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Impact Of Maternal Factors on Birth weight In Salah- Aldeen general Hospital/Tikrit City

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Abstract

Birth weight is a crucial determinant of the developmental potential of the newborn. Birth weight is the body weight of a baby at its birth. The range of normal is between 2.5 and 4.5 kilograms (5.5 and 9.9 lb). On average, babies of south Asian and Chinese heritage weigh about 3.26 kilograms (7.2 lb). Abnormal newborn weights are associated with negative effects on the health and survival of the baby and the mother. World Health Organization has defined low birth weight as birth weight less than 2,500 grams. Giving birth to a low-birth-weight infant is influenced by several factors. This study aimed to identify key determinants that influence the frequency of normal and low birth weight in Salah Al-Deen general Hospital in Tikrit city-Iraq.

This study is a Cross- sectional study, was conducted in obstetric department in Salah Al-Deen general hospital during the period from 1st Feb to the 31st of August 2020. The study sample included full term babies (gestational age 37-42 week) chosen by using a convenient sampling method selecting 197 delivered babies with their mothers. Data collection done by face-to-face interview, using the structured questionnaire developed by the researcher include the following information: Information regarding the mother included demographic variables, reproductive health, medical and obstetrical history and antenatal care visits, use of ferrous sulfate and other supplements during pregnancy. Birth weight was measured at birth, to the nearest 50 g, with the nude infant lying on the available scale. Zero adjustment of the scale was frequently done

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to ensure accuracy of the readings. Birth weight was categorized into two as low birth weight (birth weight < 2500 grams), and normal birth weight (birth weight ≥ 2500 grams).

The current study showed that prevalence of low birth weight was (2.4%), macrosomia (15.6%) and normal birth weight was (82%). The study showed that the low birth weight was higher among primigravida (3.4%), than multigravida women (1.7%) and that the low birth weight was higher among 1st and 2nd birth order (3.4%), (6.7%) respectively while it was (0%) among the 3rd baby order. Previous history of Diabetes Mellitus was associated with 0(0%) low birth weight babies and (2.6%) of those women without Diabetes Mellitus had low birth weight babies. Those with history of iron deficiency anemia was more prone to had babies with low birth weight (3.1%), versus those without history of iron deficiency anemia (1.3%). Those with history of hypertension more prone to had babies with low birth weight (4%), versus those without history of iron deficiency anemia (2.2%). The current study showed that those with ferrous sulfate supplements had lower proportion of babies with low birth weight (1.2%), versus those without supplements (7.7%), this relation statistically significant .

This study has demonstrated that the younger maternal age, mother with diabetes mellitus, hypertension and irregular antenatal care had babies with lower birth weight. Previous history of low birth weight also is a predisposing factor for low birth weight.

Keywords*:* Salah Al-Deen general Hospital, reproductive health, low birth weight.

تأثير عوامل الأمومة على وزن الولادة في مستشفى صلاح الدين العام \ مدينة تكريت

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الخلاصة:

الوزن عند الولادة هو محدد حاسم لإمكانيات نمو الوليد. ترتبط الأوزان غير الطبيعية للمواليد بآثار سلبية على صحة وبقاء الطفل والأم. حددت منظمة الصحة العالمية انخفاض الوزن عند الولادة على أنه وزن عند الولادة أقل من 2500 جرام. تتأثر ولادة طفل انخفاض الوزن عند الولادة بعدة عوامل. تهدف هذه الدراسة إلى التعرف على المحددات الرئيسية التي تؤثر على انتشار الوزن الطبيعي والوزن المنخفض عند الولادة في مستشفى صلاح الدين العام بمدينة تكريت.

هذه الدراسة عبارة عن دراسة مقطعية أجريت في قسم التوليد بمستشفى صلاح الدين العام خلال الفترة من 1 فبراير 31 أغسطس 2020. وستشمل عينة الدراسة الأطفال الناضجين (عمر الحمل 36-40 أسبوعًا) تم اختيارهم باستخدام طريقة مريحة لأخذ العينات، واختيار 205 طفلًا ولدوا مع أمهاتهم. جمع البيانات الذي تم عن طريق المقابلة وجهاً لوجه، باستخدام الاستبانة المنظمة الذي طورها الباحث يتضمن المعلومات التالية: تتضمن المعلومات المتعلقة بالأم المتغيرات الديموغرافية، والصحة الإنجابية، والتاريخ الطبي والتوليد، وزيارات الرعاية السابقة للولادة، واستخدام كبريتات الحديدوز ومكملات أخرى أثناء الحمل. تم قياس وزن الولادة عند الولادة، لأقرب 50 جرامًا، مع وضع الرضيع عاريًا على المقياس المتاح. تم إجراء تعديل صفري للمقياس بشكل متكرر لضمان دقة القراءات. تم تصنيف الوزن عند الولادة إلى قسمين مثل الوزن المنخفض عند الولادة (وزن الولادة أقل من 2500 جرام)، والوزن الطبيعي عند الولادة (وزن الولادة 2500 جرام).

أظهرت الدراسة الحالية أن انتشار انخفاض الوزن عند الولادة كان (2.4٪)، الماكروسوميا (15.6٪) والوزن الطبيعي عند الولادة (82٪). أظهرت الدراسة الحالية أن انخفاض الوزن عند الولادة كان أعلى بين اللواتي لديهن ولادة واحده (3.4٪)، من النساء اللواتي لديهن ولادات متعددة (1.7٪)، وأظهرت الدراسة الحالية أن الاوزان المنخفضة كان أعلى بين ترتيب الولادة الأول والثاني (3.4٪)، (6.7٪) على التوالي. كان (0٪) ضمن ثالث ترتيب للأطفال. ارتبط التاريخ السابق لمرض السكري مع 0 (0٪) أطفال بأوزان منخفضه و (2.6٪) من هؤلاء النساء غير المصابات بمرض السكري كان لديهن أطفال بأوزان منخفضه. أولئك الذين لديهم تاريخ من الإصابة بفقر الدم الناجم عن نقص الحديد أكثر عرضة لإنجاب أطفال مصابين بنقص وزن الجسم (3.1٪)، مقابل أولئك الذين ليس لديهم تاريخ من فقر الدم بسبب نقص الحديد (1.3٪). أولئك الذين لديهم تاريخ ارتفاع ضغط الدم أكثر عرضة لإنجاب أطفال يعانون من انخفاض الوزن عند الولادة (4 ٪)، مقابل أولئك الذين ليس لديهم تاريخ من فقر الدم بسبب نقص الحديد (2.2 ٪). تظهر الدراسة الحالية أن أولئك الذين يتناولون مكملات كبريتات الحديدوز لديهم نسبة أقل من الأطفال الذين يعانون من انخفاض الوزن عند الولادة (1.2٪)، مقابل أولئك الذين ليس لديهم مكملات (7.7٪)، وهذه العلاقة ذات دلالة إحصائية.

أظهرت هذه الدراسة أن هناك علاقة إيجابية بين عمر الأم والوزن عند الولادة، وأن المواليد منخفضة الوزن عند الولادة كانت أعلى في الأمهات الأصغر سنًا، مما يجعل عمر الأم عاملاً مهمًا في حدوث ولادات اطفال بوزن منخفض. العوامل الأخرى التي تم العثور عليها لتكون مهمة تشمل مرض السكري وارتفاع ضغط الدم الأمومي. تُظهر هذه الدراسة ارتباطًا مهمًا بين الولادات منخفضه الوزن والأمهات اللاتي لا يحضرن رعاية الام والطفل بانتظام، وتاريخ الولادات منخفضه الوزن السابق، والأمهات المصابات بفقر الدم والامهات خلال الحمل الاول.

الكلمات المفتاحية: مستشفى صلاح الدين، الصحة الإنجابية، الولادات منخفضه الوزن.

Introduction:

Birth weight is the important determinant of the child growth, survival, development, and morbidity, as well as an indicator for the health and nutrition of the mother, in addition to quality of life. [1] Low birth weight (LBW) was defined as weight at birth < 2500 g (5.5 lb), regardless

of gestational age [1]. It is an important a global public health issue, as a result of its wide range of short- and long-term consequences [2]. The birth weight of a baby is notable because very low birth weight babies are 100 times more likely to die compared to normal birth weight babies. [3] As far as low birth weights prevalence rates changing over time, there has been a slight decrease from 7.9% (1970) to 6.8% (1980), then a slight increase to 8.3% (2006), to levels of 8.2% in (2016).[1] The prevalence of low birth weight has trended slightly upward from 2012 to present day.

LBW contribution to infant morbidity and mortality. About 50% of perinatal and 33.3% of infant deaths occur among LBW babies [2].

Several maternal and fetal factors contribute to LBW. The majority of the maternal factors, which are biologically and socially interrelated, are modifiable, making LBW a potentially preventable condition. Globally, LBW constitutes about 15% to 20% of all births worldwide, 20 million births with LBW per year. Considerable variation exists between different regions and countries regarding LBW, and the majority of LBW births are in low- and middle-income countries especially in most vulnerable populations [4].

Low birth weight (LBW) is more common in developing countries than in developed countries and significantly contributes to both neonatal and post neonatal mortality in those settings. Asia accounts for 75% of worldwide LBW incidence, followed by Africa which accounts for 20%. In Iraq, 13.4% of infants born with LBW, with variations between the governorates. However, percentages of infants with LBW did not vary much by urban or rural areas. It is reported that LBW prevalence in Iraq is increasing over the last three decades. [3]

Subject and Methods:

This study is a Cross- sectional study, was conducted in obstetric department in Salah Al-Deen general hospital during the period from 1st Feb to the 31st of August 2020. The study sample included full term babies (gestational age 37-42 week) chosen by using a convenient sampling method selecting 197 delivered babies with their mothers. Data collection done by face-to-face interview, using the structured questionnaire developed by the researcher include the following information: Information regarding the mother included demographic variables, reproductive health, medical and obstetrical history and antenatal care visits, use of ferrous sulfate and other supplements during pregnancy. Birth weight was measured at birth, to the nearest 50 g, with the nude infant lying on the available scale. Zero adjustment of the scale

was frequently done to ensure accuracy of the readings. Birth weight was categorized into two as low birth weight (birth weight < 2500 grams), and normal birth weight (birth weight ≥ 2500 grams).

Results:

The current study showed that prevalence of low birth weight was (2.4%), macrosomia (15.6%) and normal birth weight was (82%). The study showed that the low birth weight was higher among primigravida (3.4%), than multigravida women (1.7%) and that the low birth weight was higher among 1st and 2nd birth order (3.4%), (6.7%) respectively while it was (0%) among the 3rd baby order. Previous history of Diabetes Mellitus was associated with 0(0%) low birth weight babies and (2.6%) of those women without Diabetes Mellitus had low birth weight babies. Those with history of iron deficiency anemia was more prone to had babies with low birth weight (3.1%), versus those without history of iron deficiency anemia (1.3%). Those with history of hypertension more prone to had babies with low birth weight (4%), versus those without history of iron deficiency anemia (2.2%). The current study showed that those with ferrous sulfate supplements had lower proportion of babies with low birth weight (1.2%), versus those without supplements (7.7%), this relation statistically significant.

Analysis of 205 newborn babies that recruited in this study show that the mean birth weight was 3288.3±464, median was 3100 g, minimum birth weight was 2000g and the maximum was 4000 g.

The percentage of low birth weight was 5(2.4%), macrosomia 32(15.6%) and normal birth weight was 168(82%), as shown in this **figure 1**.

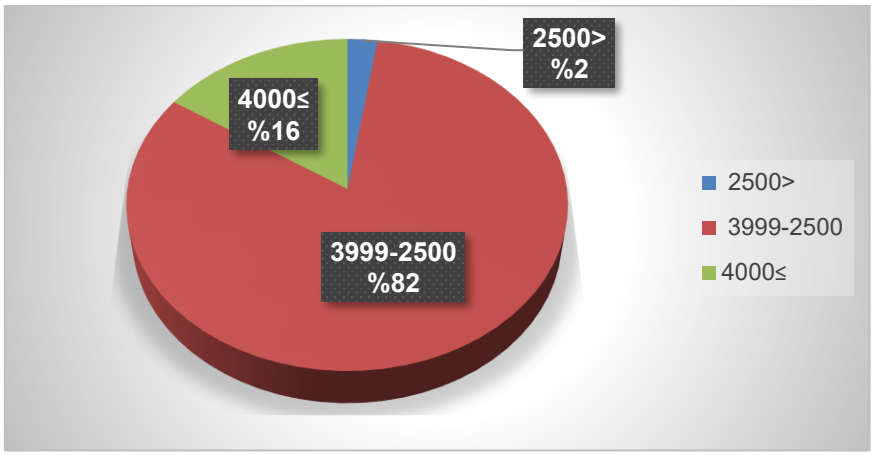

Figure 1: shows the distribution of sample according to birth weight.

The BW distribution according to mother age show that those aged < 25 years 3(2.7%) of their babied were LBW, and 20(18%) were ≥4000 g, while those aged ≥35 years none of their babies were LBW and 4(16.7%) were ≥4000 g, this relation was statistically not significant (P value>0.05), as shown in **table 1**.

Table 1. The BW distribution according to mother age

Age of mother	BW			Total
	<2500	2500-3999	≥4000	
<25	3	88	20	111
	2.70%	79.30%	18.00%	100.00%
25-34	2	60	8	70
	2.90%	85.70%	11.40%	100.00%
≥35	0	20	4	24
	0.00%	83.30%	16.70%	100.00%

Chi-sequre test X2 =2.1, df=4, P >0.05 not significant

LBW was higher among Primigravida 3(3.4%), than multigravida women 2(1.7%), this relation was statistically not significant (p value> 0.05).

LBW was higher among 1st and 2nd birth order 3(3.4%), 2(6.7%) respectively while it was 0(0%) among the 3rd baby order, this relation was statistically significant (p value> 0.05) as shown in **table 2**. Most of women living in rural area 5(6.5%) had LBW baby compared to urban 0(0%), this relation was statistically significant (P value<0.05). All women with higher education 12(100%) had normal birth weight, while 5(5.6%) of those who had 1ry education had babies with LBW, this relation was statically significant (P value<0.05) as shown in **table 2**.

Table 2. The relation of BW and the general characteristics of the women

Variables		BW			Total	P value
		<2500	2500-3999	≥4000		
Gravidity	Primigravida	3	72	12	87	>0.05NS *
		3.40%	82.80%	13.80%	100.00%	
	Multigravida	2	96	20	118	
		1.70%	81.40%	16.90%	100.00%	
Birth order	1	3	72	12	87	<0.05 S**
		3.40%	82.80%	13.80%	100.00%	
	2	2	20	8	30	
		6.70%	66.70%	26.70%	100.00%	
	≥3	0	76	12	88	
		0.00%	86.40%	13.60%	100.00%	
Residence	Urban	0	100	28	128	<0.05 S**
		0.00%	78.10%	21.90%	100.00%	
	Rural	5	68	4	77	
		6.50%	88.30%	5.20%	100.00%	
Education	Illiterate	0	28	4	32	<0.05 S**
		0.00%	87.50%	12.50%	100.00%	
	1ry	5	64	20	89	
		5.60%	71.90%	22.50%	100.00%	
	2ndry	0	64	8	72	
		0.00%	88.90%	11.10%	100.00%	
	high education	0	12	0	12	
		0.00%	100.00%	0.00%	100.00%	
Employment	Housewife	3	118	22	143	>0.05 NS**
		2.1%	82.5%	15.4%	100.00%	
	Teacher	2	42	8	52	
		3.8%	80.8%	15.4%	100.0%	
	Office working	0	8	2	10	
		0%	80%	20%	100%	

Discussion

The mean birth weight was (3288.3±464), the median was (3100 g), minimum BW was (2000g) and the maximum was (4000 g), and that percentage of low birth weight was (2.4%), macrosomia (15.6%) and normal birth weight was (82%). This also comparable to Adiba M Murad *et al* [5] (2013) who found that the mean birth weight of SGA cases was (2000 ± 258.2g) (Range 1650g-2480g), and the mean birth weight of appropriate for gestational age fetuses was 3168 ± 556.4g (Range 2600-4500g). [5]

This study showed that the birth weight distribution according to mother age show that those aged < 25 years (2.7%) of their babies were LBW, and (18%) were ≥4000 g, while those aged ≥35 years none of their babies were low birth weight and (16.7%) were ≥4000 g. This finding agrees with previous studies that found increased low birth weight among younger mothers like Makki [6] study (2002), and Jisuk B. *et al* [7] (2011), (16.6%) and (3.77%) respectively. Adiba M Murad *et al* [5] (2013) found that mothers whose age ≤16 year were 2.1 time at risk to get small for gestational age.

This study showed that most of women living in rural area had higher percentage of low birth weight (6.5%), Similar results have been found in other studies, Rezende Chrisman J et al [8], and Kayode GA et al [9], while it disagrees with Adiba M Murad *et al* [5] (2013) who found that the a rural area had no impact to get SGA (47%), probably explained by the small studied sample. The increased percentage of low birth weight in rural areas may be explained by lack of health services, antenatal care, and low socioeconomic status, and poverty in rural areas.

This study showed that the LBW was higher among prime para (3.4%), than multipara women (1.7%). This study also shows that the LBW was higher among 1st and 2nd birth order (3.4%), (6.7%) respectively while it was (0%) among the 3rd baby order. This agrees with Adiba M Murad *et al* (2013) found that primiparous mothers showed 3.47-time risk to get SGA. [5] The primipara mothers were at high risk for LBW births, and this goes in accordance with Makki AW (2002) [6], and Swamy, G. K et al [10] (2012) the explanation for this is that multiparous women know more about how to deal with their pregnancy and aware of previous dangerous pregnancy complications.

Another explanation is that women having a third birth in their early 30s compared with their early 20s are more likely to have adequate spacing between births. (The older women are also

more likely to have achieved a more stable financial status.) As a result, both the maternal age component and parity component exert a positive influence on birthweight.[10]

This study showed that regular ANC visits protective against LBW, and 5(6%) of those with irregular visits had LBW baby, and 26 (21.5%) of women with regular ANC visits give birth to baby with birth weight >4000g, while 6(7.1%) of those with irregular visits give birth to baby with birth weight >4000g , this agrees with Adiba M Murad *et al* [5] (2013) who found that mothers with irregular antenatal care (ANC) showed 5.532 time risk to get SGA. and in agreement with that of Hameed N *et al* (2011), [11] The mothers not attended ANC had (41%) SGA birth, and (16%) of those with adequate birth weight. Kayode GA et al [12] (2014), Tellapragada C et al [13] (2016) and - Mahmud RA *et al* [3] (2017) find the same results, Specifically, in women who failed to receive any ANC or had inadequate ANC than recommended, the risk of LBW was higher than in women attending the standard number of ANC visits.

The explanation is related to fact that adequate regular ANC may identify problems early, allowing treatment that may reduce risk of SGA newborns.

This study showed that the (4.8%) of women with previous history of LBW had babies with LBW, in comparison to (2.2%) of those who didn't have any history of LBW. Also found that LBW was higher among 1st and 2nd birth order (3.4%), (6.7%) respectively while it was (0%) among the 3rd baby order, this relation was statistically significant (p value> 0.05). this goes in accordance with Adiba M Murad *et al* (2013) found that Mothers with family history of SGA showed 17.471-time risk to get SGA newborn. [5]

Other studies reported that mothers with family history of SGA have strong risk of a newborn with SGA, this is compatible with Hameed N *et al* (2011) found that (24%) &(15.474) times risk to get SGA births in mothers with previous maternal history of SGA births in comparison with adequate weight group only (2%) had positive family history [11], Tsukamoto M. *et al* (2007) [14] Momeni M *et al* [15] (2017) and Bener A *et al* (2013) [16] support our findings and may related to genetic factors as consanguineous rather than nonconsanguineous was considered as risk factor for LBW by Momeni M et al [15] (2017) and Bener A et al [16].

This study revealed that the previous history of DM was not associated with LBW. This result agrees with Hameed N *et al* [11] (2011) show no significant association, and Zhu WW *et*

al [17] found relation of diabetes mellitus with macrosomia. Usta A *et al* [18] found that macrosomia represented 8.6% of babies born for mothers with gestational diabetes.

This study revealed that those with history of HT more prone to had babies with LBW (4%), this agrees with other studies that revealed that mothers with history of hypertension show increasing association with SGA, a finding supported by Hameed N *et al*(2011) [11] found that 27% of the babies born small for gestational age their mothers had hypertension with OR of 8.87, and Sehested LT and Pedersen P[19] and Sharma D et al [20] found that gestational hyper tension and history of chronic hypertension associated with increased risk of low birth weight.

Studying the pathophysiology of IUGR reveals those maternal disorders like preeclampsia, eclampsia, and chronic hypertension lead to IUGR by causing uteroplacental insufficiency. Due to decreased oxygenation of tissues, the organ growth and muscular maturation is impaired. Preeclampsia can cause placental infarction that disturbs the provision of nutrients and leads to IUGR, and poor placental flow and hence poor oxygenation of tissues cause restricted fetal growth.[21]

This study showed that those with history of iron deficiency anemia more prone to had babies with LBW (3.1%), versus those without history of iron deficiency anemia (1.3%). This agrees with other studies that revealed mothers with history of anemia show increasing risk of having SGA babies, a similar finding obtained by Hameed N *et al* (2011) [11] found Anemia contributed to about (43%) of SGA newborns, while it was (12%) in adequate weight newborns and goes with - Khan I *et al* [22] found maternal anemia have 5.4 times risk of getting LBW. This might be due to the fact that anemia may limit the amount of oxygen available for placental exchange.

Conclusion

1. The mean birth weight was (3288.3±464), median was (3100 g), minimum BW was (2000g) and the maximum was (4000 g).
2. The percentage of low birth weight was (2%), macrosomia (16%) and normal birth weight was (82%).
3. The current study show that the BW increased with increasing age, and parity of mother, birth order of the baby.
4. Risk factors of low birth weight include living in rural area, low educational level associated, previous history of LBW, history of hypertension, anemia and.

5. Mothers with ferrous sulfate, multivitamins, folic acid supplements, and calcium supplements had lower proportion LBW babies.

Those with regular antenatal care visits had lower proportion of babies with LBW, versus those with irregular antenatal care visits.

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