major concern of public health in relation to its significant

contribution towards the sustainability and well-being of the population.[1-3]

Lbw is globally recognized as an early post-birth indicator of maternal intrauterine environment and has been studied in epidemiological research in recent decades· In terms of short term and long term consequences of this outcome, low birth weight plays a major role in inferring infant and childhood morbidities like mental retardation, learning disabilities, inhibited growth of those children, cognitive delays and so on.[4-5]

Low birth weight is an important indicator of public health regarding mother's health and her surroundings. Findings from developing countries show that the incidence of intrauterine growth retardation (iugr) decreases as a country takes a leap towards development.[1,6] Some of the factors responsible for these adverse outcomes are maternal malnutrition, anemia, deficient prenatal care, drug abuse, birth order of child, and medical problems of mother, e.g., pregnancy induced hypertension, diabetes, cardiac diseases and chronic infections during gestational period. [7]

MATERIALS AND METHODS

A community-based cross-sectional study was conducted in the field practice area of SGT university to assess factors associated with low birth weight (lbw) babies. For the purpose of this study, low birth weight was defined as a neonatal birth weight of less than 2.5 kg. The study population comprised all mothers of low birth weight babies born during the year 2021 in six villages, namely Budhera, Sultanpur, Kaliawas, Makrola, Iqbalpur, and Sadhrana, located within the field practice area of SGT University.

low birth weight babies born in 2021 and their mothers residing nearby in the study area were included in the study. Mothers who could not be contacted, refused to participate, or had migrated from the study area were excluded. A total of 102 mothers meeting the eligibility criteria were interviewed.

Data were collected using a pre-designed, pretested, and structured questionnaire. Face-to-face interviews were conducted with the mothers after obtaining informed consent. A comprehensive list of low-birth-weight babies was prepared from the birth registers maintained by accredited social health activists (ASHA's) and Anganwadi workers. Subsequently, house-to-house visits were undertaken to identify and interview all eligible mothers of low-birth-weight babies born during the study period.

Information was collected regarding socio-demographic characteristics of the mothers, economic factors, dietary history during pregnancy, and lifestyle-related factors. The collected data were coded and entered into Microsoft excel, where a master database was prepared for analysis. Statistical analysis was performed to determine associations between variables using the chi-square test and fisher's exact test wherever applicable.

RESULTS

A total of 102 mothers of children born in the year 2021 were included in the study. The details of all children born in 2021 were obtained from the registers maintained by Asha workers and Anganwadi workers. Mothers were interviewed for data collection.

Table 1. Distribution of socio-economic and demographic factors of study participants (n=102)

Variables	Frequency	Percentage %
Age of mother		
1.(15-25)	99	97.05%
2.(25-35)	2	1.96%
3.(35-45)	1	0.98%
Age at marriage		
1. <18	3	2.94%
2. 18-21	96	94.11%
3. >21	3	2.94%
Birth weight of baby in grams		
1. 2499-1500	90	88.23%
2. 1499-1000	9	8.82%
3. Below 1000	3	2.94%
Sex of the child		
1. Male	42	41.17%
2. Female	60	58.82%
Birth order of child		
1. 1st	60	58.82%
2. 2nd	29	28.43%
3. 3rd	10	9.80%
4. 4th	1	0.98%
5. 5th	2	1.96%
Gravida		
1. 1st	60	58.82%
2. 2nd	28	27.45%
3. 3rd	9	8.82%
4. 4th	3	2.94%
5. 5th	2	1.96%
Any congenital defect in baby		
1. Yes	0	0

2. No	102	100%
Previous history of lbw		
1. Yes	34	33.33%

A total of 102 mothers of low birth weight babies were included in the study. Most mothers (97.05%) were aged 15–25 years, and 94.11% were married between 18 and 21 years of age. The majority of low birth weight babies (88.23%) had a birth weight between 1500 and 2499 g. Female children constituted 58.82% of the study population, while males accounted for 41.17%. Most babies were first-born children (58.82%), and a similar proportion of mothers were primigravida (58.82%). No congenital defects were reported among the babies. A previous history of low birth weight was present in 33.33% of the mothers.

Table 2. Distribution of nutritional intake during pregnancy (n=102)

Variables	Frequency	Percentage %
Total *IFA* intake during pregnancy		
1. (< 100)	73	71.56%
2. (>100)	29	28.43%
1. Yes	1	0.98%
2. No	101	99.01%
Specific diet followed		
1.yes	1	0.98%
2.no	101	99.02%
Diet		
1. Vegetarian	102	100%
2. Non-vegetarian	0	0
Milk consumption		
2. Daily : 2.1 (<200ml)	27	26.47%
2.2 (>200ml)	54	52.94%
4. Nil	21	20.58%
Egg consumption		
1. Yes	0	0
2. No	102	100%
Fruits and vegetables consumption		
1. Frequently	0	0
2. Daily : 2.1(1-2servings)	68	66.66%
3. Nil	34	33.33%

Most mothers (71.56%) consumed fewer than 100 ifa tablets during pregnancy, while 28.43% consumed more than 100 tablets. Nearly all mothers (99.02%) did not follow any specific diet during pregnancy, and all participants were vegetarians. Daily milk consumption of more than 200 ml was reported by 52.94% of mothers, whereas 20.58% did not consume milk. None of the mothers consumed eggs. Daily consumption of fruits and vegetables (1–2 servings) was reported by 66.66% of mothers, while 33.33% reported no consumption of fruits and vegetables.

Table 3. Distribution of medical history of study participants. (n=102)

Variable	Frequency	Percentage %
Hemoglobin at the time of delivery		
Mild anemia (hb 9.0–10.9 g/dl)	17	16.66
Moderate anemia (hb 7.0–8.9 g/dl)	32	31.37
Severe anemia (hb <7.0 g/dl)	53	51.96
History of any acute infection		
Yes	0	0.00
No	102	100.00
History of any chronic disease		
Yes	0	0.00
No	102	100.00
History of bleeding/discharge per vaginum (p/v)		
Yes	0	0.00
No	102	100.00

More than half of the mothers (51.96%) had severe anemia at the time of delivery, while 31.37% and 16.66% had moderate and mild anemia, respectively. None of the study participants reported a history of acute infection, chronic disease, or bleeding/discharge per vaginum during pregnancy.

Table 4. Association between life style of mothers and birth weight of baby. (n=102)

Variables	Birth weight 1500–2499 g	Birth weight 1000–1499 g	Birth weight <1000 g	Chi-square	P-value
Behavior of family members				1.00	0.60
Cooperative	83	9	3		

Non-cooperative	7	0	0		
Behavior of husband				1.00	0.60
Cooperative	83	9	3		
Non-cooperative	7	0	0		
Activity during pregnancy				17.14	0.00*
Routine work	2	3	0		
Domestic work	88	6	3		
Labor work	0	0	0		
Farm work	0	0	0		

No statistically significant association was observed between the behavior of family members or husbands and the birth weight of the baby (p=0.60). However, maternal activity during pregnancy showed a statistically significant association with birth weight (χ^2=17.14, p<0.05), indicating that the type of activity performed during pregnancy was related to the birth weight of the newborn.

Table 5. Association between nutritional intakes during pregnancy with birth weight of baby. (n=102)

Variables		2500-1500	1499-1000	<1000	Chi-Square	P-Value
Ifa consumption in Pregnancy	<100days	64	8	1	3.49	0.17
	>100days	26	1	2		
Specific diet followed	Yes	1	0	0	0.13	0.93
	No	89	9	3		
Fruits consumption	Daily	58	8	2	2.2	0.33
	Weekly	32	1	1		

No statistically significant association was observed between birth weight and ifa consumption during pregnancy (p=0.17), following a specific diet (p=0.93), or fruit consumption (p=0.33). Thus, these dietary factors were not significantly associated with birth weight in the present study.

Table 6. Association between birth weight of baby and type of delivery (n = 102)

Birth weight of baby	Normal delivery	Assisted delivery	Caesarean delivery	Total
1500 – 2499 g	76	0	14	90
1000 – 1499 g	7	1	1	9
<1000 g	2	0	1	3
Total	85	1	16	102

A statistically significant association was observed between birth weight of the baby and type of delivery (χ^2=11.19, p=0.02). Normal vaginal delivery was the most common mode of delivery across all birth weight categories, accounting for 85 of the 102 deliveries.

DISCUSSION

The present study assessed factors associated with low birth weight among babies born in the rural field practice area of SGT University, Gurugram. Most mothers were aged 15–25 years, and only 2.9% were married before 18 years of age, which was lower than the estimate reported in NFHS-5. The majority of babies (88.2%) were in the low birth weight category, while 8.8% and 2.9% were classified as very low birth weight and extremely low birth weight, respectively. Female babies constituted a higher proportion of low birth weight births than male babies. Most mothers were literate (94.1%), and more than one-third of the families belonged to the below-poverty-line category. Maternal nutrition and antenatal care are recognized determinants of birth weight. In the present study, only 28.4% of mothers consumed iron and folic acid (IFA) tablets for more than 100 days during pregnancy, which was lower than the NFHS-5 findings. Although most mothers reported daily fruit consumption, none followed a specific pregnancy diet, indicating possible gaps in nutritional awareness and dietary practices. Poor maternal nutrition during pregnancy may contribute to inadequate fetal growth and an increased risk of low birth weight.[5,8,9]

The utilization of maternal health services was generally satisfactory. A large proportion of mothers attended more than four antenatal care (ANC) visits, and almost all deliveries occurred in health institutions. Most births took place in government healthcare facilities, reflecting good access to maternal health services in the study area. Despite adequate service utilization, the high prevalence of low birth weight suggests that factors

beyond healthcare access, such as maternal nutritional status and anemia, may play a significant role.[6,10]

Maternal anemia was highly prevalent among the study participants, with more than half of the mothers being severely anemic at the time of delivery. Anemia during pregnancy can reduce oxygen and nutrient supply to the foetus, leading to impaired intrauterine growth and low birth weight.[6,11] The findings highlight the need for strengthening anemia prevention and control measures through improved nutritional counselling, regular screening, timely treatment, and enhanced compliance with IFA supplementation.

The study also found that birth weight was significantly associated with maternal age at marriage, occupation, physical activity during pregnancy, and type of delivery. These findings suggest that both socio-demographic and maternal health-related factors influence fetal growth and birth outcomes. Efforts aimed at improving maternal nutrition, preventing anemia, promoting healthy pregnancy practices, and ensuring quality antenatal care may help reduce the burden of low birth weight in rural populations.

CONCLUSION

The study found a high prevalence of maternal anemia among mothers of low birth weight babies. Utilization of maternal health services, including antenatal care and institutional delivery, was satisfactory in the study area. Birth weight was significantly associated with maternal age at marriage, occupation, activity during pregnancy, and type of delivery. Strengthening maternal nutrition and promoting healthy pregnancy practices may help reduce the burden of low birth weight in rural communities.

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