

Maternal and perinatal outcome in obese pregnant women in labour ward

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Abstract

Background and objective: Maternal obesity refers to a women obesity during pregnancy, it carries an increased risk of complications during pregnancy and childbirth. This study's major goal was to compare the maternal and perinatal outcomes of obese women to those of women with normal BMI.

Methods: A case control study was conducted on 400 delivering women, 200 of them obese women (case) and 200 will be pregnant women with normal BMI (control) at Maternity Teaching Hospital, Erbil city, Kurdistan Region, Iraq between 1st April 2021 to 1st April 2022 were recruited. Data were analyzed using the SPSS, version 25, to test statistical significance.

Results: No significant differences were detected between obese and normal weight women regarding the following maternal outcomes: mode of delivery ($P = 0.874$), medical complications ($P = 0.182$), and complications during pregnancy ($P > 0.05$). 39.5% of the normal weight women needed induction compared with 22% of the obese women ($P < 0.001$). The rate for augmentation of labor was 50% among obese women compared with 19% among the women with normal weight ($P < 0.001$). Incidence of postpartum hemorrhage was 33% among women of normal weight and 22.5% among those who were obese ($P = 0.019$). The commonest neonatal bad outcome was macrosomia baby (16.3%). It occurred in 19% of the neonates of the obese women and in 13.5% of the neonates of women with normal weight ($P = 0.080$). The rate of admission to the NICU was 38.3% in the whole sample (41% in the obese and 35.5% in the group of normal weight).

Conclusion: Pregnant women who were obese had a higher risk of delivery difficulties and neonatal intensive care unit hospitalization.

Keywords: Obesity; Pregnancy; Macrosomia; Induction of labour.

Introduction

The World Health Organization (WHO) has identified obesity as one of the most significant global health threats as a result of the rising incidence of obesity globally.⁽¹⁾ the pandemic is particularly severe among young individuals, including women who are fertile. Obesity during pregnancy enhances the risk of maternal and newborn morbidity and death on its own.⁽²⁾

Over the last 30 years, there has been an important rise in the prevalence of obesity.

⁽³⁾ This disease is now referred to as an "epidemic" and has repeatedly been linked

to detrimental health effects including metabolic disorders, cardiovascular disorders, the development of certain cancers, as well as psychological issues.⁽⁴⁾ A significant public health problem is the rising incidence of obesity, particularly among women of reproductive age.⁽⁵⁾ Obesity, which involves the buildup of intra-abdominal fat, causes a number of metabolic diseases.⁽⁶⁾ Pregnancy-related obesity has negative consequences on women's health since it raises the risk of pregnancy induced hypertension gestational diabetes, and preeclampsia.

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Birth weight increases along with an increase in mother obesity.⁽⁷⁾

This tendency has a significant influence on pregnancy outcomes, as has been well documented, in particular, obese women are more likely than women with a normal body mass index to have maternal fetal problems throughout pregnancy and delivery.⁽⁸⁾ Obese women are recognized to be at increased risk for prenatal, postpartum, intrapartum, and neonatal problems such as unexplained stillbirth, fetal macrosomia, premature delivery, cesarean section, venous thromboembolism, and gestational diabetes mellitus.⁽⁹⁾

Transient ischemic attacks, stroke, cardiac thromboembolism, myocardial infarction, biventricular heart failure, and aortic dissection are only a few of the cardiac problems associated with maternal obesity.⁽¹⁰⁾

Institute of Medicine (IOM) guidelines of 1990 categorized Body Mass Index (BMI) into 4 classes: Underweight which BMI less than 18.5 kg/m², normal weight which BMI 18.5 to 24.9 kg/m², overweight which BMI 25 to 29.9 kg/m², obese BMI equal and more than 30 kg/m².⁽¹¹⁾

According to the mother's pre-gravid BMI, the IOM announced updated recommendations for acceptable weight increase during pregnancy in 2009. IOM suggests a weight increase of 12.5–18 kg for women with a BMI of less than 18.5 kg/m², 11.5–16 kg for those with a BMI of 18.5–24.9 kg/m², 7.5–11.5 kg for those with a BMI of 25–29.9 kg/m², and 5–9 kg for those with a BMI of more than 30 kg/m².⁽¹²⁾

Maternal obesity is common growing problem in our society that frequently seen among patient attending Maternity Teaching Hospital, the majority of studies that were done on maternal obesity where health care system and culture are different from our community, data on the prevalence and factors that associated with maternal obesity in Maternity Teaching Hospital in Erbil city are necessary to provide baseline data, which could help in

the planning of interventions to improve the maternal and perinatal outcome in the country.

This study aims to find out the association demographic, anthropometric factors in obese women, and to compare the maternal and perinatal outcomes of obese women to those of women with normal BMI.

Methods

Study design and setting

This is cross sectional comparative study. This study was carried out at the labour ward of the Maternity Teaching Hospital (MTH) in Erbil city Kurdistan region, Iraq. The MTH is the only public maternity hospital in Erbil of Kurdistan region of Iraq. Women presented with labour pain to the labour ward were recruited from 1st of April 2021 to 1st of April 2022.

Study subjects and sampling procedure

Each pregnant woman consults an obstetrician upon her arrival. After which she was asked to meet the researcher. After gaining informed consent, all data about women was entered directly into a specifically created questionnaire.

All the pregnant women (obese and normal weight) who attended the labour ward MTH during the process of data collection when the researcher was available were involved in the research (a convenience sample). The total number of interviewed women was 215 obese pregnant women; 15 uncompleted questionnaires were discarded. Therefore, the total sample of obese women was 200. A suitably similar age range normal weight pregnant women, attending the labour ward, were selected as a control group (n=200).

The inclusion criteria for the cases included first-trimester pregnant women with BMIs under 30 kg/m², regardless of age or parity, who agreed to take part in the research are classified as the case group. Pregnant mothers who delivered singleton cephalic presentations and were between the ages of 18 and 40. The inclusion criteria for the controls were first-trimester

pregnant women with normal BMIs from 18.5 to 24.9 kg/m².

The exclusion criteria included: Antenatal women with BMI < 30 kg/m² and those who are not booked at first trimester or body mass index (BMI) recorded after 13 weeks of gestation are not included in the study. Only women were included in both research groups who had accurate information about their height and pre-pregnancy weight self-reported at the time of delivery admission. Weight in kilograms was divided by height in meters squared (kg/m²) to get body mass index (BMI). Women with pre-pregnancy obesity (BMI 30 kg/m²) and women with normal weights (BMI 18.5-24.9 kg/m²) were both included.

Other maternal factors include the mother's age, smoking status, educational level, parity, and pregnancy outcomes for obese and normal-weight mothers were compared. The gestational age at birth, the method of delivery (caesarean section delivery, instrumental vaginal delivery, normal vaginal delivery).

Interest-worthy maternal outcomes included the prevalence of cesarean sections, induction and augmentation of labor, gestational diabetes, preeclampsia, and gestational hypertension. Stillbirth, preterm delivery, gestational age at delivery, birthweight, and any potential hospitalization to the neonatal care unit were among the neonatal outcomes of interest (NCU). Early ultrasound results and the day of the last menstruation were used to determine the gestational age at birth.

A stillbirth was defined as a fetus dying at any point during pregnancy and giving birth after 24 weeks had passed. Regardless of gestational age, a fetus with macrosomia has a birth weight above 4 kg. (fetal birth weight is directly associated with gestational age so fetal weight 3 kg at 30 week considers macrosomia).

Immediately after birth, newborns were weighed in the nursery. Normal birth weight is baby born between 2.5 Kg-4 Kg. Preterm

labour (PTL) is the beginning of labour after 24 week and before to 37 weeks of pregnancy are those that occur between 24⁺⁰ and 36⁺⁶ weeks gestation. Premature rupture of membrane PROM (is a rupture of membrane before labour begin).

Placenta previa (placenta completely or partially covers the opening of the uterus (cervix). Heart conditions (aortic disease, strokes, peripheral arterial, and disease of coronary heart). Anemia is a condition when there are not enough red blood cells or there is not enough hemoglobin in them. Placental abruption (Before giving birth, the placenta separates from the uterus' inner wall). After 24 weeks of pregnancy, previously normotensive women were considered to have gestational hypertension if their blood pressure rose by more than 140 mmHg systolic or 90 mmHg diastolic, as measured on two separate occasions and taken 6 hours apart. When a woman had gestational hypertension and proteinuria ≥300 mg of protein in a 24-hour urine sample), preeclampsia was identified.

Based on a 2-hour plasma glucose level of ≥7.8 mmol per liter, GDM was diagnosed. When physical and pharmaceutical techniques failed to induce contractions of regular uterine and result in vaginal delivery, the induction of labour had failed.

Obstetrical complications: bringing on labour IOL (is the procedure of artificially inducing the uterus to begin contracting with the use of oxytocin and synthetic membrane rupture). Caesarean section (CS) is a surgical operation that involves making incisions in the abdomen and uterine walls to deliver the fetus.

Shoulder dystocia (is when one or both of a baby's shoulders get trapped within the mother's pelvis during labor, and it results in a birth injury). Postpartum hemorrhage PPH (severe vaginal bleeding after birth)

Ethical consideration

The research was approved by Professor Shahla Kareem Alalaf at Hawler Medical University and facilitation letter from the Directorate of Health of Erbil (DHO).

All patients will be told of the analysis prior to the consent the patient would be considered to have voluntary and anonymous involvement. The detail will be kept private and will not be used for any other reason.

Statistical analysis

Utilizing the Statistical Package for Social Sciences (SPSS, version 25), data were examined. To compare proportions, the chi square test of association was utilized. When the predicted frequency (value) of more than 20% of the table's cells was less than 5, Fisher's exact test was used. Statistical significance was defined as a *P*-value less than 0.05.

Results

Two hundred obese women and 200 women with normal body weight were included in the study. The mean age (SD) of the whole sample was 29.1, the median was 29 years, and the age range was 16 – 44 years. Table 1 clearly shows that

the majority of the sample (50%) was between the ages of 25 and 34, and that there was no appreciable variation in the age distribution across the groups (*P* = 0.667). Around half (48%) of the normal weight women were employed, compared with 36.5% of the obese women (*P* = 0.020). More than half (57%) of the normal weight women were of primary education, compared with 49.5% of the obese women (*P* = 0.006). A considerable proportion (23%) of the studied sample were smokers, but there was no significant difference in the smoking prevalence between the two groups (*P* = 0.096). Most of the women with normal weight (67.5%) were living in urban areas, compared with 49.5% of the obese women (*P* <0.001). Almost all of the pregnancies (98.5%) were full term, and there was no significant difference between the groups (*P* = 0.215). No significant (*P* = 0.345) difference was found between the groups regarding gravidity (Table 1)

Table 1 Maternal characteristics

	Controls No. (%)	Obese women No. (%)	Total No. (%)	<i>P</i> -value
Age (year)				
< 25	59 (29.5)	54 (27.0)	113 (28.3)	0.667**
25-34	97 (48.5)	106 (53.0)	203 (50.8)	
≥ 35	44 (22.0)	40 (20.0)	84 (21.0)	
Occupation				
Employed	96 (48.0)	73 (36.5)	169 (42.3)	0.020**
Housewife	104 (52.0)	127 (63.5)	231 (57.8)	
Educational level				
Primary	114 (57.0)	99 (49.5)	213 (53.3)	0.006*
Secondary	80 (40.0)	101 (50.5)	181 (45.3)	
Higher education	6 (3.0)	0 (0.0)	6 (1.5)	
Smoking				
Yes	53 (26.5)	39 (19.5)	92 (23.0)	0.096**
No	147 (73.5)	161 (80.5)	308 (77.0)	
Residency				
Urban	135 (67.5)	99 (49.5)	234 (58.5)	< 0.001**
Rural	65 (32.5)	101 (50.5)	166 (41.5)	
Gestational age (weeks)				
28-36	5 (2.5)	1 (0.5)	6 (1.5)	0.215*
37-41	195 (97.5)	199 (99.5)	394 (98.5)	
Parity				
Nulliparous	60 (30.0)	73 (36.5)	133 (33.3)	0.345**
Multi-parous (2-4)	135 (67.5)	121 (60.5)	256 (64.0)	
Grand-multiparous (≥ 5)	5 (2.5)	6 (3.0)	11 (2.8)	
Total	200 (100.0)	200 (100.0)	400 (100.0)	

*By Fisher's exact test. **By Chi square test.

No significant differences were detected between the two study groups regarding the following maternal outcomes: mode of delivery ($P = 0.874$), medical complications ($P = 0.182$), and complications during pregnancy ($P > 0.05$ for all the complications). It is evident in Table 2 that 39.5% of the normal weight women needed induction compared with 22% of the obese women ($P < 0.001$).

The rate for augmentation of labor was 50% among obese women compared with 19% among the normal weight women ($P < 0.001$). The postpartum hemorrhage incidence was 33% among normal weight women compared with 22.5% among the obese women ($P = 0.019$). The other complications were either rare or not significant, as presented in Table 2.

Table 2 Maternal outcomes

	Controls No. (%)	Obese women No. (%)	Total No. (%)	<i>P-value</i>
Mode of delivery				
Cesarean section	23 (11.5)	22 (11.0)	45 (11.3)	0.874**
Vaginal delivery	177 88.5)	178 (89.0)	355(88.8)	
Medical complications (n = 92 for normal and 81 for the obese)				
Hypertension	64 (69.6)	51 (63.0)	115 (66.5)	0.182*
Diabetes	27 (29.3)	25 (30.9)	52 (30.1)	
Heart disease	1 (1.1)	5 (6.2)	6 (3.5)	
Complications during pregnancy				
Gestational diabetes (GDM)	31 (15.5)	33 (16.5)	64 (16.0)	0.785**
Pregnancy induced HTN/ Gestational HTN	34 (17.0)	45 (22.5)	79 (19.8)	0.167**
Mild or severe preeclampsia	2 (1.0)	1 (0.5)	3 (0.8)	1.000*
Anemia	76 (38.0)	60 (30.0)	136 (34.0)	0.091**
Preterm delivery, spontaneous or induced	0 (0.0)	3 (1.5)	3 (0.8)	0.248*
PROM	8 (4.0)	15 (7.5)	23 (5.8)	0.197**
Placenta-previa	9 (4.5)	12 (6.0)	21 (5.3)	0.501**
Placental abruption	4 (2.0)	5 (2.5)	9 (2.3)	1.000*
Complications during labor				
Induction of labour	79 (39.5)	44 (22.0)	123(30.8)	< 0.001**
Meconium stained liquor	36(18.0)	26(13)	62(15.5)	0.167**
CS (emergency or elective)	9 (4.5)	0 (0.0)	9 (2.3)	0.004*
Failed induction of labor	3 (1.5)	11 (5.5)	14 (3.5)	0.030**
Augmentation of labor	38 (19.0)	100 (50.0)	138 (34.5)	< 0.001**
Shoulder Dystocia	3 (1.5)	0 (0.0)	3 (0.8)	0.248*
Postpartum hemorrhage	66 (33.0)	45 (22.5)	111(27.8)	0.019**
3rd or 4 th degree perineal tear	2 (1.0)	0 (0.0)	2 (0.5)	0.499*
Total	200 (100.0)	200 (100.0)	400 (100.0)	

*By Fisher's exact test. **By Chi square test. PROM (premature rupture of membrane), C/S (cesarean section).

It is evident in Table 3 that the commonest neonatal bad outcome was macrosomia baby (16.3%). It occurred in 19% of the neonates of the obese women and in 13.5% of the neonates of normal weight women ($P = 0.080$). The rate of admission to the NICU was 38.3% in the whole sample (41% in the obese and 35.5% in the normal weight group) but the difference was not significant ($P = 0.258$).

Discussion

In our research there was not any important differences between the groups regarding the age distribution. Around half (48%) of the normal weight women were employed, compared with 36.5% of the obese women. More than half (57%) of the normal weight women were of primary education, compared with 49.5% of the obese women. A considerable proportion (23%) of the studied sample were smokers, but there was no significant difference in the smoking prevalence between the two groups. More than two thirds (67.5%) of the normal weight women were living in urban areas, compared with 49.5% of the obese women.

There were not a significant difference between the two research groups regarding the following maternal outcomes: mode of

delivery (cesarean section, vaginal delivery), while compared to the controls, there were more instances that required cesarean sections.⁽¹³⁾

Regarding the medical complications (GDM and PIH) there was not a relationship between medical complications (GDM and PIH) and two groups, GDM was 15% in control group and 16% in cases, in comparison of a study relationship between maternal obesity and perinatal complications of pregnancy in India in which 16% of cases were GDM, 4% were controls.⁽¹³⁾

39.5% of the normal weight women needed induction compared with 22% of the obese women, it is opposite to the result of a study in India which induction of labour higher among cases.⁽¹⁴⁾ The rate for augmentation of labour was 50% among obese women compared with 19% among the normal weight women. The incidence of postpartum hemorrhage was 33% among normal weight women compared with 22.5% among the obese women.

There was significant association between obese women and macrosomia baby, 19% of obese women had macrosomia baby, compare to normal weight pregnant women about 13%, other research has shown a comparable greater frequency

Table 3 Neonatal outcomes

	Controls No. (%)	Obese women No. (%)	Total No. (%)	<i>P-value</i>
Neonatal outcome				
Normal birth weight	173 (86.5)	162 (81.0)	331 (82.8)	
Macrosomia baby	27 (13.5)	38 (19.0)	65 (16.3)	
Preterm birth	2 (1.0)	0 (0.0)	2 (0.5)	
Stillbirth	2 (1.0)	0 (0.0)	2 (0.5)	0.080*
Admission to NICU				
Yes	71 (35.5)	82 (41.0)	153 (38.3)	
No	129 (64.5)	118 (59.0)	247 (61.8)	0.258**
Total	200 (100.0)	200 (100.0)	400 (100.0)	

*By Fisher's exact test. **By Chi square test. NICU (neonatal intensive care unite)

of macrosomia.⁽¹⁴⁾

In the current investigation, it was discovered that more instances required NICU hospitalization to stabilize the newborn as compared to the control group (35% vs 41%).

Obesity should be regarded as abnormal, particularly during pregnancy. Obesity raises obstetric risks in a way that depends on BMI.⁽¹⁵⁾ In the shift from an overweight to an obese state, the risk of perinatal mortality more than doubles. A little amount of weight loss before pregnancy might have a big impact on the pregnancy's prognosis. The extra fetal and perinatal death would be susceptible to prevention since obesity is, at least theoretically, a preventable danger to pregnancy.⁽¹⁶⁾ The costs result from enhanced hospitalization of mothers, enhanced pregnancy screening at maternity clinics, excess preeclampsia cases, and enhanced cesarean section rates with chronic illnesses brought on by obesity with associated enhanced risks of dehiscence, wound infections, and anesthesia complications.⁽¹⁷⁾ The expense of treating newborns in neonatal critical care units for conditions such as maternal diabetes, birth hypoxia, and dystocia is another factor.¹⁸ Furthermore, it has been found that children of diabetic mothers are more likely to develop obesity and diabetes; this risk does not appear to go down with time but persists into adulthood.⁽¹⁹⁾

The findings of this research suggest that maternity care is provided too late to prevent overweight women from becoming pregnant.⁽²⁰⁾ Despite the fact that significant weight gain puts women at risk for obesity-related issues after giving birth. Therefore, it is important to take preventative actions with overweight teens before their first pregnancy, and antenatal care units should play a crucial function in identifying pregnant women who are at high risk for obesity in their subsequent pregnancies.⁽²⁰⁾ In order to decrease the number of obese mothers, earlier childbearing should be promoted.

The prognosis of these women's pregnancies would be significantly improved by even a little amount of weight reduction, as long as it is done with the goal of maintaining maternal weight below the obesity limit (BMI ≥ 30 kg/m²).

Conclusion

It is concluded from this study that complications during pregnancy and delivery are more likely to occur in obese pregnant women, and pregnancy obesity is a significant problem in Erbil, and most of the women there are unaware of their pre-pregnancy weights.

We recommend that obese pregnant women require meticulous prenatal, perinatal, and periconceptional care. It is crucial to encourage pregnant obese women to conduct routine weight checks, particularly prior to attempting to procreate.

Competing interests

The authors declare that they have no competing interests.

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