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Original Article

Frequency & Association of Low Birth Weight Babies with Important Risk Factors Among Term Pregnancies Visiting Private Health Care Facility

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Abstract

Objective: To determine the frequency of low birth weight among term pregnancies and assess its association with maternal demographic, socioeconomic, antenatal, nutritional, and obstetric risk factors.

Methodology: This cross-sectional analytical study was conducted in the Department of Obstetrics & Gynecology, South West Health Complex Hospital, Kohat, from Jan 2026 to May 2026. We recruited 256 pregnant women aged >18 years with term pregnancies, using consecutive sampling. We defined LBW as birth weight <2.5 kg. We analyzed data using SPSS version 26.0. We used the chi-square test to explore associations between categorical variables, and considered $p < 0.05$ statistically significant.

Results: Out of 256 term pregnancies, 61 (23.83%) had LBW. Maternal age <25 years (51.95%), illiteracy (50.39%), household income <75,000 PKR (70.70%), birth interval <2 years (57.42%), fewer than four antenatal visits (51.56%), and hemoglobin <11 g/dL (65.63%) were common. LBW was significantly associated with maternal age ($p=0.0228$), occupation ($p=0.0248$), education ($p=0.0236$), monthly income ($p=0.0079$), birth interval ($p=0.0133$), antenatal visits ($p=0.0193$), anemia ($p=0.0229$), parity ($p=0.0174$), and iron-folic acid supplementation ($p=0.0149$). BMI was not significantly associated with locality, type of pregnancy, or mode of delivery.

Conclusion: LBW was common for term pregnancies and was linked with several maternal socio-economic and pregnancy-related risk factors. Enhancing antenatal care, preventing anemia, improving maternal nutrition, and providing socioeconomic support could contribute to the reduction of LBW and related neonatal morbidity.

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Introduction

Worldwide, the prevalence of low birth weight is 15 to 20%, and approximately 18 million low birth weight babies are born annually[1]. The morbidity and mortality in developed and developing countries are significant issues that depend on low birth weight. According to the World Health Organization, low birth weight (LBW) is a birth weight below 2.5 kg.[2] Moreover, Thapa et al. (2022) found that about 1/7 of newborns had low birth weight and showed a significant association with fewer antenatal visits and no iron and folic acid supplementation during pregnancy.[3] Worldwide, low birth weight affects about 22 million people. Prevalence varies widely, and South Asia has the highest prevalence, at 20-29%.[4] Low birth weight is a common problem in Pakistan.[5] In a study by Aysha et al. (2022), the prevalence of low birth weight was 10.6%. Moreover, 67% did not receive any antenatal care, and most mothers (87%) were multiparous. Additionally, 26% of mothers weighed < 50 kg; 37% were < 5 feet tall; and 72% were anemic.[6] Furthermore, Javed et al. (2018) found that the prevalence of low birth weight was 13.35%; most cases were not registered (64.15%); 54% were grand-multiparous; and 69.81% were anemic. Low birth weight was strongly associated with hypertension, placental previa, and oligohydramnios.[7] Numerous studies of low birth weight all over the world reveal that the weight of the mother, height, age, parity, weight gained during pregnancy, and even anemia during pregnancy are all important factors in low birth weight. Indirect determinants include maternal literacy, occupation, family income, socioeconomic status, prenatal care, tobacco use, and use of iron and folic acid supplements during pregnancy.[8] Maternal malnutrition, anemia, poor prenatal care, drug use, birth order, and maternal medical disorders like hypertension, diabetes mellitus, heart disease, and chronic infections are other significant factors that contribute to low birth weight.[4] Research has shown that low birth weight babies are more likely to be born to women who are too young, too old, have too many children, or have too narrow birth intervals.[9] According to WHO, 10% of all pregnancies had hypertension, which poses a significant risk to the mother and newborn.[10] Moreover, 30.34% of mothers with gestational hypertension had low birth weights.[11] An international study conducted by Dildora et al. (2022) found that low birth weight had a strong link with hypertension. It revealed that hypertension during pregnancy increases the risk of low birth weight fourfold. Tobacco smoking had adverse maternal and neonatal health risks. During the first wave of the COVID-19 pandemic, the prevalence of tobacco smoking use among pregnant women increased to 10%, and thus the prevalence of low birth weight babies proportionately increased.[12] In Pakistan, unregistered and unbooked cases pose a significant problem, which is exacerbated by the scarcity of health care services and facilities. Thus, poor economic and social status, along with poor healthcare facilities and cultural beliefs, played a key role in the

development of low birth weight.[13] Pakistan is a developing country with scarce resources and a weak health care delivery system. The burden of low birth weight is on the rise; thus, this descriptive cross-sectional study was planned and conducted in Kohat and Peshawar Districts to estimate the burden of risk factors for low birth weight among term pregnancies with hypertension and to communicate the current study findings to the local community and, at large, to reduce and prevent the unnecessary mortality and morbidity associated with low birth weight.

Materials & Methods

This cross-sectional analytical study was conducted in the Department of Obstetrics & Gynecology, South West Health Complex Hospital, Kohat, from Jan 2026 to May 2026. We determined the sample size using the WHO sample size calculator, based on a 95% confidence interval, 5% absolute precision, 5% margin of error, and a 19.75% prevalence of low birth weight. The calculated sample size was 246. However, we selected a total sample size of n=256. We used consecutive sampling to recruit eligible participants. We included pregnant women aged >18 years with term pregnancies. In contrast, women with congenital anomalies, diabetes mellitus, renal, cardiac, or respiratory disorders, and non-permanent residents of District Kohat and Peshawar were excluded. The data collection tool included socio-demographic variables, birth interval, antenatal care, parity, type of delivery, maternal weight and height, hemoglobin, and iron and folic acid supplementation during pregnancy. We categorized maternal age as <25 and >25; locality as rural and urban; BMI as <24 and >24; monthly income as <75K and >75K PKR per month; literacy as literate and illiterate; and occupational status as employed and unemployed. We defined low birth weight as birth weight <2.5 kg. We classified antenatal visits as <4 or >4 during pregnancy and defined anemia as HB <11 g/dL. We used the chi-square test for categorical data and assessed statistical significance using $p < 0.05$ and $\chi^2 > 3.84$ for dichotomous variables with 1 degree of freedom. We entered and analyzed all data in the Statistical Package for the Social Sciences (SPSS) version 26.0 and presented results in tables. For reference management, we used Mendeley Desktop version 1.19.8.

Results

Among the 256 term pregnancies included in the study, 61 (23.83%) newborns had low birth weight (<2.5 kg), while 195 (76.17%) had normal birth weight. In our study; 51.95% had age less than 25 years; 35.94% had BMI > 24; 50.39% were illiterate; 70.70% had monthly income <75K PKR; 44.53% reside had rural residence; & 64.04% were unemployed, as was shown in Table No. 1. Additionally, 57.42% had < 2 years of birth interval during consecutive pregnancies; 51.56% had <4

antenatal visits or adequate antenatal care during pregnancy; 65.63% were anemic, with HB levels < 11 g/dL; & 48.05% were primigravida among the study participants. Moreover, 98.44% of mothers had singleton pregnancies; 91.02% had normal vaginal delivery; & 80.86% used iron &or folic acid supplementation during pregnancy, as shown in Table No. 2.

Table 1. Frequency and Association of Important Demographic Variables Among Women at Term (n=256) Visiting Health Care Facility, District Kohat and Peshawar

Variable	Response	LBW F (%)	Normal F (%)	Total F (%)	χ^2	P-value
Age (years)	<25	39 (15.23)	94 (36.72)	133 (51.95)	3.997	0.0456
	≥25	22 (8.59)	101 (39.45)	123 (48.05)		
BMI of mother	<24	43 (16.80)	121 (47.27)	164 (64.06)	1.150	0.2836
	≥24	18 (7.03)	74 (28.91)	92 (35.94)		
Occupation	Employed	15 (5.86)	77 (30.08)	92 (35.94)	3.855	0.0496
	Unemployed	46 (17.97)	118 (46.09)	164 (64.06)		
Education status	Literate	23 (8.98)	104 (40.63)	127 (49.61)	3.936	0.0473
	Illiterate	38 (14.84)	91 (35.55)	129 (50.39)		
Family monthly income (PKR)	<75,000	49 (19.14)	132 (51.56)	181 (70.70)	5.834	0.0157
	≥75,000	12 (4.69)	63 (24.61)	75 (29.30)		
Locality	Rural	23 (8.98)	91 (35.55)	114 (44.53)	1.170	0.2794
	Urban	38 (14.84)	104 (40.63)	142 (55.47)		

F = Frequency; LBW = Low Birth Weight; χ^2 = Chi-square test. P < 0.05 considered statistically significant.

Table 2. Frequency & Association of Important Risk Factors of Low Birth Weight Among Women at Term (n=256) Visiting Health Care Facility

Variable	Response	LBW F (%)	Normal F (%)	Total F (%)	X ² Test (P Value)
Birth Interval	< 2years	43 (16.80)	104 (40.63)	147 (57.42)	4.915* 0.0133
	>2years	18 (7.03)	91 (35.55)	109 (42.58)	
Antenatal Visits/ Care	< 4 ANV	39 (15.23)	93 (36.33)	132 (51.56)	4.279* 0.0193
	> 4 ANV	22 (8.59)	102 (39.84)	124 (48.44)	
HB Level	< 11mg/dl	47 (18.36)	121 (47.27)	168 (65.63)	3.992* 0.0229
	> 11mg/dl	14 (5.47)	74 (28.91)	88 (34.38)	
Parity	Primi-parous	37 (14.45)	86 (33.59)	123 (48.05)	4.459* 0.0174

Type of Pregnancy	Multi or Grand Multiparous	24 (9.38)	109 (42.58)	133 (51.95)	0.418 0.2588
	Singleton	59 (23.05)	193 (75.39)	252 (98.44)	
Type of Delivery	Twin or Multiple	2 (0.78)	2 (0.78)	4 (1.56)	2.400 0.0607
	NVD	52 (20.31)	181 (70.70)	233 (91.02)	
	C/S	9 (3.52)	14 (5.47)	23 (8.98)	
Iron+ Folic Acid Used	Yes	43 (16.80)	164 (64.06)	207 (80.86)	4.717* 0.0149
	No	18 (7.03)	31(12.11)	49 (19.14)	

Significant: *; F: Frequency; LBW: Low Birth Weight

Discussions

The prevalence of low Birth weight was associated with personal demographic and socio-economic factors, along with birth interval, parity, and antenatal care during pregnancy. The literature revealed that low socioeconomic status, inadequate antenatal visits, financial constraints, illiteracy, maternal anemia, and folic acid supplementation contribute to low birth weight. In our study, about 51.95% of participants were <25 years old, whereas Axame et al. (2022) and Dildora et al. (2022) reported 25.7% and 34.9%, respectively.[14] In Devaguru et al. (2023), only 2.3% were older than 25 years.[8] Additionally, in our study, 35.94% of pregnant women were employed, whereas in Girotra et al. (2022) and Thapa et al. (2022), 21.98% and 22.4%, respectively, were employed. [15] Moreover, Axame et al. (2022) reported 78.5%. Thus, our results showed a lower prevalence of illiteracy than in Girotra et al. (2022), Thapa et al. (2022), and Axame et al. (2022).[16] In international studies, illiteracy among pregnant women was reported as 14.1%, 26.66%, and 19.54% among Axame et al. (2022), Devaguru et al. (2023), and Girota et al. (2023, respectively [17] whereas in our study, 49.61% were illiterate; thus, our illiteracy status level showed a higher frequency compared to previous international studies. Regular antenatal visits play a pivotal role in early detection and timely management of hypertension during pregnancy, and our study revealed that a large proportion of women had inadequate antenatal care. In our study, 51.56% had ≤4 antenatal visits, whereas in studies by Thapa et al. (2022), Giotra et al. (2023), and Devaguru et al. (2023), this was 8.4%, 53.15%, and 58.66%, respectively.[18,19] In our study, 57.42% had birth intervals of <2 years, whereas in Thapa et al. (2022), 8.2% had birth intervals of <2 years. Thus, our findings showed a higher prevalence of short birth intervals than in the Thapa et al. (2022) study.[2] Maternal anemia was another significant factor identified in this study. Anemia reduces the oxygen-carrying capacity of maternal blood and further aggravates placental

hypoxia caused by hypertension. In our study, 65.63% had HB <11 g/dL and were classified as anemic, whereas in the studies of Axame et al., 2022, and Giotra et al., 2023, it was 57.4% and 59.19%, respectively.[19] In our study, 48.05% were primigravida and 51.95% were multigravida, whereas Farhan et al. (2023) reported 61.7% and 38.2%, respectively.[13] In our study, 91.02% had normal vaginal delivery, whereas in the study by U.I. Khan et al. (2024), 66.9% had NVD.[17] Moreover, in our study, 80.86% used iron and/or Folic Acid supplementation during pregnancy, whereas Devaguru et al. (2023) and Thapa et al. (2022) reported 68% and 97.4%, respectively.[20] This study found that low birth weight in term pregnancies was significantly associated with maternal age, illiteracy, birth interval, inadequate antenatal care, maternal anemia, parity, and monthly family income, with significant chi-square test values and p-values < 0.05.

Conclusions

Low birth weight was significantly associated with maternal age, occupation, education, family income, birth interval, antenatal care, anemia, parity, and iron/folic acid supplementation among term pregnancies. Strengthening antenatal care, improving maternal nutrition, controlling anemia, and promoting appropriate birth spacing may help reduce the burden of low birth weight.

Authors' Contributions

Sajeela Amin: Conceptualization, study design, literature search, study screening, data extraction, manuscript drafting, and critical revision.

Musarrat Jabeen: Conceptualization, supervision, interpretation of findings, critical revision of the manuscript, and final approval of the version to be published.

Muhammad Ishtiaq: Literature search, study screening, data extraction, preparation of tables and figures, and manuscript revision.

Natasha Junaid: Data extraction, literature review, manuscript drafting and revision, and reference verification.

Zaib Un Nisa: Data analysis, interpretation of findings, manuscript revision, and final approval of the manuscript.

Jaweria Ahmad Khattak: Literature review, manuscript revision, reference verification, and final approval of the manuscript.

All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

Data Availability

The data generated and analyzed during the current study are available from the corresponding author on reasonable request, subject to appropriate ethical and institutional restrictions. The data are not publicly available because they contain information collected from human participants and may include potentially identifiable or sensitive information.

Ethical Approval: Ethical approval was obtained from the GCON Ethical Committee, Govt. College of Nursing Kohat, under Approval No. 18/CON/KT, dated 15 January 2026, for the study on low birth weight.

Informed Consent: Not applicable.

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Conflict of Interest: The authors declare no conflict of interest.

References

- Boateng D, Oppong FB, Senkyire EK, Logo DD. Spatial analysis and factors associated with low birth weight in Ghana using data from the 2017 Ghana Maternal Health Survey: spatial and multilevel analysis. *BMJ Open*. 2024;14(8):e083904. doi:10.1136/bmjopen-2024-083904
- Burger RJ, Gordijn SJ, Mol BW, Ganzevoort W, Ravelli ACJ. Birth-weight centile at term and school performance at 12 years of age: linked cohort study. *Ultrasound Obstet Gynecol*. 2023;61(4):458-465. doi:10.1002/uog.26160
- Costello JM, Kim F, Polin R, Krishnamurthy G. Double Jeopardy: Prematurity and Congenital Heart Disease-What's Known and Why It Is Important. *World J Pediatr Congenit Heart Surg*. 2022;13(1):65-71. doi:10.1177/21501351211062606
- Crump C, Sundquist J, Sundquist K. Adverse pregnancy outcomes and long-term mortality in women. *JAMA Intern Med*. 2024;184(6):631-640. doi:10.1001/jamainternmed.2024.0276
- Crump C, Wei J, Sundquist J, Sundquist K. Adverse pregnancy outcomes and long-term risk of atrial fibrillation. *JAMA Cardiol*. 2025;10(12):1285-1294. doi:10.1001/jamacardio.2025.3951
- Cummins D, Kerr C, McConnell K, Perra O. Risk factors for intellectual disability in children with spastic cerebral palsy. *Arch Dis Child*. 2021;106(10):975-980. doi:10.1136/archdischild-2020-320441
- De Leeuw S, Delens G, Vanden Brande L, Henrion E, Legros L. Socio-familial environment influence on cognitive and language development in very preterm children. *Child Care Health Dev*. 2024;50(2):e13239. doi:10.1111/cch.13239
- Dunne F, Newman C, Alvarez-Iglesias A, O'Shea P, Devane D, Gillespie P, et al. Metformin and small for gestational age babies: findings of a randomized placebo-controlled clinical trial of metformin in gestational diabetes (EMERGE). *Diabetologia*. 2024;67(12):2660-2666. doi:10.1007/s00125-024-06252-y
- Elfane H, El-Jamal S, Mziwira M, Barakat I, Sahel K, El Ayachi M, et al. Risk factors for low birth weight in El Jadida province, Morocco: case-control study. *Rocz. Państw. Zakł. Hig.* 2022;73(2):209-214. doi:10.32394/rpzh.2022.0206
- Guedalia J, Farkash R, Wasserteil N, Kasirer Y, Rottenstreich M, Unger R, et al. Primary risk stratification for neonatal jaundice among term neonates using a machine learning algorithm. *Early Hum Dev*. 2022;165:105538. doi:10.1016/j.earlhumdev.2022.105538
- Huang Y, Zhang H, Xiong Z, Lv Y, Jia Z, Liu H, et al. Mortality and risk factors of small vulnerable newborns in 32 low- and middle-income countries. *BMC Med*. 2025;23:558. doi:10.1186/s12916-025-04406-2
- Khan W, Zaki N, Ahmad A, Bian J, Ali L, Masud MM, et al. Infant low birth weight prediction using graph embedding features. *Int J Environ Res Public Health*. 2023;20(2):1317. doi:10.3390/ijerph20021317
- Li B, He D, Zhu H, Li Y, Ye W, Guo D, et al. Factors influencing the birth weight of ART-conceived offspring. *J Assist Reprod Genet*. 2025;42(10):3145-3166. doi:10.1007/s10815-025-03617-z
- Lyimo GS, Moshi FV. The prevalence of low birth weight and its associated maternal factors among women of reproductive age who gave birth to live babies within five years preceding the survey in Tanzania: an analysis of data from the 2015-16 Tanzania Demographic and Health Survey and Malaria Indicators Survey. *BMC Pregnancy Childbirth*. 2024;24:523. doi:10.1186/s12884-024-06719-1
- Mertens A, Benjamin-Chung J, Colford JM Jr, Coyle J, van der Laan MJ, Hubbard AE, et al. Causes and consequences of child growth faltering in low-resource settings. *Nature*. 2023;621(7979):568-576. doi:10.1038/s41586-023-06501-x

16. Mütze U, Garbade SF, Gleich F, Lindner M, Freisinger P, Hennermann JB, et al. Long-term anthropometric development of individuals with inherited metabolic diseases identified by newborn screening. *J Inherit Metab Dis.* 2023;46(1):15-27. doi:10.1002/jimd.12563
17. Piccoli GB, Torreggiani M, Crochette R, Cabiddu G, Masturzo B, Attini R, et al. What a pediatric nephrologist should know about preeclampsia and why it matters. *Pediatr Nephrol.* 2022;37(8):1733-1745. doi:10.1007/s00467-021-05235-0
18. Rattanaprom P, Ratinthorn A, Sindhu S, Viwatwongkasem C. Contributing factors of birth asphyxia in Thailand: a case-control study. *BMC Pregnancy Childbirth.* 2023;23:584. doi:10.1186/s12884-023-05885-y
19. Singh A, Rahut DB, Singh KK. Linking mother's demographic disadvantages with children's demographic outcomes in India: a pseudo cohort study. *Popul Health Metr.* 2025;23(1):27. doi:10.1186/s12963-025-00384-y
20. Sockel K, Neu A, Goeckenjan M, Ditschkowski M, Hilgendorf I, Kröger N, et al. Hope for motherhood: pregnancy after allogeneic hematopoietic cell transplantation (a national multicenter study). *Blood.* 2024;144(14):1532-1542. doi:10.1182/blood.2024024342