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Determination of Factors Associated with Low Birth Weight among Babies Born in Sulaimania City, Kurdistan-Iraq

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Abstract:

Background: Low birth weight (LBW) is the main leading cause of infant death. It is contributing to a variety of short and long term poor health outcomes. Determination of risk factors associated with LBW is important to select a suitable action to prevent or reduce this outcome. Studies on LBW and maternal risk factors in the Kurdistan region of Iraq are scarce.

Objectives: This study aimed to determine risk factors associated with Low birth weight in Sulaimania city, Kurdistan region of Iraq.

Cases and Methods: This study was carried out in the Maternity Hospital in Sulaimania from first of July, 2019 to first of February, 2020. Participants were 300 randomly selected mothers who gave a live birth. The questionnaire form, which contains information about factors associated with low birth weight (infant's weight at birth lower than 2.5 kg) were filled by collectors. Infants were weighed immediately after delivery, and the weight was recorded in addition to sex of the infants, gestational age (weeks), age of the mother, job of the mothers, mother's educational levels, antenatal care attendance, gravidity, residency, exercise and history of chronic diseases of mothers were recorded.

Results: The results of the present study indicate that LBW was reported in 44.7% of the participants. For the LBW group, 48.5% were males and 51.5% were females. The highest percentage of LBW was among those born preterm 75.4% and the lowest was among full term 24.6%. Many factors such as an employed mother (85.8%), no exercise during pregnancy (88.1%), residency in urban (61.9%), mothers with chronic diseases (86.6%) and low level of education (illiterate and primary) (67.9%) were found as the significant risk factors of LBW. However, other factors such as prenatal care visits, age of mothers and gravidity were not found to be associated with LBW.

Conclusion: The current study concludes that multiple risk factors may be associated with LBW in Sulaimania city, Kurdistan region of Iraq. Gestational age (preterm delivery), working mothers, no regular exercise, urban residence, low level of education and mother's diseases such as hypertension, respiratory conditions, chronic infections and diabetes mellitus were considered as the risk factors associated with LBW.

Keywords: Low birth weight, maternal risk factors, preterm delivery, full term delivery, Sulaimania city.

Introduction:

Low birth weight (LBW) is defined by the World Health Organization (WHO) as infant's weight at birth lower than 2.5 kg. It is estimated that 15% - 20% of all births worldwide are LBW, representing more than 20 million births a year (1). In some communities LBW may be a major health problem and is related to a variety of both short- and long-term consequences. Globally, LBW is a main contributing factor to neonatal deaths (2). Short term complications may include problems such as enterocolitis, retinopathy, late onset sepsis and problems of the respiratory tract (3, 4). Long term outcomes may include hypertension in young adult life (5), neurodevelopmental outcomes at age two and five years (6), high risk of cognitive impairment (7), and type-2 Diabetes mellitus (8). One study found that a long term consequence among LBW female children is a likelihood of developing obesity (9). Moreover, children with very low birth weight (VLBW) are also at high risk of undergoing progressive or delayed-onset hearing loss (10). Two main conditions contribute to LBW, which are premature delivery (11) and/or a poor perfusion between the placenta and uterus due to the restriction in the intrauterine growth (12). The risk factors associated with LBW according to many studies are maternal weight, age, malnutrition, inadequate health care, chronic infection, and gestational diabetes mellitus. Furthermore, smoking, drinking large amount of alcohol during pregnancy and genetic factors may be causes of LBW (13, 14).

There is a very scarce research regarding maternal risk factors and LBW in Kurdistan region of Iraq.

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Therefore, this study was carried out in a Sulaimania maternity hospital with the aim of identifying risk factors associated with LBW.

Cases and Methods:

Location and participants: This study was carried out in Sulaimania city/ Kurdistan region of Iraq. Sulaimania is located in the north east of Iraq with a population of nearly one million. Three hundred mothers who were admitted to Sulaimania Maternity Hospital and have delivered live born neonates were included in this study.

Data collection: The cases were enrolled between the first of July 2019 and first of February 2020. Participants were selected randomly and the questionnaire form, which covers information about factors associated with LBW (infant's weight at birth lower than 2.5 kg), was filled. The information included: infant's weight immediately after delivery, infant's sex, gestational age at delivery which is taken from the beginning of the mother's last menstrual period, mother's age, job, mothers educational level, antenatal care attendance, gravidity, residency, exercise and medical history (hypertension, all types of respiratory conditions, chronic infections and others).

Data analysis: Data was entered into statistical package for social sciences "SPSS" version 26 for storage and statistical analysis. The Chi –square test was applied to test for association, with a P value of 0.05 or less considered as significant.

Results:

Among 300 live born neonates, 134 (44.7%) (65 males and 69 females) weighed less than 2.5 kg (LBW), 160 (53.3%) (74 males and 86 females) were between 2.5-4.5 kg (normal birth weight) and 6 (2%) (4 males and 2 females) were over 4.5 kg (high birth weight). Statistically, there was no significant association between sex and birth weight (P value =0.596), table 1.

Table 1: Distribution of the live born infants by sex and birth weight

Birth weight (Kg)	Sex of infants - No. (%)			Statistics
	Male	Female	Total	
< 2,500	65 (45.5)	69 (43.9)	134 (44.7)	Chi-square 1.035
2,500 - 4,500	74 (51.7)	86 (54.8)	160 (53.3)	
> 4,500	4 (2.8)	2 (1.3)	6 (2.0)	P value 0.596
Total (100%)	143	157	300	

Among mothers who have delivered LBW infants, 101 mothers (75.4%) had a gestational age of less than 37 weeks (preterm birth). Statistically there was a significant association between preterm birth and LBW (P value =0.01). The results show a statistically significant association between employment status of mothers and the occurrence of LBW. Among 134 LBW infants, 115 mothers (85.8%) were employed and only 19 (14.2%) were housewives, P value=0.001. A significant association was found between practicing exercises and LBW. Out of 134 LBW infants, 118 (88.1%) were born to non-exercising mothers and only 16 (11.9%) were born to exercising mothers (P value < 0.001). A similar association was found for residence of the mothers, with more LBW infants being born to urban mothers 83 (61.9%) than those born to rural mothers 51 (36.1%), (P value < 0.01). For mothers with diseases such as hypertension, asthma, diabetes, chronic infections, the incidence of LBW infants was 116 (86.6%) compared to 18 (13.4%) among mothers who had no history of such diseases, P value < 0.001). A significant association was found between mother's level of educations and LBW. LBW infants were 55 (41.0%), 36 (26.9%), 23 (17.7%) and 20 (14.9%) among mothers whose level of educations were illiterate, primary, secondary and university respectively, P value=0.001, table 2.

Table 2: Distribution of LBW infants according to some maternal factors

Variable	Category	No. (%)			P Value
		LBW, No.	LBW, (%)	Total	
Gestational age at birth (weeks)	< 37	101	75.4	134	0.01
	37 +	33	24.6		
Mother's employment	Employed	115	85.8	134	0.001
	Housewife	19	14.2		
Exercise	Yes	16	11.9	134	0.001
	No	118	88.1		
Residency	Urban	83	61.9	134	0.006
	Rural	51	36.1		
Mother's diseases	Yes	116	86.6	134	0.001
	No	18	13.4		
Mother's educational level	Illiterate	55	41.0	134	0.001
	Primary	36	26.9		
	Secondary	23	17.2		
	University	20	14.9		

Factors like gravidity, mother's age and regular prenatal health care were not found to be statistically significant, table 3.

Table 3: Distribution of LBW infants according to some maternal variables

Variable	Category	No. (%)		Total	P Value
		LBW, No.	LBW, (%)		
Prenatal health care visits	Regular	63	47.0	134	0.490
	Irregular	71	53.0		
Gravidity	1-2	65	48.5	134	0.510
	3-4	58	43.3		
	5+	11	8.2		
Age of mother (years)	≤ 25	64	47.8	134	0.282
	26-35	57	42.5		
	> 35	13	9.7		

Discussion:

The present study investigated many factors known to be associated with LBW infants in a group of neonates born in Sulaimania Maternity Hospital.

Gestational age at birth, mother's employment, exercising, residency, diseases and educational level showed a statistically significant association with LBW. On the other hand, neonate's sex, prenatal health care, gravidity and mother's age were not significant associated with LBW. The current study showed that the prevalence of LBW was 44. 7% which is very high compared to the other developing countries. Previous studies found that the prevalence of LBW in the developing countries ranged between 9-35.1% (15). However, our result was consistent with another study done in a Maternity and Pediatrics Hospital in Baghdad / Iraq, which found that half of all neonates were born with LBW (16). Our study did not find a significant association between the sex of the neonate and LBW, in consistent with a previous study done in Al-Diwaniyah governorate, Iraq (17). However, a study from Afghanistan reported that female infants had a higher probability of being born with a LBW (18), which was attributed to the effects of androgen hormone and / or the Y chromosome on the male intrauterine growth and hence on birth weight. The current study found that the main cause of LBW infants was preterm delivery where contributed to 75.4% of all LBW infants. This is in parallel with a study that confirmed LBW primarily resulted from preterm delivery and intrauterine growth restriction or both (19). The level of mother's education had a strong association with LBW, with mothers who were illiterate or below secondary level of education had a higher risk of delivering a LBW infants compared to mothers who had secondary or university levels of education. This may be explained by a lower access to health and nutrition information by mothers of low levels of education, with a negative effect on fetal growth. This finding is consistent with a study conducted in 12 European countries and found that low mother's education was associated with preterm and LBW infants (20). Urban residence of mothers was found to be a risk factor for LBW, which may be due to a healthier environment in rural areas of Sulaimania and better access to prenatal care than the overcrowded urban environment. However, this result is in disagreement with that of Kayode *et al*. who found that rural residency contributed to a higher risk for LBW. They suggested that mothers who live in rural area are deprived from good health care, amenities or parities (21). The current study found a higher percentage of LBW infants among working mothers than housewives, in consistence with a study done in Northern Ethiopia which found that mothers who have a history of physical working during pregnancy have a high risk for LBW infants (22). Another study from Baghdad confirmed that working mothers have a high risk than housewives to have LBW infants (23). The current study found an association between regular exercise and LBW. Mothers with regular exercise during pregnancy have a much lower chance to have LBW infants compared to mothers with no exercise. This finding disagree with a previous study which suggested that exercise during pregnancy was not associated with a reduction of LBW or preterm delivery, but they did not find a negative effects of exercise on gestational age or prematurity (24). Mother's diseases such as hypertension, asthma or chronic infections were found to be associated with LBW. This is consistent with a study done in a developed region in China, where anemia and hypertension of mothers contributed to LBW (25). Another study suggested that asthma, heart disease, hypertension, anemia and urinary tract infection in mothers were associated with LBW (16, 26). Factors like maternal age, prenatal health care and gravidity had no significant association with LBW. However, previous studies have confirmed that maternal age was a risk factor for LBW. A study in Nigeria found that maternal age was an important risk factor for LBW (27). A study from Italy showed that younger mothers were more likely to deliver LBW infants specially those who smoked and had irregular prenatal care visits (28). Prenatal care visits in our study result is inconsistent with a study performed in Brazil which showed an association between LBW and number of prenatal health care visits (29). Conversely, a study conducted in Afghanistan found no association between antenatal care visits and LBW (18).

Conclusion:

Multiple factors were found to be associated with LBW in Sulaimania city, Kurdistan region of Iraq. Preterm delivery, working mothers, no regular exercise, living in urban areas, low level of education and mothers diseases such as hypertension, respiratory conditions, chronic infections and diabetes mellitus were found to be associated with LBW. Early detection and suitable control and management of the mentioned factors would possibly reduce the incidence of LBW and therefore prevent its short and long term consequences.

References:

1- World Health Organization (WHO). Global Nutrition Targets 2025 Low Birth Weight Policy Brief. Geneva: World Health Organization 2014.

2- Lawn JE, Cousens S, Zupan J. 4 million neonatal deaths: when? Where? Why? Lancet 2005; 365(9462): 891-900.

3- Al Hazzani F, Al-Alaiyan S, Hassanein J, Khadawardi E. Short-term outcome of very low-birth-weight infants in a tertiary care hospital in Saudi Arabia. Ann Saudi Med 2011; 31(6): 581-585.

4- Goldenberg RL, Culhane JF. Low birth weight in the United States. Am J Clin Nutr 2007; 85: 584-590.

5- Hovi P, Vohr B, Ment LR, Doyle LW, McGarvey L, Morrison KM et al. Blood Pressure in Young Adults Born at Very Low Birth Weight. Hypertension 2016; 68: 880-887.

6- Lin CY, Hsu CH, Chang JH. Neurodevelopmental outcomes at 2 and 5 years of age in very-low-birth-weight preterm infants born between 2002 and 2009: A prospective cohort study in Taiwan. Pediatrics and Neonatology 2020; 61: 36-44.

7- Sobaih BH. Long-term cognitive outcome of very low birth-weight Saudi preterm infants at the corrected age of 24-36 months. Saudi Med J 2018; 39 (4): 368-372.
8- Burke JP, Forsgren J, Palumbo PJ, Bailey KR, Desai J, Devlin H, et al. Association of Birth Weight and Type 2 Diabetes in Rochester, Minnesota. Diabetus Care 2004; 27 (10): 2512-2513.
9- Chakraborty A, Rakesh PS, Kumaran V, Prasad J, Alexander AM, George K. Risk of developing adulthood obesity among females born with low birth weight: Results from a non-concurrent study from rural Southern India. Indian J Endocrinol Metab 2014; 18(3): 414-418.
10-Cristobal R, Oghalai JS. Hearing loss in children with very low birth weight: current review of epidemiology and pathophysiology. Arch Dis Child Fetal Neonatal 2013; 93(6): 462-468.
11-Coutinho PR, Cecatti JG, Surita FG, Souza JP, Morais SS. Factors associated with low birth weight in a historical series of deliveries in campinas, Brazil. Rev Assoc Med Bras 2009; 55(6): 692-9.
12-Eleftheriades M, Creatsas G, Nicolaides K. Fetal growth restriction and postnatal development. Ann N Y Acad Sci. 2006; 092: 319-330.
13-Reyes L, Manalich R. Long-term consequences of low birth weight. Kidney International 2005; 68 (97): 107-111.
14-Mumbare SS, Maindarkar G, Darade R, Yenge S, Tolani MK, Patole K. Maternal risk factors associated with term low birth weight neonates: a matched-pair case control study. Indian Pediatr 2012; 49(1): 25-28.
15-Mahumud RA, Sultana M, Sarker AR. Distribution and determinants of low birth weight in developing countries. Journal of Preventive Medicine and Public Health 2017; 50:18–28.
16-Al-Diwan JK, Al-Ageeli ST, Al-Hadi AM, Al-Hadithi TS. Low birth weight in Iraq. Baghdad. J Fac Med Baghdad 2006; 48: 363-65.
17-Hussein AJ. Maternal risk factors for low birth weight of neonates in al- Diwaniyah province, Iraq. Int. J. Res. Pharm. Sci. 2019; 10(3): 1904-1909.
18-Das Gupta R, Swasey K, Burrowes V,Hashan MR, Al Kibria GM. Factors associated with low birth weight in Afghanistan: a cross-sectional analysis of the demographic and health survey 2015. BMJ Open 2019; 9: e 025715.
19-Cutland CL, Lackritz EM, Mallett-Moore T, Bardají A, Chandrasekaran R, Lahariya C, Nisar MI, Tapia MD, Pathirana J, Kochhar S,1, Muñoz FM. Low birth weight: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. Vaccine 2017; 35: 6492–6500.
20-Ruiz M, Goldblatt P, Morrison J, Kukla L, Svancara J, Riitta-Järvelin M et al. Mother's education and the risk of preterm and small for gestational age birth: a DRIVERS meta-analysis of 12 European cohorts. J Epidemiol Community Health 2015; 69:826–833.
21-Kayode GA, Amoakoh-Coleman M, Agyepong IA, Ansah E, Grobbee DE, Klipstein-Grobusch K. Contextual Risk Factors for Low Birth Weight: A Multilevel Analysis. PLoS ONE 2014; 9(10): e109333.
22-Hailu LD, Kebede DL. Determinants of Low Birth Weight among Deliveries at a Referral Hospital in Northern Ethiopia. BioMed Research International 2018; 2: 1-8.
23-Hasoon SM. Assessment of Risk Factors for Preterm Birth: Case Control Study. AL- Taqani 2013; 26(3): 83-91.
24-Haakstad LA, Bø K. Exercise in pregnant women and birth weight: a randomized controlled trial. BMC Pregnancy and Childbirth 2011; 11: 66.
25-Bian Y, Zhang Z, Liu Q, Wu D, Wang S. Maternal risk factors for low birth weight for term births in a developed region in China: a hospital-based study of 55,633 pregnancies. The Journal of Biomedical Research 2013; 27(1): 14-22.
26-Al-Assadi AF, Al- Haroon DS, Al-Rubaye AH, Abdul-Rahman BA. Risk Factors and neonatal outcome among preterm birth at Basrah central hospitals. The medical journal of Basrah University 2018; 36(2): 87-96.
27- Dahlui M, Azahar N, Oche OM, & Abdul Aziz N. Risk factors for low birth weight in Nigeria: evidence from the 2013 Nigeria Demographic and Health Survey. Global Health Action 2016; 9: 28822.
28-Nobile CG, Raffaele G, Altomare C, Pavia M. Influence of maternal and social factors as predictors of low birth weight in Italy. BMC Public Health 2007; 7:192.
29-Fonseca CR, Strufaldi MW, Carvalho LR, Puccini RF. Adequacy of antenatal care and its relationship with low birth weight in Botucatu, Sao Paulo, Brazil: a case- control study. BMC Pregnancy and Childbirth 2014; 14: 255.

تحديد عوامل المرتبطة بانخفاض وزن الطفل عند الولادة في مدينة السليمانية، كردستان العراق

د. سردار محمد ولي

الخلاصة:

الخلفية: انخفاض الوزن عند الولادة هو السبب الرئيسي لوفيات الرضع. وهو يساهم في مجموعة متنوعة من النتائج الصحية السيئة قصيرة وطويلة الأجل. من المهم تحديد عوامل الخطر المرتبطة بـانخفاض الوزن عند الولادة لاتخاذ الإجراء المناسب لمنع أو تقليل العواقب. ومع ذلك، فإن الدراسة بشأن انخفاض الوزن عند الولادة وعوامل الخطر الأمومية في إقليم كردستان العراق قليلة جدا.

الأهداف: هدفت هذه الدراسة إلى تحديد عوامل الخطر المرتبطة بانخفاض الوزن عند الولادة في مدينة السليمانية ، إقليم كردستان العراق.

الطريقة: أجريت هذه الدراسة في مستشفى الولادة في السليمانية من الاول من تموز 2019 واستمرت حتى الاول من شباط 2020. شملت الدراسة 300 والدة ممن ولدن أطفالا أحياء وتم اختيارهن عشوائيا لملء نموذج الاستبيان الذي يحتوي على معلومات حول العوامل المرتبطة بانخفاض الوزن عند الولادة. و شملت المعلومات وزن الرضّع بعد الولادة مباشرة، وجنس الرضّع، ومدة الحمل، وعمر الأم، ووظيفة الأمهات، والمستويات الدراسية للأمهات، والحضور المنتظم في مركز رعاية الحمل، عدد مرات الحمل، ومحل السكن، والتمارين الرياضية، و الامراض المزمنة للامهات.

النتائج: كشفت نتائج الدراسة الحالية أنه من بين 300 مشارك، كانت نسبة انخفاض الوزن عند الولادة 44.7 ٪. بين الأطفال في مجموعة انخفاض الوزن عند الولادة، كان 48.5 ٪ ذكور و 51.5٪ إناث. كانت أعلى نسبة من انخفاض الوزن عند الولادة بين المولودين قبل الأوان 75.4٪ وأدنى نسبة كانت 24.6٪ في المولودين بعد ذلك. عوامل كثيرة مثل الأمهات العاملات (85.8٪) وعدم ممارسة الرياضة أثناء الحمل (88.1٪) والسكن في المناطق الحضرية (61.9٪) والأمهات المصابات بأمراض مزمنة (86.6٪) وانخفاض مستوى التعليم (أمي وأساسي) (67.9٪) كل هذه العوامل تسبب خطر كبيرلحدوث انخفاض الوزن عند الولادة. ومع ذلك، فان عوامل أخرى مثل زيارات الرعاية السابقة للولادة، وعمر الأمهات وعدد مرات الحمل، لم تظهر لها علاقة كبيرة مع انخفاض الوزن عند الولادة.

الخلاصة: خلصت الدراسة الحالية إلى أن عوامل الخطر المتعددة قد ارتبطت مع انخفاض الوزن عند الولادة في مدينة السليمانية، إقليم كردستان العراق. اعتبرت مدة الحمل (الولادة قبل الأوان)، والأمهات العاملات، وعدم ممارسة التمارين الرياضية بانتظام، والسكن في المناطق الحضرية، وانخفاض مستوى التعليم وأمراض الأم مثل ارتفاع ضغط الدم، والامراض التنفسية، والالتهابات المزمنة والسكري من عوامل الخطر المرتبطة بانخفاض الوزن عند الولادة.

الكلمات المفتاحية: انخفاض الوزن عند الولادة، عوامل الخطر الأمومية، الولادة المبكرة، الولادة الكاملة، مدينة السليمانية.