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Research Article

The Effect of the Body Mass of Pregnant Women on Anemia: A Comparative Study Between Pregnant Women Who Took Iron and Mothers Who Did Not Take it During Pregnancy

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Abstract

Background: During pregnancy, women are exposed to many psychological and physical changes and health problems and the most prominent thing they face is anemia or anemia caused by a lack of iron level in the body; Iron is the main component of hemoglobin that carries oxygen to the cells of the body and brain.

Research Problem: The research problem is focused on knowing the effect of a pregnant woman's body mass on poverty among pregnant mothers who took iron and mothers who did not take it during pregnancy.

Methods: Cross-sectional design was chosen to assess the effect of the body mass of pregnant women on anemia and a comparison between pregnant women who took iron and mothers who did not take it during pregnancy.

Objectives: The research seeks to achieve the following objectives to getting to know the effect of the body mass of pregnant women on anemia and identifying the difference between women who took iron in different forms and those who did not, in terms of the effect on body mass.

Results: The t-test of two independent samples for body mass with the mothers who took iron and the others who did not take iron. We find that the number of pregnant mothers who were given iron vitamins was 21 women with an average body mass index (BMI) of 26.5810 and a standard deviation of 5.4982, and we also find that the number of pregnant mothers who were not given iron vitamins were 12 women, with a mean body mass index (BMI) of 31.5250 and a standard deviation of 3.65914. We also find that the t-test value equals -2.790 and that the p-value equals 0.009 > 0.05 level of significance.

Conclusion: Through the results that were reached in the statistical analysis and discussion of the results, it was concluded that there is a statistically significant relationship between the use of iron vitamin and the body mass of the pregnant mother, as the iron vitamin is necessary for the mother during pregnancy. We also find that the mother's weight is linked to taking vitamins, which entails many problems that accompany the birth process and affect the fetus.

Keywords: *Iron; Anemia; BMI; Pregnancy*

Introduction

The research problem is focused on knowing the effect of a pregnant woman's body mass on poverty among pregnant mothers who took iron and mothers who did not take it during pregnancy. Through the study of Martina Mocking [2] found that Anemia is common among pregnant women, especially in low- and middle-income countries (LMICs). While body mass index (BMI) relates to many risk fac-

tors for anemia in pregnancy, little is known about the direct relation with anemia itself. This is particularly relevant in Southeast Asia and Sub-Saharan Africa where the prevalence of anemia in pregnancy and the associated adverse outcomes is among the highest worldwide.

As in the Martina Mocking [2] was found that a high BMI can cause damage to a woman's fertility by inhibiting the natural process of ovulation. Even in women who ovulate regularly, the higher the BMI, the longer it seems to be needed to get pregnant. Some researchers also point out that the higher the BMI, the greater the odds that *in vitro* fertilization will fail.

Body mass index (BMI) during pregnancy increases the risk of various pregnancy complications, including: Risk of spontaneous abortion, stillbirth and recurrent spontaneous abortion gestational diabetes Complications of pregnancy are also characterized by high blood pressure and signs of damage to another organ system, often the liver and kidneys (pre-eclampsia) as well as heart dysfunction with sleep apnea resulting in the need for a caesarean section and the risks of complications, such as wound infection and a high body mass index (BMI) during pregnancy is associated with an increased risk of various health problems for the baby, including: birth defects, a larger than average fetus (fetal macrosomia) and weakness growth and Pediatric asthma and childhood obesity [4].

Body mass index is a mathematical value that allows estimating the mass of the human body by taking into account weight and height. It was invented by the Belgian mathematician Adolphe Caetelleh in the mid-eighteenth century, who is considered one of the founders of modern statistics, so it is also called: the Caetelle index.

The BMI is calculated by dividing the weight in kilograms by the square of the height in meters as follows: BMI = Weight in kilograms/squared of height in meters.

Category	Body mass index - kg/m^2
Very severe deficiency	Less than 15
Acute shortage	15 to 16
Weight loss	16 to 18.5
normal weight	18.5 to 25
Increase in weight	25 to 30
Mild obesity (first degree obesity)	30 to 35
Moderate obesity (class II obesity)	35 to 40
Severe obesity (third degree obesity)	More than 40

Objectives of the Study

The research seeks to achieve the following objectives:

- Getting to know the effect of the body mass of pregnant women on anemia.
- Identifying the difference between women who took iron in different forms and those who did not, in terms of the effect on body mass.
- The study also seeks to identify the effects of not taking iron and increasing the weight of pregnant mothers and its effect on the fetus.

Research hypothesis

The study is based on the following assumptions:

1. There are statistically significant differences between the mothers who took the iron vitamin and the mothers who did not take the iron vitamin at the 0.05 level of significance.
2. There is a statistical relationship between weight gain and iron use with anemia.

Materials and Methods

Study design

In this study, a cross-sectional design was chosen to assess the effect of the body mass of pregnant women on anemia and a comparison between pregnant women who took iron and mothers who did not take it during pregnancy.

Where data were collected from the study sample of pregnant women from International medical center tertiary teaching hospital on Jeddah Saudi Arabia kingdom.

This is after obtaining the approval of the ethics of scientific research in the hospital.

Study fund

The study was carried out by the researchers, who incurred all the research costs at their own expense. The hospital also paid the expenses for providing data and information.

Sample/participants

The simple random sampling method was used, where the Stephen Sampson equation was applied, where the sample was taken from the community of mothers. International medical center tertiary teaching hospital on Jeddah Saudi Arabia kingdom.

The sample size was determined by 33 pregnant mothers.

Statistical methods used

The researcher used the statistical methods: Frequency and percentages to describe the study sample members' characteristics and determine their response to the main themes included in the study administration by percentage.

Weighted arithmetic mean

To find out the extent to which the responses of the study sample members increased or decreased to each of the main study phrases according to the questionnaire scale, and to arrange those phrases according to the highest weighted arithmetic average.

Arithmetic means (Mean)

To find out the extent of the increase or decrease in the responses of the study sample members on all the main axes according to (the averages of the phrases), and the arrangement of those axes according to the highest weighted arithmetic average.

Standard deviation

To measure the extent of deviation or dispersion in the responses of the study sample members to each of the study tool phrases (the questionnaire) and each of the axes it included from its arithmetic mean, as the closer the value of the standard deviation is to zero, the responses focus, and their dispersion decreases from the scale.

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality.

The chi-squared test is statistical hypothesis test that is valid to perform when the test statistic is chi-squared distributed under the null hypothesis, specifically Pearson's chi-squared test and variants. Pearson's chi-squared test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of contingency table.

In the standard applications of this test, the observations are classified into mutually exclusive classes if the null hypothesis that there are no differences between the types in the population is true (Chiang, C. L. 2013).

Reliability of the search tool

Validity of the study instrument: The researcher presented the study tool (the questionnaire) in its initial form to several academic referees to ensure its apparent reality, to explore their opinions about the clarity of the wording of each of its phrases, correct what should be corrected, and the suitability of each statement to the scale to which it belongs, and the extent of its appropriateness of each information to measure what was put for it, with the addition or deletion of what they see in terms of any of the axes, and in light of the arbitrators' directives, the researcher made the agreed-upon amendments and modified the wording of some of the paragraphs they proposed.

Cronbach reliability coefficient (Alpha): This parameter is used to determine the stability parameter of the study tool (the resolution) with the questionnaire statements. The researcher has selected 29 sample units for a pilot study to find the reliability of the Cronbach reliability coefficient (Alpha) found equal to 0.83; this result means that the questionnaire is valid and having good reliability.

Results

Table 1 show the general characteristics of the study subjects/pregnant women, where the sample size is equal 33 pregnant women with mean age 28 years old, and the minimum age is equal to 19 years and the maximum age is equal to 35 years the confidence interval (CI) for age is equal 26.5 - 29.68. For the body mass index (BMI) for the Pregnant women the mean is equal to 28.4 and standard deviation is 5.4, the confidence interval (CI) for age is equal 26.5 - 30.3. This indicates that there is an increase in weight for mothers in different age groups. For gestational age (GA) pregnant women with mean 38 week, and the minimum (GA) is equal to 36 week and the maximum (GA) is equal to 41 week confidence interval (CI) for (GA) is equal 38.3 - 39.3. For the Gravida pregnant women the mean is equal 1.6, and the minimum Gravida is equal to 1 week and the maximum Gravida is equal to 4, the confidence interval (CI) for Gravida is equal 1.26 - 1.90.

General characteristics	n	Mean ± SD	95% CI	Minimum value	Maximum value
Age (years)	33	28 ± 4.47	26.5 - 29.68	19	35
BMI (kg/m^2)	33	28.4 ± 5.4	26.5 - 30.3	20	48.6
GA	33	38.8 ± 1.4	38.3 - 39.3	36	41
Gravida	33	0.90 ± 1.6	1.26 - 1.90	1	4

Table 1: *General characteristics of the study subjects/pregnant women.*

Table 2 shows the t-test of two independent samples for body mass with the mothers who took iron and the others who did not take iron. We find that the number of pregnant mothers who were given iron vitamins was 21 women with an average body mass index (BMI) of 26.5810 and a standard deviation of 5.4982, and we also find that the number of pregnant mothers who were not given iron vitamins were 12 women, with a mean body mass index (BMI) of 31.5250 and a standard deviation of 3.65914. We also find that the t-test value equals -2.790 and that the p-value equals 0.009 > 0.05 level of significance, which indicates that there are significant differences Statistical significance between mothers who took iron and others who did not take iron in the body mass, where we find that mothers who took iron suffer from an increase in weight, while mothers who did not take iron suffer from mild obesity of the first degree.

Iron	N	Mean	Std. Deviation	df	T	p-value
Yes	21	26.5810	5.45982	30	-2.790	0.009
No	12	31.5250	3.65914			

Table 2: *A t-test of two independent samples shows a body mass with mothers who took iron and those who did not take iron.*

Figure 1 shows the relationship between iron and the body mass of pregnant mothers. Through the figure, we find that the pregnant mothers who did not take the iron vitamin had the highest body mass, while the pregnant mothers who took the iron vitamin had the lowest body mass, and we also found that the mothers who did not take the iron vitamin did not have any or at a normal weight.

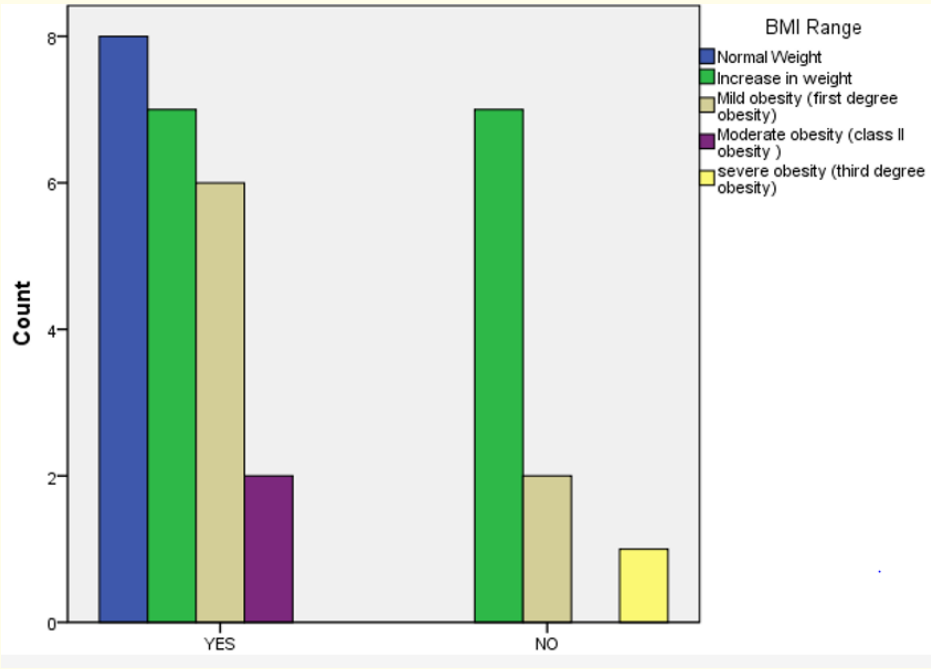

Figure 1: *Explains the relationship between iron and body mass for a pregnant women.*

Through table 3, we find that there is a statistically significant relationship between BMI Range and IRON, where the Chi square p-value is 0.040, which is less than 0.05, which means that the mothers who took the iron vitamin had less weight than the pregnant mothers who did not take the iron vitamin. Severe obesity (third degree obesity) is found only in mothers who did not take vitamin iron, and found that normal weight only in mothers who took vitamin iron [6].

BMI Range	Iron		Total
	Yes	No	
Normal Weight	8	0	8
Increase in weight	7	7	14
Mild obesity (first degree obesity)	4	4	8
Moderate obesity (class II obesity)	2	0	2
severe obesity (third degree obesity)	0	1	1
Total	21	12	33
Chi square p-value	0.040 < 0.05		

Table 3: *The relationship between body mass (BMI) range of pregnant women on anemia for pregnant women who took iron and mothers who did not take it during pregnancy.*

Discussion

Through the results of the statistical analysis, we find that pregnant mothers who have iron deficiency suffer from an increase in body weight mass, as we find that their BMI is higher than mothers who take iron vitamins, as we find that the number of pregnant mothers who were given iron vitamins was 21 women with an average body mass index (BMI) of 26.5810 and a standard deviation of 5.4982, and we also find that the number of pregnant mothers who were not given iron vitamins were 12 women, with a mean body mass index (BMI) of 31.5250 and a standard deviation of 3.65914. We also find that the t-test value equals -2.790 and that the p-value equals 0.009 > 0.05 level of significant. This results agreed with Martina Mocking [2] (2018) found that anaemia is common among pregnant women, especially in low- and middle-income countries (LMICs). While body mass index (BMI) relates to many risk factors for anaemia in pregnancy, little is known about the direct relation with anaemia itself [10]. This is particularly relevant in Southeast Asia and Sub-Saharan Africa where the prevalence of anaemia in pregnancy and the associated adverse outcomes is among the highest worldwide. The pregnant mothers who did not take the iron vitamin had the highest body mass, while the pregnant mothers who took the iron vitamin had the lowest body mass, and we also found that the mothers who did not take the iron vitamin did not have any or at a normal weight. This results agreed with See Ling Loy [1] where he found that the Iron deficiency is the most prevalent nutrient deficiency and the most common cause of anaemia worldwide. Because of the increased iron requirements during pregnancy, iron deficiency can lead to maternal anaemia and reduced newborn iron stores. We examined the proportion and risk factors of iron deficiency among pregnant women in a developed Asian country [11]. According to results the researcher found that there is a statistically significant relationship between BMI Range and IRON, where the Chi square p-value is 0.040, which is less than 0.05, which means that the mothers who took the iron vitamin had less weight than the pregnant mothers who did not take the iron vitamin. Severe obesity (third degree obesity) is found only in mothers who did not take vitamin iron, and found that normal weight only in mothers who took vitamin iron, this results agreed with Dev Ram [3,9] where he found At the end of the nutrition education intervention and iron rich food based diet plan, the change in hemoglobin level was significantly high in the intervention over control group [0.56 ± 0.40 gm/dl vs. 0.16 ± 0.82 gm/dl, p = 0.002]. The change in the maternal nutritional knowledge score on anemia and iron rich foods was significantly high in the intervention over control group [8.26 ± 4.57 vs. 1.05 ± 6.59, p < 0.001]. Consumption of iron rich food was significantly high in the intervention group (P < 0.05).

Conclusion

Through the results that were reached in the statistical analysis and discussion of the results, it was concluded that there is a statistically significant relationship between the use of iron vitamin and the body mass of the pregnant mother, as the iron vitamin is necessary for the mother during pregnancy. We also find that the mother's weight is linked to taking vitamins, which entails many problems that accompany the birth process and affect the fetus.

Iron plays an important role in the manufacture of hemoglobin, which is attributed to the fact that it is a protein found in red blood cells that carries oxygen and transports it from the blood to tissues. The pregnant woman is responsible for providing the fetus with oxygen. In the event of insufficient iron or not obtaining enough of it from iron-rich foods or through supplements, the woman will develop iron deficiency anemia [5,7,8].

Severe anemia or severe iron deficiency during pregnancy increases the risk of childbirth before the expected time, in addition to the birth of the child with a low birth weight, and postpartum depression for the mother, and some studies have indicated that it increases the risk of fetal death before birth or immediately after birth.

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