https://doi.org/10.48047/AFJBS.6.16.2024.4101-4106

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

Prevalence and Determinants of Low Birth Weight among Newborns In Comparison To Rural and Urban Regions of Khyber Pakhtunkhwa

Maryam Mumtaz[1], Shehzadi Mehmoona Zeb[2], Farzana Burki[3*], Rabia Inam Gandapore[4], Ihtiram Hussain[5], Yaman Ahmad[6]

[1,2]Medical Officer, Department of General Surgery, Naseer Teaching Hospital, Peshawar, Pakistan
[3]Assistant Professor, Department of Obstetrics and Gynecology, Mercy Teaching Hospital, Peshawar, Pakistan
[4]Assistant Professor, Department of Anatomy, Bacha Khan Medical College, Peshawar, Pakistan
[5,6]Final Year, Kabir Medical College, Peshawar, Pakistan
*Corresponding Author's Email: farzanaburki09@gmail.com

Received: 10 Oct, 2024
Accepted: 07 Dec, 2024
Published: 25 Dec, 2024

doi:10.48047/AFJBS.6.16.2024.4101-4106

ABSTRACT

Background: Low birth weight (LBW), defined as a birth weight of less than 2500 grams, remains a significant public health issue globally. The prevalence and determinants of LBW can vary based on geographic location, socioeconomic status, maternal health, and access to healthcare facilities. In Khyber Pakhtunkhwa (KP), a province in Pakistan with varying rural and urban populations, understanding the regional disparities in LBW prevalence and its contributing factors is crucial for targeted interventions.

Objective: To assess the prevalence and determinants of LBW among newborns in rural and urban regions of Khyber Pakhtunkhwa.

Methods: This study employed a cross-sectional design, using a sample of 1000 newborns from both rural and urban areas of KP from January 2022 to September 2024. Data was collected from hospitals and healthcare centers in the regions of urban and rural, both representative of their respective areas in terms of demographics and healthcare accessibility. Inclusion criteria included all newborns born during the study period, with a documented birth weight recorded within 24 hours of birth. Exclusion criteria included newborns with congenital anomalies, twin pregnancies, or those born to mothers with pre-existing conditions such as diabetes or hypertension. Data was collected using a structured questionnaire administered to mothers.

Results: The prevalence of LBW in the rural areas was significantly higher (30%) than in urban areas (18%). Maternal education, socioeconomic status, antenatal care, and maternal health were identified as significant determinants of LBW.

Conclusion: The study revealed significant disparities in LBW prevalence between rural and urban regions of Khyber Pakhtunkhwa. Regional differences in healthcare access, maternal nutrition, and education majorly contribute to these disparities. Interventions focusing on improving maternal healthcare services, especially in rural areas, are recommended.

Keywords: Low birth weight, Maternal, Nutrition, Healthcare

INTRODUCTION

Low birth weight (LBW), defined as a birth weight of less than 2500 grams, remains a significant global health concern, particularly in low- and middle-income countries.[1] LBW is a well-documented risk factor for neonatal morbidity and mortality, as well as for adverse long-term health outcomes, including growth retardation, cognitive impairments, and increased susceptibility to chronic diseases such as diabetes and cardiovascular disorders later in life.[2,3] According to the WHO, nearly 20 million infants worldwide are born with LBW each year, with the highest prevalence observed in South Asia and Sub-Saharan Africa (WHO, 2018).[1] In developing countries, including Pakistan, LBW remains a leading contributor to neonatal deaths, accounting for nearly 60% of all neonatal fatalities.[4] Pakistan has one of the highest rates of LBW in the region, with estimates suggesting that approximately 21%–23% of all live births fall under this category.[4,5] The situation is further exacerbated by disparities in healthcare access, maternal nutrition, and socioeconomic development across different regions of the country.[6] Khyber Pakhtunkhwa (KP), a province in the northwestern part of Pakistan, presents a unique case due to its diverse geography and substantial rural-urban divide. While urban centers in KP have relatively better healthcare infrastructure, higher literacy rates, and improved socioeconomic conditions, rural areas continue to struggle with limited healthcare facilities, inadequate maternal nutrition, and lower levels of maternal education, all of which are significant risk factors for LBW.[7]

A growing body of research highlights the multifactorial nature of LBW, attributing it to both direct and indirect determinants. Direct factors include maternal age, nutritional status, presence of infections, antenatal care (ANC) visits, and maternal comorbidities such as hypertension and gestational diabetes.[8,9] Indirect determinants, such as socioeconomic status, maternal education, household food security, and access to healthcare facilities, also play a crucial role in influencing birth weight outcomes.[10,11] Studies conducted in South Asia emphasize that maternal malnutrition, particularly deficiencies in iron, folic acid, and protein intake during pregnancy, significantly increases the risk of LBW.[12] A study found that women who received inadequate antenatal care had a 2.5 times higher likelihood of delivering LBW infants compared to those who attended at least four ANC visits.[13]

Globally, regional disparities in LBW prevalence have been widely documented, with rural areas exhibiting higher rates compared to urban settings due to differences in healthcare access, economic stability, and maternal education.[14,15] In Pakistan, similar trends have been observed, where rural regions demonstrate a significantly higher LBW prevalence compared to urban regions, often linked to poor maternal health, food insecurity, and inadequate healthcare services.[5,16] Urban settings generally provide better opportunities for maternal education, awareness campaigns, and nutritional support, which contribute to healthier pregnancy outcomes.[17] In contrast, women in rural Pakistan face barriers such as long distances to healthcare facilities, financial constraints, and sociocultural restrictions that hinder their access to quality maternal healthcare services.[18] Although numerous studies have examined the determinants of LBW in Pakistan, there is a lack of research focusing specifically on the rural-urban disparities within KP. Understanding the prevalence and determinants of LBW in both rural and urban regions is essential for designing targeted interventions aimed at reducing LBW rates and improving neonatal health outcomes in the province. This study seeks to fill this gap by comparing the prevalence of LBW in rural and urban areas of KP and identifying key determinants influencing birth weight outcomes.

METHODOLOGY

This cross-sectional study was conducted in Khyber Pakhtunkhwa, Pakistan, from January 2022 to September 2024. The study included 1000 newborns, with 500 infants from rural areas and 500 from urban areas. Data was collected from hospitals and healthcare centers in the regions of urban and rural, both representative of their respective areas in terms of demographics and healthcare accessibility. Inclusion criteria included all newborns born during the study period, with a documented birth weight recorded within 24 hours of birth. Exclusion criteria included newborns with congenital anomalies, twin pregnancies, or those born to mothers with pre-existing conditions such as diabetes or hypertension. Data was collected

using a structured questionnaire administered to mothers. The questionnaire collected sociodemographic information (e.g., maternal age, education level, socioeconomic status), pregnancy-related factors (e.g., number of antenatal visits, nutritional status), and infant birth details (e.g., birth weight, gestational age). The birth weight was categorized into LBW (less than 2500 grams) and normal birth weight (2500 grams or more). Additional data was obtained from hospital records to supplement maternal responses. Descriptive statistics were used to analyze sociodemographic data and birth outcomes.

RESULTS

The overall prevalence of LBW in the study population was 24%. However, a significant difference was observed between rural and urban areas. In rural regions, the prevalence of LBW was 30%, while in urban areas, it was 18%. Several factors were found to be significantly associated with LBW. Maternal education, antenatal care attendance, and socioeconomic status were all identified as key determinants.

Table 1: Prevalence of LBW in Rural and Urban Areas

Region	Total Newborns	LBW Newborns (%)	Non-LBW Newborns (%)
Rural	500	150 (30%)	350 (70%)
Urban	500	90 (18%)	410 (82%)

Table 2: Determinants of LBW in Rural and Urban Areas

Factor	Category	Rural (%)	Urban (%)	Odds Ratio (95% CI)
Maternal Education	No education	40%	25%	2.4 (1.8–3.2)
	Primary education	30%	25%	1.8 (1.4–2.3)
	Secondary education	15%	40%	0.9 (0.7–1.1)
	Higher education	15%	10%	0.5 (0.4–0.7)
Socioeconomic Status	Low income	50%	30%	2.1 (1.7–2.5)
	Middle income	40%	50%	1.3 (1.0–1.6)
	High income	10%	20%	0.7 (0.5–0.9)
Antenatal Care	Inadequate (≤4 visits)	70%	30%	3.0 (2.3–3.9)
	Adequate (>4 visits)	30%	70%	0.6 (0.4–0.8)
Maternal Health	Anemia	60%	20%	2.9 (2.2–3.8)
	No anemia	40%	80%	0.7 (0.5–0.9)
Healthcare Access	Poor access	55%	15%	3.8 (2.9–5.1)
	Good access	45%	85%	0.3 (0.2–0.4)
Nutritional Status	Underweight (BMI <18.5)	68%	35%	2.5 (1.95–3.2)
	Normal/Overweight	32%	65%	0.6 (0.5–0.8)

DISCUSSION

The findings of this study indicate that the prevalence of low birth weight (LBW) is significantly higher in rural areas (30%) compared to urban areas (18%). This trend is consistent with several studies conducted in South Asia, which have consistently shown that rural populations experience higher rates of LBW due to factors such as limited access to maternal healthcare, inadequate nutrition, and lower maternal education.[5,19] For instance, a systematic review by Khan et al. reported that rural women face structural barriers, including a lack of healthcare infrastructure and transportation issues, that hinder access to antenatal care services, which are crucial for reducing LBW rates.[20]

Urban areas, on the other hand, tend to have better access to healthcare facilities, higher levels of maternal education, and improved nutritional availability, which collectively contribute to a lower prevalence of LBW in these regions.[9] For example, research by Farooq et al. highlighted that urban settings provide more opportunities for maternal education programs and nutritional interventions, which can directly reduce the incidence of LBW.[21] Moreover, urban mothers are more likely to be exposed to health awareness campaigns and support networks, factors identified by Ali et al. as critical in ensuring better birth outcomes.[22]

This study highlights several key determinants of LBW that align with findings from other studies conducted in Pakistan and globally. Maternal education emerged as a significant protective factor, with higher levels of education associated with a lower risk of LBW. This aligns with the work of Mumtaz et al., who emphasized that educated mothers are more aware of the importance of prenatal care, balanced diets, and seeking timely medical assistance.[6] A similar association has been noted in studies conducted in India and Bangladesh, where maternal education was found to have a direct correlation with improved prenatal practices and reduced LBW rates.[13]

Socioeconomic status was another significant determinant identified in this study, with higher socioeconomic levels associated with a reduced risk of LBW. This finding is consistent with global and regional literature suggesting that wealthier families can afford better prenatal care, improved nutrition, and healthier living conditions, all of which reduce the risk of LBW.[10,11] Studies from Sub-Saharan Africa and Southeast Asia also confirm that economic stability directly affects maternal health outcomes by increasing access to healthcare services and reducing maternal stress, both of which are linked to better fetal growth.[12,13]

Antenatal care (ANC) coverage was found to be a critical determinant of LBW. Mothers who attended more than four ANC visits had significantly lower rates of LBW. This finding aligns with studies by Rao et al. and Parveen et al., who demonstrated that adequate ANC visits allow for early identification and management of risk factors such as maternal anemia, hypertension, and infections.[23] Moreover, ANC visits provide opportunities for healthcare professionals to educate mothers on nutritional requirements and lifestyle modifications, further reducing the risk of LBW.[24] However, in rural areas, limited access to ANC services remains a significant barrier, as noted by Nisar et al., who found that rural women are less likely to seek ANC due to logistical challenges, financial constraints, and cultural beliefs.[16]

The regional disparities observed in this study can be largely attributed to differences in healthcare infrastructure between rural and urban areas. Urban regions are often equipped with better hospitals, more qualified healthcare providers, and greater availability of essential prenatal care services. For example, Pasha et al. noted that urban healthcare centers in Pakistan are more likely to have resources such as ultrasound facilities, trained midwives, and nutritional supplements, all of which contribute to improved birth outcomes.[4] Conversely, rural areas frequently suffer from inadequate healthcare resources, including a lack of trained personnel, poorly equipped facilities, and a higher reliance on traditional birth attendants.[17] This disparity in healthcare infrastructure contributes to the higher rates of maternal complications and poor birth outcomes, such as LBW, in rural regions.

Furthermore, maternal nutrition plays a pivotal role in determining birth weight. This study's findings are supported by global evidence indicating that maternal undernutrition significantly increases the likelihood of LBW.[12] In rural settings, food insecurity and micronutrient deficiencies are more prevalent which leads to intrauterine growth restrictions.[1] Urban mothers, on the other hand, are more likely to have access to diverse diets and fortified foods, which can mitigate the risk of LBW.[9] Moreover, studies from other low- and middle-income countries, such as Brazil and Indonesia, confirm that maternal dietary diversity is positively associated with fetal growth and reduced LBW rates.[11,13]

CONCLUSION

This study provides robust evidence of the significant disparities in LBW prevalence between rural and urban areas in Khyber Pakhtunkhwa. It emphasizes the urgent need for targeted interventions, particularly in rural regions, to address the identified determinants of LBW. Efforts to improve maternal education, expand ANC coverage, enhance socioeconomic conditions, and address nutritional deficiencies are critical. Cross-sectoral collaboration among policymakers, healthcare providers, and community organizations is essential to reduce these disparities and improve maternal and neonatal health outcomes in the region.

REFERENCES

1. World Health Organization. Global nutrition targets 2025: Low birth weight policy brief [Internet]. Geneva: WHO; 2018 [cited 2025 Jan 30]. Available from: https://www.who.int/publications/i/item/WHO-NMH-NHD-14.5

2. Lawn JE, Cousens S, Zupan J. 4 million neonatal deaths: When? Where? Why? Lancet. 2005;365(9462):891–900.
3. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 2013;382(9890):427–51.
4. United Nations International Children's Emergency Fund. State of the World's Children 2020: Statistical tables [Internet]. New York: UNICEF; 2020 [cited 2025 Jan 30]. Available from: https://www.unicef.org/reports/state-worlds-children-2020
5. Bashir A, Kadir MM, Khan A, Ikram MF. Low birth weight and its associated factors in Pakistan. J Pak Med Assoc. 2017;67(3):350–5.
6. Mumtaz S, Bahk J, Khang YH. Current status and determinants of low birth weight in Pakistan based on Pakistan Demographic and Health Survey 2012-2013: A multilevel analysis. PLoS One. 2019;14(3):e0212626.
7. Ilyas M, Shabbir G, Akhtar S. Impact of maternal nutrition on birth weight of newborns in Khyber Pakhtunkhwa, Pakistan. Pak J Med Sci. 2019;35(2):398–403.
8. Bhutta ZA, Das JK, Bahl R, Lawn JE, Salam RA, Paul VK, et al. Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost? Lancet. 2013;382(9890):452–77.
9. Pasha O, Saleem S, Ali S, Goudar SS, Garces A, Esamai F, et al. Maternal infections and risk of low birth weight in developing countries: A multi-center study. Am J Perinatol. 2018;35(9):928–36.
10. Jabeen S, Amjad N, Fatima R. Socioeconomic determinants of low birth weight in developing countries: A case study of Pakistan. J Public Health Res. 2017;6(3):108–14.
11. Kabir A, Rahman MS, Mondal D, Saha AK, Banu N. Socioeconomic determinants of low birth weight in developing countries: A systematic review. BMC Pregnancy Childbirth. 2021;21(1):34.
12. Sharma K, Singh B. Maternal nutritional status and its association with birth weight: A cross-sectional study in South Asia. J Health Popul Nutr. 2021;40(1):12.
13. Rao S, Kanade AN, Yajnik CS, Fall CH. Antenatal care and low birth weight in South Asia: A systematic review and meta-analysis. BMC Pregnancy Childbirth. 2020;20(1):534.
14. Ahmed T, Hossain M, Mahfuz M, Choudhury N, Hossain MM, Bhandari N, et al. Maternal undernutrition and adverse birth outcomes: Lessons from South Asia. Food Nutr Bull. 2016;37(4 Suppl):S49–S56.
15. Ukwuani FA, Suchindran CM. Implications of women's work for child nutritional status in sub-Saharan Africa: A cross-national study. Soc Sci Med. 2019;68(5):856–63.
16. Farooq MU, Iqbal U, Javed T. The role of urban maternal healthcare programs in improving birth outcomes: Evidence from Pakistan. BMC Health Serv Res. 2020;20(1):502.
17. Nisar YB, Dibley MJ. Determinants of low birth weight in developing countries: Evidence from Pakistan Demographic and Health Survey 2012-13. J Matern Fetal Neonatal Med. 2019;32(14):2396–403.
18. Shaikh S, Kadir MM, Rizvi N. Barriers to utilization of maternal health care services in rural Pakistan: A qualitative study. BMC Pregnancy Childbirth. 2020;20(1):759.
19. Islam MM, Broidy L, Baird K, Mazerolle P. Exploring the rural-urban disparity in neonatal mortality in South Asia. *PLoS One*. 2019;14(6):e0216783.
20. Khan A, Nasrullah M, Khan M. Maternal barriers to accessing health facilities for childbirth in rural and remote areas of Pakistan. *J Glob Health Sci*. 2018;2(1):9-15.
21. Farooq S, Jalil A, Arif M. Urban maternal health awareness campaigns: Their role in reducing neonatal mortality in Pakistan. *Int J Community Med Public Health*. 2020;7(4):1569-1574.
22. Ali SM, Zafar MI, Munir F, Fayyaz A. Role of social support in maternal healthcare utilization in Pakistan. *BMC Health Serv Res*. 2019;19(1):745.
23. Parveen S, Haider G, Imran A. Utilization of antenatal care services in Pakistan: A cross-sectional study. *J Public Health Med Res*. 2018;6(1):12-17.

24. Islam Z, Ahmed S, Rashid A. The impact of antenatal care on birth weight in South Asia. *Asia Pac J Public Health*. 2021;33(4):498-506.