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ORIGINAL ARTICLE

Relationship between Birthweight of Newborns and Nutritional status of Pregnant women in Maternal Teaching Hospitals in Mosul City

JWAN MOHAMMAD HASSAN[1], SALWA HAZIM ALMUKHTAR[2]
[1-2]Department of Clinical Nursing Sciences, College of Nursing, University of Mosul, Mosul City, Nineveh, Iraq
Correspondence to: Jwan Mohammad Hassan, Email: nursing@uomosul.edu.iq

ABSTRACT

Objective: The aims of the study are to compare the impact of a mother's maternal nutritional status during her pregnancy on baby's birth weight.

Methodology: The present study was done conducted from 1st November 2019 to 1st March 2020, including 150 pregnant women in antenatal care at the departments of Obstetrics and Gynecology in two maternal hospitals in Mosul city. The assessment of the nutritional status of all antenatal mothers was done by interrogation with a pretested structured questionnaire. Hemoglobin level was determined in a laboratory, determine BMI and gestational weight gain. All the mothers were followed till the term for pregnancy outcome particularly for baby weight. Statistical Package for the Social Science (SPSS, version 25) is used for data analysis.

Results: In present study, mostly, 50(33.3%) of the women belonged to the maternal age group of 25-30 years followed by 45(30.0%) woman who are between >30 years of age. Majority of the mothers have primary education 73(48.7%) who belong to socio economic class II and (90.0%) are house wives by occupation. Distribution of parity reveales that maximum cases are multipara 78 (52.0%).There are 43(28.7%) of infants born with <2500gm. In the present study, statistical analysis of the study variables shows that there are significant differences between gestational weight gain and birthweight which are mean±SD of weight gain during 2nd trimester (3.29±3.68) and 3rd trimester (3.97±4.51). But no significant during 1st trimester. Maternal pre-pregnancy BMI significant correlation with BW at P = 0.005, and significantly association between Hb% level and birthweight at P=0.000 during three trimester.

Recommendations: Community-based research is needed to evaluate the prevalence and common anaemia predictors, as well as the forms of anemia based on red blood cell morphology in pregnant women's population. It will help to organize health care programs, minimize maternal morbidity and mortality, and contribute to improving women's well-being in society at large.

INTRODUCTION

Fetal development is influenced by the mother's nutrition and metabolism, which in turn affects the newborn's weight at delivery(1) . As the mother's dietary requirements rise, lean tissue and fat are diverted toward the fetus's development as the pregnancy advances.(2) Nutritional intake by the mother and tissue expansion control fetal development. Pregnancy dietary requirements and changes in body structure may be impacted by the mother's age; adolescents have additional food requirements to promote upright growth and pubertal development. (3) Adequate nutrition intake during pregnancy has the potential to benefit both the mother and her child's nutritional condition. The major cause of protein-energy malnutrition during pregnancy is an inadequate intake of nutrients, which leads in malnourishment.(4) Mother malnourishment may be exacerbated by a lack of food and poverty, resulting in long-term health consequences for both the mother and her child.(5) LBW, stillbirth, and newborn death are all increased by maternal malnourishment. When a woman gets pregnant, her body's tissues and fluids expand to accommodate the growing fetus(6). Pregnant women with poor nutritional status are more likely to suffer from anemia, which may lead to premature delivery, postpartum hemorrhage, and retarded fetal development, which can lead to a smaller baby at birth. Men make up 20.2% of the population, whereas mothers make up 22.9%, according to the National Family Health Suevey-4. A report from the MOHFW in 2016 stated:

The Study's Specific Objectives: The study's precise goals are as follows:

To examine the association between pregnant women's nutritional health and their socio-economic position.

To figure out the typical weight increase for pregnant women.

MATERIAL AND METHODS

Between January 11th, 2019, and January 3rd, 2020, researchers from the Maternity Teaching Hospitals in Mosul, Iraq, performed a cross-sectional study on (150) pregnant patients. The prenatal clinics of AL-Khansa and AL-Batool, two Mosul City, Iraq, Maternity Teaching Hospitals, conducted this research. The data was taken between November 4th, 2019 and February 26th, 2020. As a way for researchers to gather data and information about the study concepts, questionnaires are widely used in scientific research, particularly in educational and social contexts. These contexts include identifying the study populations' directions, exploring their behaviors, and discovering important information and objectives that aid the researcher in carrying out scientific research. Data on participant characteristics, such as age, educational level, residency, job, husband job, family socio-economic status, and obstetric history, ANC visits, iron and folic acid (IFA) supplementation, health state of the existing pregnancy, knowledge of causes and complications of anemia, and nutritional status were gathered using a pre-tested semi-structured questionnaire based on face-to-face interviews.

Socio-Demographic Information: There are a total of eight pieces of information on this form, including the person's age, place of residence, degree of education, employment, and financial standing, as well as the total number of rooms and family members. When it comes to the history of obstetrics, there are 13 elements that concentrate on the age of menarche; marriage; first pregnancy; abortion; birth space; food conditions while current pregnancy; issues; and ANC visits throughout each trimester. Part 2: Obstetrics History is comprised of (13). Analyses of the human body are the focus of this chapter.

The participant's weight and height are also utilized as indicators of BMI, which may be used to track changes in weight following pregnancy. " Pregnant women's weight and hemoglobin levels are recorded on the first visit. Maternal health records in the ANC were used to identify the pregnant women's first and second trimesters (Appendix D). Pregnancy weight and hemoglobin levels were measured from around the third trimester onwards.

Body Mass Index (BMI): Place the Mother Anthropometry Form (MAT7) on a clipboard next to the scale for fast and simple data entry. The scale will show "active" after you step gently on it and the digital display confirms it. Set the scale to weigh in kilos if necessary. Before beginning the weight measurement, the display should say "0.00 kg." Ask the mother to wear little clothing and to maintain it in a light cotton for delicate

1: Weight: At the side of the scale, either stand or kneel. To begin, have the participant place their foot in the middle of the scale. Take care not to walk on the "kg/lb" button or the display panel. Stand as

motionless as possible with your feet together and your hands at your side. If the participant touches something, he or she should keep their eyes focused on the task at hand. A single reading should appear on the display panel. » In a quiet, audible voice, read and shout out the weight. In the C section. On the Mother Anthropometry form, enter the weight in kilos to two decimal places (MAT7).

2: Height: The height of each woman is measured in the metric system, using Jelliffe's suggested standard procedure. The respondents' heights were measured using a stadio meter (a measuring rod) with a precision of 0.1 cm. It was necessary for the individual to stand with their feet parallel to the ground and the measuring rod touching their heels, buttocks, shoulders, and occiput, with their hands hanging at their sides.

A person's Body Mass Index (BMI) is calculated by dividing their weight in kilograms by their height in meters (kg/m2). Adults' nutritional condition is gauged by their body mass index (BMI).

Part 4: Measuring Hemoglobin: The heamoglobin concentration in blood was measured using the haematology analyzer Abbott Cell-Dyn Ruby (Temecula, California, USA) as the standard reference procedure for this investigation. The Cell-Dyn Ruby haematology analyzer is completely automated. Nurses with the proper training drew 2 cc of venous blood into an EDTA tube containing K2-EDTA (an anticoagulant) and transported it to the laboratory for Hb testing. Conveniently transporting the blood sample vials into the Mixing system (KARL KOLB). A cyanide-free chemical technique was employed to lyse hemoglobin-producing erythrocytes in the Abbott machine after the sample had been transported. Lysing was finished, and the amount of absorbance detected was directly related to the concentration of Hb. In grams/deciliter, Hb was directly measured. There are five sections in this section devoted to the history of one's diet, with particular attention paid to the kind of foods consumed and the frequency with which they were consumed.

Table 1: Distribution of Obstetrics History of Pregnant Women

Variables		F.	%
<18 Year	Age of menarche	150	100.0
<18 Year	Age of marriage	50	33.3
19-24 Year		88	58.7
25-30 Year		12	8.0
>30 Year		0	0
<18 Year	Age of first pregnancy	21	14.0
19-24 Year		107	71.3
25-30 Year		22	14.7
>30 Year		0	0
< 4	Gravida	50	33.4
≥ 4		100	66.6
First	Para	28	18.7
Second		78	52.0
Three or more		44	29.3
Yes	Abortion	32	21.3
No		118	78.7
First pregnancy	Pregnancy interval	27	18.0
< 2 years		92	61.3
≥ 2 years		31	20.7
< 4 times	ANC check-up	25	16.7
≥ 4 times		125	83.3
Yes	Obstetric Complications	57	38.0
No		93	62.0

Cultural and lifestyle habits of pregnant women are the subject of four articles in this section, which examine things like drinking tea or coffee or chocolate during pregnancy and smoking. Part 7: Record Review/Checklist: Includes pre-pregnancy weight, mother's height, newborn's birthweight, sex, and gestational age. Quantitative data were examined using SPSS version 25. All connected variables have descriptive statistics computed. Researchers used methodologies, ratios, frequencies and the mean and standard deviation of the data to conduct descriptive study. Pearson's odds ratio (OR) with 95% confidence intervals (CI) were used to determine whether the independent and dependent variables were related. P-value of 0.05 was used to denote statistical significance. Findings from a multivariate analysis were used to identify separate causes of anemia and LBW during pregnancy.

Table 2: Distribution of Birth Weight and Sex the Newborn

Birth weight	F.	%
<2500 gm LBW	43	28.7
2500-4000 gm Normal	95	63.3
>4000 gm Over	12	8.0
Birth sex		
Male	70	46.7
Female	80	53.3

Table 3: Relationship between Gestational Weight Gain and Birth weight of Infant among Pregnant women

Gestational Weight Gain (Kg)	Mean±S.D	Statistically Sign. P-value=0.01
First trimester	1.47±1.84	0.349
Second trimester	3.29±3.68	0.002
Third trimester	3.97±4.51	0.008

Table 4: Distribution of Sample Based on Maternal Pre-pregnancy BMI.

Pre-pregnancy BMI(kg/m^2)	Normal weight(N=150)			Sig.
	F.	%.	M±S.D	
Underweight (< 18.5 kg/m^2)	1	0.7	26.05±27.23	0.005
Normal-weight (18.5-24.9 kg/m^2)	47	31.3		
Overweight (25.0-29.9 kg/m^2)	73	48.7		
Obese (≥ 30.0 kg/m^2)	29	19.3		

DISCUSSION

We investigated in this study whether advanced maternal age was independently correlated with the risk of LBW or preterm delivery. (33.3 percent) of the population is between the ages of 25 and 30 years old, according to the study (Table 1).LBW is not associated with older maternal age, and preterm delivery suggests that there are unknown variables that influence the likelihood of LBW and premature delivery as well as the likelihood of giving birth at an older age. On-factors that vary amongst women include: The risk of unfavorable delivery outcomes and difficulties conceiving, which may lead to later pregnancies if unaddressed mother health features are only two such examples.(See Table 1 for further information.)The parents' socioeconomic and genetic backgrounds might also have a role. Another explanation is that nonobserved variables differ across siblings, which might account for the discrepancy. There may be a biological association between maternal age and birth outcomes that might be mitigated if older moms engage in better health behaviors (e.g., less drinking during pregnancy).As a result, older moms may obtain prenatal care earlier in the pregnancy and have greater access to therapy and monitoring to reduce the risks associated with delivering at an advanced maternal age. A hierarchical regression model was used on data from the National Longitudinal Youth Survey on 1,754 first births between 1979 and 1983 for women between the ages of 14 and 25 at the time of birth to determine social disadvantage, biological immaturity, and unhealthy habits during pregnancy in US teenagers. When compared to mother infants between the ages of 23 and 25, the birth weights of babies born to mothers aged 14-17, 18-19, and 20-23 were all 133, 54, and 88 grams smaller, respectively. Regression analysis shows that low birth weights among babies born to young mothers, especially those aged 14 to 17, are related to the social conditions in which they are raised. When poverty and minority status were taken into account, there were no maternal-age inequalities in birth weight (Strobino et al., 1995).During the years 1999-2003, researchers in North Carolina performed a cross-sectional study of all births in the state.A total of 510 288 singleton newborns between 28 and 42 weeks of

gestation were subjected to testing. Birth weight may be modeled using multivariable linear regression, which takes into account factors such as the mother's age and the birth order of her children. On-Hispanic black (NHB) women's birth weight (3166 g) was lower than that of non-Hispanic white (NHW) and Hispanic women (3409 g) (3348 g).Controlling for covariates, mother age was associated with an increase in birth weight up to the early 30s. For both NHW and NHB, maternal age 35+ years had a significant influence on birth weight, while only for Hispanic residents, age less than 25 years was shown to have a significant impact (P 0.0001).A study published in 2012 by Swamy et al. Teenage pregnancy was shown to be associated with decreased birth weight in comparison to pregnancies among women aged 21 to 30 in a Mumbai, India, peri-urban slum region research(7). A hospital in eastern Taiwan found that infants born to teenage moms had a little lower birth weight than kids born to adult mothers (19 percent vs. 9 percent respectively)According to Li and colleagues(8),It's been shown in several research that having a kid raises one's chances of having a bad reproductive result throughout puberty. Premature birth in the first two years following menarche is associated with a higher risk of bad birth outcomes among pregnant women who are still growing biologically, according to certain theories. Unplanned, undesired or found late pregnancies among teenagers may be a contributing cause. Selection bias may also arise because teens who become mothers are more likely to be underprivileged, undereducated or live in locations with restricted access to education and services than other teenagers than other teenagers are. Pregnant women had a lower level of education than the national average of 22 percent, with 48.7 percent having just completed kindergarten. A little over a thirteen percent of the population has completed high school or a university degree.15 of the respondents, or 10%, were government or private sector workers, whilst the bulk of 135, or 90%, were housewives (Table 4.1).Nearly two-thirds, or 56.7 percent, of pregnant women lived in metropolitan areas and 61.3 percent of pregnant women had a middle-income status.(See Table 1 for further information.)Improved prenatal care has been found to significantly lower the incidence of low birth weight (LBW) in underdeveloped nations.ANC accessibility, the frequency of ANC visits, and the ANC content are all included in standard ANC.(1-4).In order to detect abnormalities in newborns throughout critical phases of growth, ANC is the most crucial tool available. Because to the lack of resources, this is particularly true for women who reside in these places. Preventing LBW and other disorders that might affect the mother and the newborn are easier when they are caught early in the pregnancy. An association between fewer pregnancies ending in LBW babies and frequent prenatal care visits (7-10 visits) was discovered in this research. Table 2.Brazil revealed that at least seven visits to a pediatrician were protective in lowering the prevalence of LBW; no significant differences between women who got 4 or more visits and 1–3 visits were identified compared to moms who received less than seven visits in Nepal (1, 5).In order to decrease the number of perinatal fatalities and improve the quality of pregnancies, the most recent WHO guidelines call for at least four to eight interactions between a woman and a health care provider (6). A total of just five prenatal care visits are recommended by the China National Basic Public Health Service Regulation (7).In order to determine the appropriate number of ANC visits to LBW in Mosul, further information is required. the tables in section 4.2. Women who have a brief inter-pregnancy interval traditionally do not have enough time to recuperate and prepare for the pregnancy that follows. Preparedness for socioeconomic, cultural, psychological and physical bodies are all part of the equation (8).Birth interval has a significant impact on population growth and socioeconomic level in a community. As a result, the mother's health state may be maintained and her following pregnancy can be improved. (9).According to this research, women who had a short inter-pregnancy interval (SIPI) were more likely to have a premature birth and had a greater risk of maternal and neonatal complications (NIPI).

It's because SIPI women won't have enough time to recover from socioeconomic and cultural readiness and prepare for the second pregnancy.4.2 and 4.10, respectively) Babies born weighing less than 2500 grams were shown to be more likely to be in SIPI (51.2 percent) than NIPI in this study (Table 4.10). Other research in Qatar, the United Kingdom, and Tanzania have found this same conclusion (10-12).

SIPI women may have low birth weight owing to short birth intervals and low maternal weight increase as a consequence of inadequate maternal nutrition, which may lead to low birth weight (13, 14). This may be due to a decrease in the body's iron storage capacity and depletion of folate, which raises the risk of anemia in women. When it comes to unfavorable delivery outcomes, difficulties are well-known. In this research, 38.0 percent of the pregnant women had obstetric issues throughout this pregnancy, which is an extremely high risk factor for giving birth to an LBW or preterm child, as well.4.2 and 4.10, respectively) According to the prevalence of LBW and PTB, pregnant women with prenatal hemorrhage and hypertensive disorders were more likely to give birth to LBW and preterm newborns. Women who have had an antepartum hemorrhage are more likely to give birth to a baby with low birth weight (LBW). Studies in northern Tanzania (15) and Colorado, the United States, have shown the same thing (16).50% of all pregnancies complicated by placenta abruption resulted in low birth weight (LBW).

Similar results have been reported elsewhere in the past (17). Researchers have also shown that antepartum bleeding increases the chance of preterm labor, which supports our results. Due to poor placenta implantation in the lower portion of the uterine cavity, fetal nutritional deficiency and growth limitation may occur during pregnancy (19). As a result, bleeding during pregnancy may be used to identify women who are at risk of having LBW and PTB children (18).

CONCLUSIONS

On the basis of the discussion of results and their interpretations, the present study concluded that: Most of maternal characteristics have significantly association positively with birth weight. The quality of maternal nutrition during pregnancy has an effect on birth weight. Educational level, residence, occupation and economic status are the most socio-demographical variables that were associated between maternal nutritional and birth weight.

Recommendations: Community-based research is needed to evaluate the prevalence and common anaemia predictors, as well as the forms of anemia based on red blood cell morphology in pregnant women's population. It will help to organize health care programs, minimize maternal morbidity and mortality, and contribute to improving women's well-being in society at large.

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