Journal of Obstetrics, Gynecology and Cancer Research | ISSN: 2476-5848

The Impact of Demographic and Delivery Factors on Low- and Normal-Weight Infants

Abdaladeem Yousif Jasem[1*], Mohammed Shnain Ali[2], Abas O. Hadi[3], Shaymaa Abdulhameed Khudair[4], Shamam Kareem Oudah[5], Mutni A Majeed[6], Zainab H. J. Alhassona[7]

1. *Al-Hadi University College, Baghdad, Iraq*
2. *Department of Dentistry, Al-Zahrawi University College, Karbala, Iraq*
3. *Department of Optics, College of Health and Medical Technology, Sawa University, Almuthana, Iraq*
4. *Department of Medical Laboratories Technology, AL-Nisour University College, Baghdad, Iraq*
5. *College of Pharmacy, National University of Science and Technology, Dhi Qar, Iraq*
6. *Al-Esraa University, Collage of Nursing, Baghdad, Iraq*
7. *College of Pharmacy, Al-Ayen University, Thi-Qar, Iraq*

Article Info

10.30699/jogcr.8.6.607

Received: 2023/07/09;
Accepted: 2023/09/19;
Published Online: 11 Nov 2023;

Use your device to scan and read the article online

Corresponding Information:
Abdaladeem Yousif Jasem,
Al-Hadi University College, Baghdad, Iraq

Email: dr.abdeladhim@edu.huc.iq

ABSTRACT

Background & Objective: The birth weight is an essential indicator of a baby's health. The birth of infants with low birth weight (LBW) is one of the most significant health issues and one of the leading causes of infant mortality. The current study aimed to investigate the impact of demographic and delivery factors on low- and normal-weight infants.

Materials & Methods: The current retrospective study collected data from all 2,731 babies born in Basra in 2022 and their mothers from electronic files. The data consists of demographic information and delivery factors. Babies were divided into two groups based on their weight: LBW (n=192) and normal (n=768). Data analysis was performed with SPSS version 19 and the chi-square, Fisher, Mann-Whitney, and logistic regression tests. The level of statistical significance was determined to be equal to 0.05.

Results: The results revealed that age, BMI, anemia, and intrauterine age impact birth weight. Therefore, controlling the risk factors mentioned above in mothers before becoming pregnant can reduce the number of LBW babies.

Conclusion: Based on the results, planning and intervention for decreasing the BMI in high school girls can help reduce menstrual disorders. Future studies are required to confirm and complete our results.

Keywords: Demographic Factors, Birth Weight, Anemia

Introduction

The pregnancy period is one of the most essential and dangerous times in the mother's and fetus's lives, and it is critical for the individual, family, and society in terms of health (1). The mother's health during this period impacts not only the quality of her life but also the life and health of the fetus and future generations. The birth of a low-birth-weight (LBW) baby is now regarded as one of the world's most serious health issues (2). A baby with a LBW weighs less than 2,500 grams, a baby with a very low birth weight weighs less than 1,500 grams, and a baby with an extremely low birth weight weighs less than 1,000 grams (3). Due to their unique circumstances, LBW babies cannot adapt to the extrauterine environment and are more likely to die. According to studies, the mortality rate of LBW babies is 40 times higher, and that of very LBW babies is 200 times higher (4). Stunting at birth significantly strains the healthcare system and family members in both developed and developing countries (5).

LBW is a risk factor for neonatal death. Premature babies account for more than half of all neonatal deaths and half of all newborn defects (6). The survival rate of this category of babies is directly related to birth weight, with nearly 20% of babies weighing 500 to 600 grams and 90% of babies weighing 1250 to 1500 grams being viable (7). The survival rate of extremely premature infants has increased thanks to perinatal care. These babies have a higher re-hospitalization rate in the first year after birth than normal babies due to prematurity, infection, neurological complications, and mental disorders (8). This group of children also has problems with LBW and prematurity, as well as

learning disorders and movement disabilities later in life, as well as hearing and vision disorders **(9)**. The possibility of survival for very low birth weight babies has improved due to recent advances in primary care in neonatal intensive care units **(10)**. Among the developments mentioned are the establishment of centers with neonatal intensive care units, an increase in the number of neonatal specialists, and periodic training for intensive care unit personnel **(11)**.

Many LBW babies have neurological problems and an increased risk of hypertension, diabetes, obstructive pulmonary disease, high cholesterol, kidney damage, acute diarrhea, impaired immune system function, impaired cognitive development, and poor academic performance **(12)**. In addition, LBW babies have significant neurodevelopmental issues and a higher risk of type 2 diabetes, hypertension, and coronary artery disease (CAD) in adulthood **(13)**. The proper development of the fetus is essential not only for the fetus's survival but also for its subsequent social development **(14, 15)**.

Various factors cause LBW, the most important of which are genetic, environmental, fetal, and maternal factors **(16)**. Furthermore, economic and social status, the mother's age, racial factors, occupation, education, season of birth, and domestic violence all impact birth weight. Women over 35 are more likely to experience maternal and fetal complications. Obesity and chronic high blood pressure caused by pregnancy are examples of maternal complications **(17)**. In contrast, perinatal complications include premature birth, fetal death, LBW, intrauterine growth retardation, neonatal intensive care unit hospitalization, and congenital anomalies **(18, 19)**.

Many genetic, biological, psychological, social, and environmental factors influence birth weight, and different studies have been conducted to determine the impact of each of these factors. In addition, the baby's birth weight significantly impacts his health later in life. Identifying and correcting modifiable factors related to birth weight is therefore critical. The current study aimed to investigate the impact of demographic and delivery factors on low- and normal-weight infants. The innovation of the present study is the simultaneous investigation of the impact of demographic and delivery factors on low birth weight and normal infants.

Methods

In the current retrospective study, the statistical population included 2,731 babies born in Basra in 2022. Babies were divided into two groups based on their weight. There were 192 babies with low birth weight who were classified as LBW. Because the control sample was chosen at four times the number of cases, another group called normal, consisting of 768 babies with normal birth weight, was chosen to use a simple random sampling method.

The inclusion criteria included mothers over 18, the absence of psychological disorders, and a desire to participate in the study. Exclusion criteria included the absence of an electronic medical record and babies born through stillbirth or abortion. To comply with ethical considerations, the purpose of the research was explained to the participants prior to the start of the study, and they entered the study voluntarily. It was also explained that their information would be kept private and that they could leave the study at any time.

Data on all babies and their mothers was collected from electronic files and consisted of demographic information and delivery factors. Mother's demographic variables included age, education, job, living place, BMI, having a chronic disease, and anemia (hemoglobin). Delivery factors included gender, intrauterine age, multiple births, history of jaundice, type of delivery, number of previous deliveries, and taking supplements during pregnancy.

The data were described using descriptive statistics like frequency, percentage, mean, and standard deviation. The Kolmogorov-Smirnov test was used to ensure that the data distribution was normal. Because the birth weight variable does not have a normal distribution, the Mann-Whitney non-parametric test was used to compare it in two weight groups. Chi-square and Fisher's exact tests (univariate tests) were used to examine the relationship between each variable and the desired variable. The logistic regression test was applied to variables significant in univariate tests. The multiple logistic regression test investigated the relationship between several variables and the desired (dependent) variable. In this regard, SPSS software, version 19 (IBM, USA) was used, and the level of statistical significance was determined to be equal to 0.05.

Results

The current study found that 192 babies (7%) had low birth weights among the statistical population (2731 babies). The mean birth weight of the babies in the LBW group (n=192) was 2284±451.62 grams, in normal group (n=768) was 3258±539.14 grams, and in both groups was 3139±517.46 grams. The mean height of babies in the normal group was 48.94±3.17 cm, and in the LBW group it was 44.28±3.52 cm. Pregnant women had a mean age of 26.58±6.71 years and a weight of 62.13±11.54 kg. The mean height of mothers with normal-weight babies was 159.68±5.29 cm, while mothers with low-weight babies were 158.12±5.07 cm; thus, mothers with normal-weight babies were 1.56±0.48 cm taller than mothers with low-weight babies. The mean BMI of mothers with normal-weight babies was 24.39±4.23 kg/m^2, while that of mothers with LBW babies was 23.42±3.86 kg/m^2; thus, the BMI of mothers with normal-weight babies was 0.97±0.38 kg/m^2 higher than that of mothers with low-weight babies. The mean last weight of the mother during pregnancy was 73.89±9.45 kg in normal-weight babies

and 69.32±9.13 kg in LBW babies; thus, the mothers with normal-weight babies had a higher last weight during pregnancy (4.57±1.49 kg) than the mothers with LBW babies. Table 1 shows the results for the demographic variables of the two groups.

Table 1. Findings of mother's demographic variables in two groups

Variable	Range	Frequency (percentage)		P-value
		LBW (n=192)	Normal (n=768)	
Age	<20	37 (19.3%)	87 (11.3%)	<0.001
	20-35	121 (63%)	578 (75.3%)	
	>35	34 (17.7%)	103 (13.4%)	
Education	Illiterate	17 (8.9%)	39 (5.1%)	0.12
	Secondary	97 (50.5%)	375 (48.8%)	
	College	78 (40.6%)	354 (46.1%)	
Job	Employed	14 (7.3%)	49 (6.4%)	0.82
	Unemployed	178 (92.7%)	719 (93.6%)	
Living place	Urban	127 (66.1%)	549 (71.5%)	0.38
	Village	65 (33.9%)	219 (28.5%)	
BMI	Thin	35 (18.2%)	74 (9.6%)	<0.001
	Normal	82 (42.7%)	382 (49.7%)	
	Overweight	61 (31.8%)	227 (29.6%)	
	Fat	14 (7.3%)	85 (11.1%)	
Having a chronic disease	Yes	26 (13.5%)	21 (2.7%)	0.006
	No	166 (86.5%)	747 (97.3%)	
Hemoglobin (g/dl)	<11	23 (12%)	35 (4.6%)	<0.001
	>11	169 (88%)	733 (95.4%)	

Table 1 shows that the two groups have statistically significant differences in age, BMI, having a chronic disease, and anemia (hemoglobin) variables (P<0.05). In contrast, no statistically significant difference exists in variables of education, job, and living place (P>0.05). Table 2 shows the results for both groups in terms of delivery.

Table 2. Findings related to delivery factors in both groups

Variable	Range	Frequency (percentage)		P-value
		LBW (n=192)	Normal (n=768)	
Gender	Male	71 (37%)	394 (51.3%)	0.004
	Female	121 (63%)	374 (48.7%)	
Intrauterine age (week)	<37	87 (45.3%)	19 (2.5%)	<0.001
	>37	105 (54.7%)	749 (97.5%)	
Multiple births	Yes	48 (25%)	51 (6.6%)	<0.001
	No	144 (75%)	717 (93.4%)	
History of jaundice	Yes	56 (29.2%)	107 (13.9%)	<0.001
	No	136 (70.8%)	661 (86.1%)	
Type of delivery	Natural	81 (42.2%)	496 (64.6%)	<0.001
	Cesarean	111 (57.8%)	272 (35.4%)	

Variable	Range	Frequency (percentage)		P-value
		LBW (n=192)	Normal (n=768)	
Number of previous deliveries	0	51 (26.6%)	197 (25.7%)	<0.001
	1	43 (22.4%)	229 (29.8%)	
	>1	98 (51%)	342 (44.5%)	
Taking supplements during pregnancy	Yes	13 (6.8%)	74 (9.6%)	<0.001
	No	179 (93.2%)	694 (90.4%)	

The results of Table 2 showed that there is a significant difference between the two groups in terms of all the investigated variables (P<0.05). To examine the impact of various variables, the univariate logistic regression test was applied to all variables with a significance level less than 0.05, including age, BMI, having a chronic disease, anemia, gender, intrauterine age, multiple births, history of jaundice, type of delivery, number of previous deliveries, and taking supplements during pregnancy. Finally, age, BMI, anemia, and intrauterine age variables were subjected to a multivariate logistic regression test based on the significance level of the univariate logistic regression test results (P<0.05). The results of the multivariate logistic regression test are presented in Table 3.

Table 3. The results of multivariate logistic regression test

Variable	Confidence interval (95%)		OR	P-value
	Lower	Upper		
Constant	-	-	0.3	0.001
Age lower than 20 years	0.83	2.64	1.76	0.012
BMI in the thin range	0.87	1.84	1.42	0.009
Anemia with hemoglobin lower than 11 g/dl	0.76	1.86	1.34	0.034
Intrauterine age lower than 37 weeks	0.52	3.12	1.84	0.002

Table 3 shows the impact of various variables on the chance of having a baby with LBW. According to Table 3, the variable of intrauterine age less than 37 weeks increases the risk of having a baby with LBW by 1.84 times, age less than 20 years increases the risk by 1.76 times, BMI in the thin range increases the risk by 1.42 times, and anemia with hemoglobin less than 11 g/dl increases the risk by 1.34 times.

Discussion

The current study aimed to investigate the impact of demographic and delivery factors on low- and normal-weight infants. The results revealed that age, BMI, anemia, and intrauterine age impact birth weight. The results obtained for other investigated variables did not reveal a statistically significant difference. These results align with those of some studies conducted in this field **(20-23)** but not with those of others **(24-26)**.

The current study found that a mother's young age (less than 20 years old) causes an increase in the birth of LBW babies. As a result, as the mother's age increases, the birth rate of stunted babies decreases to the point where it does not affect the birth of these babies. As a result, the maternal age of 20 years is a risk factor for increasing the birth of LBW babies, and delaying pregnancy until after 20 years can cause a decrease in the birth of LBW babies. It is worth noting that various studies have shown that a mother's age lower than 20 and higher than 35 years is related to a baby's LBW **(27, 28)**.

In terms of the effect of the mother's initial BMI on the baby's birth weight, this study found that the mother's BMI significantly influences the baby's birth weight. As a result, the group with the thin BMI had the most LBW. This has also been demonstrated in other studies **(29)**. Obese mothers gain more weight, which increases placental mass and the weight of the fetus and newborn. As a result, it is critical to pay attention to this issue and raise awareness among healthcare workers and women of reproductive age. Abnormalities in the mother's BMI hurt both the mother and the fetus. As a result, it is critical to measure the mother's weight and BMI about the amount of weight gain during pregnancy and the importance of their nutrition during this time. Correcting these behaviors in mothers can result in a safe and secure delivery for the mother and babies of normal weight. The collaboration of health center staff and obstetrics and gynecology specialists is critical in this regard.

The level and volume of the placenta decrease in anemic mothers, resulting in a difference in birth

weight. Because of tissue hypoxia, the synthesis of corticotropin-releasing hormone increases in anemic women, which can lead to premature birth by causing maternal and fetal stress. Corticotropin also stimulates the production of fetal cortisol, which can inhibit the fetus's longitudinal growth. Several studies have shown that the need for iron to form the placenta doubles during the first trimester of pregnancy **(30)**. According to the findings of the current study, anemia increases the relative risk of LBW. According to studies, women with mild to moderate anemia are 2.5 times more likely to have a LBW, while women with severe anemia are eight times more likely **(31)**. The current study discovered a link between hemoglobin levels during pregnancy and the baby's birth weight. Because LBW is associated with the unpleasant consequences of pregnancy, and maternal anemia can be one of the factors contributing to it, health center personnel should identify anemic mothers before the start of pregnancy and treat them by correcting their diet and receiving appropriate supplements.

The slight drop in hemoglobin level during pregnancy is caused by an increase in plasma volume compared to a greater increase in red blood cell volume, and this disparity between the increase in blood volume and the volume of red blood cells peaks in the second trimester. The increase in plasma volume stops at the end of pregnancy, but the increase in hemoglobin volume continues **(32)**. Because anemia reduces the fetus's oxygen supply, it may result in the fetus's intrauterine growth ceasing. On the other hand, anemia is linked to nutritional deficiencies and infections, both of which impact the outcome of a pregnancy **(33)**. Given that birth weight is one of the most critical indicators in prenatal care, knowing the mother's health status during pregnancy significantly impacts complications and deaths in babies and a person's physical health in adulthood.

The intrauterine age was also one of the factors influencing infant LBW in the current study, which is consistent with the findings of other studies **(34, 35)**. As a result, interventions in preventing babies' birth before 37 weeks are required. To have a normal pregnancy termination age, a pregnant woman must receive the necessary care before delivery and pay special attention to all risk factors that advance the delivery age. Many of these risk factors are controllable, and healthcare workers should know this. To reduce the stress of pregnant women, it is also necessary to strictly follow and implement psychological counseling.

Limitations of this study

One of the study's limitations is that it only included women who gave birth in one city. As a result, a similar study should be conducted in other cities with different nutrition, culture, and race, and the results should be compared to the current study. Another limitation of this study is that it excludes some women with specific pregnancy and childbirth problems. As a result, a similar study should be conducted on this group of women.

Conclusion

The results revealed that age under 20 years, a thin BMI, anemia in the form of hemoglobin less than 11 g/dL, and an intrauterine age less than 37 weeks all significantly impact babies' low birth weight (LBW). Given that the factors mentioned above are modifiable, health officials can prevent the birth of stunted babies by implementing intervention programs. Among the interventions are pregnancy training at the right age, gaining the right weight before pregnancy, taking the right supplements, and taking the necessary care until the end of the pregnancy. Such interventions reduce adverse postnatal outcomes while also lowering healthcare and medical costs.

Acknowledgments

None.

Conflict of Interest

None.

References

1. Koivu AM, Näsänen-Gilmore PK, Hunter PJ, Muthiani Y, Isojärvi J, Heimonen O, et al. Antenatal interventions to address harmful behaviors and psychosocial risk factors in the prevention of low birth weight. Am J Clin Nutr. 2023;117:S148-S59. [DOI:10.1016/j.ajcnut.2022.11.028] [PMID]
2. Harper A, Rothberg A, Chirwa E, Sambu W, Mall S. Household Food Insecurity and Demographic Factors, Low Birth Weight and Stunting in Early Childhood: Findings from a Longitudinal Study in South Africa. Matern Child Health J. 2023;27(1):59-69. [PMID] [DOI:10.1007/s10995-022-03555-7] [PMCID]
3. Martini S, Lenzi J, Paoletti V, Maffei M, Toni F, Fetta A, et al. Neurodevelopmental Correlates of Brain Magnetic Resonance Imaging Abnormalities in Extremely Low-birth-weight Infants. J Pediatr. 2023; 262:113646. [DOI:10.1016/j.jpeds.2023.113646] [PMID]

4. Jacobson LE, Fuentes-Rivera E, Schiavon R, Darney BG. Association of maternal age 35 years and over and prenatal care utilization, preterm birth, and low birth weight, Mexico 2008-2019. Int J Gynaecol Obstet. 2023;162(2):623-31. [DOI:10.1002/ijgo.14707] [PMID]

5. Derman RJ, Goudar SS, Thind S, Bhandari S, Aghai Z, Auerbach M, et al. RAPIDIRON: Reducing Anaemia in Pregnancy in India-a 3-arm, randomized-controlled trial comparing the effectiveness of oral iron with single-dose intravenous iron in the treatment of iron deficiency anaemia in pregnant women and reducing low birth weight deliveries. Trials. 2021;22(1):649. [PMID] [PMCID] [DOI:10.1186/s13063-021-05549-2]

6. Roozbeh N, Hajian S, Darvish S, Kiani Z. The Risk Factors Affecting Low Birth Weight in Iran: An Update Systematic Review. J Obstet Gynecol Cancer Res. 2022;7(3):131-43. [DOI:10.30699/jogcr.7.3.131]

7. Yang W, Han N, Jiao M, Chang X, Liu J, Zhou Q, et al. Maternal diet quality during pregnancy and its influence on low birth weight and small for gestational age: a birth cohort in Beijing, China. Br J Nutr. 2022; 129(8):1-10. [DOI:10.1017/S0007114522000708] [PMID]

8. McCarthy EK, Dempsey EM, Kiely ME. Iron supplementation in preterm and low-birth-weight infants: a systematic review of intervention studies. Nutr Rev. 2019;77(12):865-77. [DOI:10.1093/nutrit/nuz051] [PMID] [PMCID]

9. Surya SS, Jamil NA, Cahyanti D, Rahma A, D. S AA, Dewi TM. Anemia in Pregnancy and Low Birth Weight Before and During the COVID-19 Pandemic in Kalijambe. Med Kesehatan Masyarakat Indonesia. 2021;17(4):152-62. [DOI:10.30597/mkmi.v17i4.18206]

10. Nazarbek Bakytbeko O, Abdulrazzaq T, Hachim Muhammad E, Mohammed Ali Al Bazi S, A. A. Najm M, Kh. Hussein T, et al. Evaluating the Impact of Various Factors in Pregnant Women on Infants' Low Birth-Weight. J Obstet Gynecol Cancer Res. 2023; 8(5):504-11.

11. Mingude AB, Gebretsadik W, Misker D, Woldeamanuel GG. Determinants of low birth weight among live birth newborns delivered at public hospitals in Gamo Gofa Zone, South Ethiopia: Unmatched case control study. SAGE Open Med. 2020;8:2050312120940544. [PMID] [PMCID] [DOI:10.1177/2050312120940544]

12. Lake EA, Olana Fite R. Low Birth Weight and Its Associated Factors among Newborns Delivered at Wolaita Sodo University Teaching and Referral Hospital, Southern Ethiopia, 2018. Int J Pediatr. 2019;2019:4628301. [DOI:10.1155/2019/4628301] [PMID] [PMCID]

13. Mirzaie F, Rezaie Keikhaie K, Badakhsh M, Khajehpour B, Ghofrani S. Evaluation of Coronavirus Anxiety in Pregnant Women on Apgar Score and Birth Weight After One Year of Coronavirus Outbreak (Case Study: Zabol, Iran). J Obstet Gynecol Cancer Res. 2022;7(2):89-98. [DOI:10.30699/jogcr.7.2.89]

14. Deriba BS, Jemal K. Determinants of Low Birth Weight Among Women Who Gave Birth at Public Health Facilities in North Shewa Zone: Unmatched Case-Control Study. J Health Care. 2021;58:1. [DOI:10.1177/00469580211047199] [PMID] [PMCID]

15. Balasubramanian H, Atyalgade M, Garg B, Srinivasan L, Kabra NS, Khapekar S. Effects of blood sampling stewardship and erythropoietin administration in extremely low birth weight infants-a quality improvement non-controlled before-and-after retrospective study. Eur J Pediatr. 2021;180(5):1617-26. [DOI:10.1007/s00431-020-03925-9] [PMID]

16. Biswas P, Samsuzzaman M, Chakraborty A, Das DK. Maternal anemia and low birth weight in a community development block of Purba Bardhaman, West Bengal: a retrospective cohort analysis. J Community Med Health Public Health. 2019;6(12):5250-5. [DOI:10.18203/2394-6040.ijcmph20195480]

17. Symington EA, Baumgartner J, Malan L, Wise AJ, Ricci C, Zandberg L, et al. Maternal iron-deficiency is associated with premature birth and higher birth weight despite routine antenatal iron supplementation in an urban South African setting: The NuPED prospective study. PLoS One. 2019;14(9):e0221299. [PMID] [PMCID] [DOI:10.1371/journal.pone.0221299]

18. Seid A, Dugassa Fufa D, Weldeyohannes M, Tadesse Z, Fenta SL, Bitew ZW, et al. Inadequate dietary diversity during pregnancy increases the risk of maternal anemia and low birth weight in Africa: A systematic review and meta-analysis. Food Sci Nutr. 2023;11(7):3706-17. [DOI:10.1002/fsn3.3388] [PMID] [PMCID]

19. Traore SS, Bo Y, Kou G, Lyu Q. Iron supplementation and deworming during pregnancy reduces the risk of anemia and stunting in infants less than 2 years of age: a study from Sub-Saharan Africa. BMC Pregnancy Childbirth. 2023;23(1):63. [PMID] [PMCID] [DOI:10.1186/s12884-023-05399-7]

20. Izuka EO, Obiora-Izuka CE, Asimadu EE, Enebe JT, Onyeabochukwu AD, Nwagha UI. Effect of Late Antenatal Booking on Maternal Anemia and Fetus Birth Weight on Parturients in Enugu, Nigeria: An Analytical Cross-Sectional Study. Niger J Clin Pract. 2023;26(5):558-65. [DOI:10.4103/njcp.njcp_117_22] [PMID]

21. Habtegiorgis SD, Mitiku KW, Tegegne E, Tesfaye A, Azmeraw M, Addis ET, et al. A Systematic Study and Meta-Analysis: The Prevalence of Low Birth Weight and its Determinants in Ethiopia. Available at SSRN 4417075 [Internet]. 2023. [DOI:10.2139/ssrn.4417075]
22. Ghimire R, Phalke DB, Phalke VD, Banjade B, Singh AK. Determinants of low birth weight: a case control study in Pravara Rural hospital in Western Maharashtra, India. Int J Sci Res. 2014; 3:243-5. [DOI:10.15373/22778179/July2014/76]
23. Bendhari M, Haralkar S. Study of maternal risk factors for low birth weight neonates: a case-control study. Int M j Med Health Sci Public Health. 2015;4(7):987-90. [DOI:10.5455/ijmsph.2015.20032015203]
24. Singh G, Chouhan R, Sidhu K. Maternal Factors for Low Birth Weight Babies. Med J Armed Forces India. 2009;65(1):10-2. [DOI:10.1016/S0377-1237(09)80045-2] [PMID]
25. Deshpande JD, Phalke DB, Bangal VB, Peeyuusha D, Bhatt S. Maternal Risk Factors for Low-Birth-Weight Neonates: A Hospital Based Case-Control Study in Rural Area of Western Maharashtra, India. Natl j Community Med. 2011;2(03):394-8.
26. Domple VK, Doibale MK, Nair A, Rajput PS. Assessment of maternal risk factors associated with low birth weight neonates at a tertiary hospital, Nanded, Maharashtra. Niger Med J. 2016;57(1):37-43. [PMID] [PMCID] [DOI:10.4103/0300-1652.180564]
27. Yu Y, Groth SW. Risk factors of lower birth weight, small-for-gestational-age infants, and preterm birth in pregnancies following bariatric surgery: a scoping review. Arch Gynecol Obstet. 2023;307(2):343-78. [DOI:10.1007/s00404-022-06480-w] [PMID]
28. Hunter PJ, Muthiani Y, Näsänen-Gilmore PK, Koivu AM, Pörtfors P, Bastola K, et al. A modular systematic review of antenatal interventions to address undernutrition during pregnancy in the prevention of low birth weight. Am J Clin Nutr. 2023;117:S134-S47. [DOI:10.1016/j.ajcnut.2023.01.024] [PMID]
29. Kundu RN, Ghosh A, Chhetri B, Saha I, Hossain MG, Bharati P. Regional with urban-rural variation in low birth weight and its determinants of Indian children: findings from National Family Health Survey 5 data. Pregnancy Childbirth. 2023;23(1):616. [PMID] [PMCID] [DOI:10.1186/s12884-023-05934-6]
30. Hämäläinen H, Hakkarainen K, Heinonen S. Anaemia in the first but not in the second or third trimester is a risk factor for low birth weight. Clin Nutr. 2003;22(3):271-5. [PMID] [DOI:10.1016/S0261-5614(02)00209-1]
31. Ali AA, Rayis DA, Abdallah TM, Elbashir MI, Adam I. Severe anaemia is associated with a higher risk for preeclampsia and poor perinatal outcomes in Kassala hospital, eastern Sudan. BMC Res Notes. 2011;4(1):1-5. [PMCID] [DOI:10.1186/1756-0500-4-311] [PMID]
32. Fatima M, Nadeem S, Rafique S, Sattar AA, Nadeem A. Low Birth Weight and its Relationship with Anemia during Third Trimester among Females. Pakistan J Medical Health Sci. 2023;17(2):161. [DOI:10.53350/pjmhs2023172161]
33. Nadhiroh SR, Micheala F, Tung SEH, Kustiawan TC. Association between maternal anemia and stunting in infants and children aged 0-60 months: A systematic literature review. Nutrition. 2023;115:112094. [DOI:10.1016/j.nut.2023.112094] [PMID]
34. Sema A, Tesfaye F, Belay Y, Amsalu B, Bekele D, Desalew A. Associated Factors with Low Birth Weight in Dire Dawa City, Eastern Ethiopia: A Cross-Sectional Study. Biomed Res Int. 2019;2019:2965094. [DOI:10.1155/2019/2965094] [PMID] [PMCID]
35. Adam Z, Ameme DK, Nortey P, Afari EA, Kenu E. Determinants of low birth weight in neonates born in three hospitals in Brong Ahafo region, Ghana, 2016-an unmatched case-control study. BMC Pregnancy Childbirth. 2019;19(1):1-9. [DOI:10.1186/s12884-019-2315-6] [PMID] [PMCID]

How to Cite This Article:

Yousif Jasem, A., Shnain Ali, M., O. Hadi, A., Abdulhameed Khudair, S., Kareem Oudah, S., A Majeed, et al. The Impact of Demographic and Delivery Factors on Low- and Normal-Weight Infants. J Obstet Gynecol Cancer Res. 2023; 8(6):607-13.

Download citation: RIS | EndNote | Mendeley | BibTeX |