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The Significance of Maternal and Fetal Risk Factors in Determining Low Birth Weight Perspectives from Obstetrics and Gynecology

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Abstract: A cross-sectional study was conducted in Iraq by collecting demographic information and data on 120 Iraqi pregnant women patients, targeting risk factors for pregnant women, and conducting logistic analysis to find out what factors pose a risk to women. In this study, (exchange cards, date of birth, and growth history of newborns) were collected between 2023 and 2024.

The information contained in the clinics and obstetric records will be saved between 2023 and 2024, with the application of a codification procedure to preserve the identity of the subjects registered in the clinic. The collected data will be transferred to a central database intended for development in the Microsoft Excel archive for each client registered with the corresponding code.

The independent variables encompassed in this study are as follows: maternal age, pre-pregnancy weight, weight gain during pregnancy, anemia during the third trimester of pregnancy, arterial pressure, type 2 diabetes, gestational diabetes, number of pregnancies, gestational age, supplemental folate intake, and gestational period. The pre-weight is calculated from the weight and height data to obtain the IMC (body weight in kg/m2), which allows the nutritional status of the mother to be classified into the following categories: (less than 18.5 kg/m2) / normal (18.5 to 24.9 kg/m2) / (between 25 and 29.9 kg/m2) and (30 kg/m2). The mode of delivery is categorized as "vaginal delivery" or "caesarean section." The consumption of iron supplements is categorized as either "Yes" or "No" based on the documented findings in clinical history. Gestational age is categorized as "less than 40 weeks" or "greater or equal to 40 weeks". The results of this study are as follows: Age Mean and SD 32.88±4.97BMI 29.2±2.2, Type The results of the study are as follows: mean age 32.88 years (±4.97 years); BMI 29.2 kg/m² (±2.2 kg/m²); mode of delivery: 80 (66.6 %) caesarean section and 40 (33.4 %) vaginal delivery; hemoglobin mean 7.9 g/dL (±2.2 g/dL); duration of pregnancy (weeks) 36.7 (±2.8 weeks); the number of antenatal care visits 3.2 (±1.1); Apgar main score: 1 min 50 (41.6 %) and 5 min 70 (58.3 %). We conclude from this study that a relationship was found between low birth weight and complications that occur after pregnancy, such as gestational diabetes and high blood pressure.

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Key words: Pregnancy, vaginal delivery, caesarean section, hemoglobin, Apgar, Low Birth, BMI.

Introduction

In the planning stage of pregnancy and throughout gestation, it is imperative to normalize body weight at the pre-gravid stage and to gain weight appropriately during pregnancy, contingent on the initial BMI, in order to avert obstetric and perinatal complications. [1,2] Excessive and inadequate weight gain during pregnancy have been associated with obstetric and perinatal complications. Patients with obesity (BMI ≥ 30 kg/m2) have a significantly higher risk of perinatal complications, including miscarriage, gestational diabetes mellitus (GDM), hypertensive disorders, premature birth (PL), operative delivery, antenatal and intrapartum fetal death, and thromboembolic complications (TEC) [3,4]. Conversely, pregnant women with a BMI ≤ 18.5 kg/m2 are at high risk of fetal growth retardation (FGR). During pregnancy, it is imperative to abstain from work that involves prolonged standing or excessive physical exertion, night work, and work that causes fatigue in order to prevent obstetric and perinatal complications. [5] These types of work are associated with an increased risk of preterm labour, hypertension, preeclampsia (PE), and IGR [6].

According to the studies, obstetrics and gynecology form the major segments of both Russian and foreign scientific research on the assessment of the structure of factors of perinatal losses and adverse perinatal outcomes. The clearest findings in this report include intrauterine hypoxia and fetal asphyxia during childbirth, intrauterine fetal anomalies, and respiratory disorders [7,8,9]. It will also cover other unwanted factors associated with perinatal infections, pathologies of the placenta and umbilical cord, birth injuries, intraventricular hemorrhage, neonatal infections, as well as the overall statistics above [10]. Currently, the risk of adverse perinatal outcomes remains, even in high-technology countries that usually would develop such obstetric, gynecological, and perinatal care [11]. The existence of any type of perinatal loss automatically declares that a pregnant woman falls into the high-risk category. [12] Risk assessment for monitoring in antenatal clinic contexts does not always and necessarily mean that the risk elevation is underestimated, and improper or inappropriate management of pregnancy, treatment, and referral to appropriate level maternity institutions ensues [13]. Such assessment seeks scientifically and practically meaningful real-life conditions for possible intervention within management approaches that might be applied to times of adverse perinatal outcomes. Further comparison of perinatal outcomes with risk assessment against outpatient findings and admission to the facility reveals factors resulting in adverse perinatal outcomes [14].

Material and method

A cross-sectional study was conducted in Iraq by collecting demographic information and data on 120 Iraqi pregnant women patients, targeting risk factors for pregnant women, and conducting logistic analysis to find out what factors pose a risk to women. In this study, (the date of birth and growth history of newborns) were collected between 2023 and 2024.

All patients were examined, diagnosed, and treated in the observation phase in the antenatal clinic according to the order of the Iraqi Ministry of Health, which included electrocardiography, prenatal examination, fetal measurement, Doppler measurements, cervical measurement, cardiotocography (CTG), clinical and laboratory examination methods, and included conclusions related to specialists [8].

A comprehensive assessment was conducted on all social, biological, and laboratory indicators, obstetric and gynecological records, physical extragenital diseases, the birth process, and information about the child's condition at the time of birth and in the early neonatal period. In this study, the study was conducted in accordance with the ethical standards of the World Medical Association Declaration of Helsinki of 1964 and its later amendments. In addition, informed consent from patients was required due to the design, as the study was approved by the local ethics committee of the

educational institution. In this study, statistical data analysis was performed using Statistica 22.0 software, where mean values and standard error of the mean (M ± m) were calculated using the Student's method. Nonparametric methods were applied for statistical analysis, as the distribution of features obeys the laws of nonparametric statistics, confirming the Kolmogorov-Smirnov one-sample normality test. To determine the measure of variance, indicators were presented as mean (Me), where qualitative data were presented as n (absolute number of patients in the group) and percentage (percentage of the feature in the group); when comparing quantitative data, the Mann-Whitney test was used. The statistical significance of differences was determined at $P < 0.05$.

Results Table 1- Assessment of demographic characteristics of women patients

Variable	Value
Age	
Mean and sd	32.88±4.97
BMI	
Mean and sd	29.2±2.2
Comorbidities, f (p%)	
Diabetes	30 (25)
Hypertension	25 (20.8)
Joints	22 (16.6)
None	43 (35.8)
Gestational age	
Preterm	50 (41.6)
Full term	70 (58.3)
Type of delivery	
CS	80 (66.6)
AD	40 (33.4)
Residence	
Urban	90 (75)
Rural	30 (25)
Education	
primary	20 (16.6)
Secondary	60 (50)
College	40 (33.4)
Socioeconomic status	
Bad	19 (15.8)
Medium	80 (66.6)
Good	21 (17.5)
Maternal height (cm)	
Mean and sd	155.7±2.9
Weight gain (kg)	
Mean and sd	3.5±0.97
Smoking	
Yes	10 (8.3)
No	110 (92.7)

Table 2- Evaluation of obstetric characteristics related to Iraqi patients

Variable	Value
Parity	
1-4	40 (33.3)
>5	80 (66.4)

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Hemoglobin	
Mean and sd	7.9±2.2 g/dl
Iron Supplements	
Yes	30 (25)
No	90 (75)
Nutritional Counseling	
Yes	37 (30.8)
No	83 (69.1)
Extra Food During Late Pregnancy	
Yes	50 (41.6)
No	70 (58.3)
Birth interval	
Mean sd	23.7±1.756
History of abortion	
Yes	4 (3.3)
No	116 (96.7)
Previous history of low birth weight	
yes	29 (24.1)
no	91 (75.8)

Table 3- Secondary outcomes related to LBW patients Duration of pregnancy (weeks) and Current maternal MUAC (cm)

Variable	Mean and sd
Duration of pregnancy (weeks)	36.7±2.8
Current maternal MUAC (cm)	22.1±2.6
Number of ANC visits	3.2±1.1
Current body weight (kg)	55.9±2.9
Apgar main score	
1min	50 (41.6)
5 min	70 (58.3)

Table 4- Logistic regression evaluation of Iraqi patients to assess risk factors in the study

Variables	OR	**Lower**	**Upper**	P VALUE
Number of ANC visits	2.3	1.5	3.87	0.033
Illnesses during pregnancy	1.83	1.33	2.83	0.03
Body weight (kg)	2.938	1.73	4.9	<0.05
Body height (m)	2.123	1.66	3.109	0.033
Duration of pregnancy (weeks)	1.66	0.84	2.77	0.04
Apgar main score	1.855	1.1	2.66	<0.05
Gravidity	1.5	0.784	2.11	0.983

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Table 5- The effect of low weight in pregnant women on complications after childbirth

Variable	VALUE
NICU admission (P %)	33 (27.5)
Fetal death	5 (4.1)
Postpartum hemorrhage	12(10)
BW	3050 (2820-3280)
Gestational hypertension	11 (9.1)
Premature Labor and Delivery	20 (16.6)

Discussion

Low birth weight represents a significant global health problem, given that such newborns frequently experience severe limitations in terms of survival and quality of life. Globally, low birth weight (LBW) is widely regarded as an indicator of the quality of health services, in addition to its use as a prognostic indicator in relation to neonatal and infant morbidity and mortality. [15] The present study revealed a predominance of intrauterine growth retardation, with preterm birth being the second most common complication. This finding aligns with the observations reported by Lopez and Lugones et al., who documented a higher prevalence of intrauterine growth restriction (IUGR) compared to other clinical manifestations. The results of a multivariate study conducted by Soriano T. also corroborated these findings. The mean and standard deviation (SD) of the patients' ages were determined to be 32.88±4.97. Intrauterine growth restriction (IUGR) emerged as the predominant condition. It is important to acknowledge the potential for selection bias, as the exclusion criteria may have led to the exclusion of pregnant women from other age groups, potentially skewing the results. [16,17] The extant literature suggests that the health risks for both the mother and child increase when the mother is a teenager or over 35 years of age. This is attributed to the impact of current psychosocial conditions and a higher incidence of pregnancy complications and obstetric interventions. [18] Conversely, adolescent girls are associated with their biological and emotional immaturity, which determines that their reproductive organs have not yet reached their full development and maturity [19,20].

Older women are said to bear low birth weight newborns of the poorest quality (weighing less than 1500 grams) on account of the numerous risk factors associated with them, biological, psychological, social, and environmental, and which affect themselves. For example, we can say that the endometrium is probably not in the conditions it was in when it was younger or that she exerts herself to work quite hard and that affects her and her product. Average Apgar scores of newborns at the first minute of life were: first group 50 (41.6) second group 5 min 70 (58.3). The average Apgar scores at the first and the fifth minute of life in the principal group of newborns were very inferior with regard to normality [21].

In the nutritional assessment by gender for low birth weight recruiting clinical forms, the scale of low weight is 55.9±2.9. Evidently, these findings indicate that mothers with restricted weight give birth to low-wait children. Maternal malnutrition is likely to impede sound development of pregnancy as fetal growth is deprived of its nutrient source, resulting generally in body growth deficiency during pregnancy.

This makes the age range of 20-34 years as the optimum period for women to bear children, but the study was somehow mitigated by adverse factors affecting study outcomes, such as maternal malnutrition, insufficient weight gain during pregnancy, and pregnancy-related conditions. Ortiz MD, in a recent study in Bolivia entitled "Strategies for the Prevention of Low Birth Weight in a High-Risk Population: Evidence-Based Medicine," produced results that contradicted this work concerning age since adolescents mostly outnumber other age groups in the research. This was as a result of Latin America and the Caribbean [22].

The research conducted analyzes the relationship between different maternal factors that are associated with low birth weight in live-born newborns who have completed the gestation period. The results of this work show that there is a significant association between low birth weight and factors such as maternal age, number of pregnancies, and type of delivery, gestational age, and lack of folic acid consumption. Among them, cesarean section, gestational age, and number of pregnancies are independent predictors of low birth weight and act synergistically. On the other hand, there is no association between low birth weight and anemia, type 2 diabetes, gestational diabetes, hypertension, and pre-pregnancy weight. Regarding maternal age, an association with low birth weight was observed in the group of mothers under 30 years of age, and the results coincide with the cross-sectional analysis study conducted by Restrepo Mesa et al., where the association between early pregnancy and low birth weight is high.

In relation to the mode of delivery, a significant correlation was identified between low birth weight newborns and caesarean delivery, consistent with the findings of Forero Torres et al. who conducted a longitudinal descriptive study involving 388 mothers in Bogotá, determining that low birth weight was more prevalent in caesarean deliveries [23] In a similar vein, Márquez Beltrán et al., based on a retrospective descriptive study conducted on the total number of live newborns in Colombia during the five-year period 2005-2009, concluded that cesarean delivery and primiparous pregnant women were factors strongly associated with low birth weight, and the results were similar to those obtained in this investigation (36). Despite the findings of several studies that suggest a potential relationship between HTN and LBW, the present study did not have sufficient cases to ascertain this association. Similarly, no association was identified between low birth weight and type 2 diabetes or gestational diabetes, although many studies have linked these diseases to fetal gigantism.

Conclusion

The results of the present work allow us to conclude that there is a statistically significant relationship between low birth weight in newborns and maternal factors such as age, type of delivery, gestational age, and number of pregnancies, and lack of folic acid consumption. On the other hand, a relationship is found between low birth weight and complications that occur after pregnancy, such as gestational diabetes and hypertension. Research on the relationship between low birth weight and maternal nutrition at the local level indicates

Referencies

1. Liu P, Xu L, Wang Y, et al. Association between perinatal outcomes and maternal pre-pregnancy body mass index. Obes Rev. 2016;17(11):1091-1102. [DOI] [PubMed] [Google Scholar]
2. Zanardo V, Mazza A, Parotto M, Scambia G, Straface G. Gestational weight gain and fetal growth in underweight women. Ital J Pediatr. 2016;42 (1):74. [DOI] [PMC free article] [PubMed] [Google Scholar]
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. 5th ed. American Psychiatric Association; 2013. [Google Scholar]
4. Sebastiani G, Andreu-Fernandez V, Herranz Barbero A, et al. Eating disorders during gestation: implications for mother's health, fetal outcomes, and epigenetic changes. Front Pediatr. 2020; 8:587. [DOI] [PMC free article] [PubMed] [Google Scholar]
5. Pan JR, Li TY, Tucker D, Chen KY. Pregnancy outcomes in women with active anorexia nervosa: a systematic review. J Eat Disord. 2022;10 (1):25. [DOI] [PMC free article] [PubMed] [Google Scholar]
6. Miller KK, Grinspoon SK, Ciampa J, Hier J, Herzog D, Klibanski A. Medical findings in outpatients with anorexia nervosa. Arch Intern Med. 2005;165 (5):561-566. [DOI] [PubMed] [Google Scholar]

7. Easter A, Bye A, Taborelli E, et al. Recognising the symptoms: how common are eating disorders in pregnancy? Eur Eat Disord Rev. 2013;21 (4):340-344. [DOI] [PubMed] [Google Scholar]
8. Bulik CM, Von Holle A, Hamer R, et al. Patterns of remission, continuation, and incidence of broadly defined eating disorders during early pregnancy in the Norwegian Mother and Child Cohort Study (MoBa). Psychol Med. 2007;37 (8):1109-1118. [DOI] [PMC free article] [PubMed] [Google Scholar]
9. Forsum E., Sadurskis A., Wager J. Energy maintenance cost during pregnancy in healthy Swedish women. Lancet. 1985 Jan 12;1 (8420):107–108. DOI: 10.1016/s0140-6736 (85)91998-1. [DOI] [PubMed] [Google Scholar]
10. Knuth U. A., Hull M. G., Jacobs H. S. Amenorrhoea and loss of weight. Br J Obstet Gynaecol. 1977 Nov;84 (11):801–807. DOI: 10.1111/j.1471-0528. 1977.tb12499. x. [DOI] [PubMed] [Google Scholar]
11. Leader A., Wong K. H., Deitel M. Maternal nutrition in pregnancy. Part I: a review. Can Med Assoc J. 1981 Sep 15;125 (6):545–549. [PMC free article] [PubMed] [Google Scholar]
12. Lechtig A., Yarbrough C., Delgado H., Habicht J. P., Martorell R., Klein R. E. Influence of maternal nutrition on birth weight. I am J Clin Nutr. 1975 Nov;28 (11):1223–1233. DOI: 10.1093/ajcn/28.11.1223. [DOI] [PubMed] [Google Scholar]
13. Lind T. Would more calories per day keep birthweight at bay? Lancet. 1984 Mar 3;1 (8375):501–502. DOI: 10.1016/s0140-6736 (84)92860-5. [DOI] [PubMed] [Google Scholar]
14. Low J. A., Galbraith R. S., Muir D., Killen H., Karchmar J., Campbell D. Intrauterine growth retardation: a preliminary report of long-term morbidity. Am J Obstet Gynecol. 1978 Mar 1;130 (5):534–545. DOI: 10.1016/0002-9378 (78)90072-8. [DOI] [PubMed] [Google Scholar]
15. Luke B., Dickinson C., Petrie R. H. Intrauterine growth: correlations of maternal nutritional status and rate of gestational weight gain. Eur J Obstet Gynecol Reprod Biol. 1981 Aug;12 (2):113–121. DOI: 10.1016/0028-2243 (81)90024-1. [DOI] [PubMed] [Google Scholar]
16. Mason P., Adams J., Morris D. V., Tucker M., Price J., Voulgaris Z., Van der Spuy Z. M., Sutherland I., Chambers G. R., White S. Induction of ovulation with pulsatile luteinising hormone-releasing hormone. Br Med J (Clin Res Ed) 1984 Jan 21;288 (6412):181–185. DOI: 10.1136/bmj.288.6412.181. [DOI] [PMC free article] [PubMed] [Google Scholar]
17. Lewandowska M, Wieckowska B, Sajdak S. Pre-Pregnancy obesity, excessive gestational weight gain, and the risk of pregnancy-induced hypertension and gestational diabetes Mellitus. J Clin Med. 2020;9 (6):1980. [DOI] [PMC free article] [PubMed] [Google Scholar]
18. Ratnasiri AWG, Lee HC, Lakshminrusimha S, et al. Trends in maternal prepregnancy body mass index (BMI) and its association with birth and maternal outcomes in California, 2007-2016: a retrospective cohort study. PLoS One. 2019;14 (9): e0222458. [DOI] [PMC free article] [PubMed] [Google Scholar]
19. Simko M, Totka A, Vondrova D, et al. Maternal body mass index and gestational weight gain and their association with pregnancy complications and perinatal conditions. Int J Environ Res Public Health. 2019;16 (10):1751. [DOI] [PMC free article] [PubMed] [Google Scholar]
20. Chaemsaithong P, Leung TY, Sahota D, et al. Body mass index at 11-13 weeks gestation and pregnancy complications in a southern Chinese population: a retrospective cohort study. J Matern Fetal Neonatal Med. 2019;32 (12):2056-2068. [DOI] [PubMed] [Google Scholar]
21. Butwick AJ, Abreo A, Bateman BT, et al. Effect of maternal body mass index on postpartum hemorrhage. Anesthesiology. 2018;128 (4):774-783. [DOI] [PMC free article] [PubMed] [Google Scholar]

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22. Harvey MW, Braun B, Ertel KA, Pekow PS, Markenson G, Chasan-Taber L. Prepregnancy body mass index, gestational weight gain, and odds of cesarean delivery in Hispanic women. Obesity (Silver Spring). 2018;26 (1):185-192. [DOI] [PMC free article] [PubMed] [Google Scholar]

23. Pettersen-Dahl A, Murzakanova G, Sandvik L, Laine K. Maternal body mass index as a predictor for delivery method. Acta Obstet Gynecol Scand. 2018;97 (2):212-218. [DOI] [PubMed] [Google Scholar]