

Impact of Increased Maternal Body Mass Index on Pregnancy Outcomes

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ABSTRACT

Background: in the last decade, the prevalence of obesity has significantly increased in populations worldwide and becomes epidemic. Obesity has been documented by World Health Organization (WHO) as "a pandemic nutritional disorder. Egypt had the highest average Body Mass Index (BMI) and obesity in the world. **Aim of the Work:** evaluation of the possible effects of increased body mass index on pregnancy and measure its maternal, fetal and neonatal outcomes. **Patients and Methods:** the present study was approved from alazhar research ethical committee. The present study was carried out in Obstetrics and gynecology out-patient, Nasr city police hospital and El-hussien university hospital. Three hundred (300) pregnant women were included in the study; they were divided into 3 groups: Group I 150 pregnant women with normal weight (BMI = 18.5 – 24.9 kg/m²). Group II: 75 pregnant women who are overweight (BMI = 25 – 29.9 kg/m²). Group III: 75 pregnant women who are obese (BMI \geq 30 kg/m²). Groups were subjected to full history taking, clinical examination, obstetric palpation, ultrasound, investigations, antenatal care, post natal care and neonatal assessment. **Results:** statistical significant relationship between increased BMI and incidence of gestational hypertension, diabetes, postpartum hemorrhage and macrosomia. No Statistical significant relationship was found between increased BMI and incidence of cesarean rate, wound infection and intra uterine fetal retardation (IUGR). **Conclusion:** maternal obesity carries significant risks for the mother and fetus, including maternal outcomes as increased incidence of hypertension, gestational diabetes, cesarean rates, and postpartum hemorrhage. Fetal outcomes as macrosomia.

Keywords: Maternal Body Mass Index, Pregnancy Outcomes

INTRODUCTION

Egypt had the highest average Body Mass Index (BMI) and obesity in the world Obesity has been documented by World Health Organization (WHO) as "a pandemic nutritional disorder" ⁽¹⁾. Obesity is an increased body fats accumulation to an extent that affects the health negatively. It is defined as body mass index (BMI) equal or more than 30 kg/m² BMI is calculated as weight in kilograms divided by height in meters squared. 25-30kg/m² are considered overweight and those with BMI \geq 30 are considered obese ⁽²⁾. All the complications that occur in pregnancy are more likely with obese gravid when compared to women with normal body mass indices ⁽³⁾. Maternal obesity has many health implications with increased morbidity and mortality for both mother and fetus ⁽⁴⁾. According to the Confidential Enquiry into Maternal and Child Death obesity is associated with over half of the total maternal deaths ⁽⁵⁾.

AIM OF THE WORK

Evaluation of the possible effects of increased body mass index on pregnancy and measure its maternal, fetal and neonatal outcomes.

PATIENTS AND METHODS

The present study was carried out in Obstetrics and gynecology out-patient, Nasr city

police hospital and El-hussien university hospital. **The study was approved by the Ethics Board of Al-Azhar University.** Three hundred (300) pregnant women were included in the study; they were divided into 3 groups: Group I about 150 pregnant women with normal weight (BMI = 18.5 – 24.9 kg/m²). Group II: 75 pregnant women who are overweight (BMI = 25 – 29.9 kg/m²). Group III: 75 pregnant women who are obese (BMI \geq 30 kg/m²). **Patients: Inclusion criteria:** Pregnant women up to 40 weeks, Age ranged between 20 – 40 years, primigravidas. Their weights prior to 8 weeks gestation was estimated; either through her weight previously documented in her follow up card or from the patient's own words and recall with their pregestational BMI, Pregnancy of single viable fetus and Patients with no medical disorders as Diabetes, Hypertension, chronic heart diseases, thyroid dysfunction, chronic liver disease, adrenal dysfunction and renal failure. **Exclusion criteria:** Diabetes, Hypertension, chronic heart diseases, thyroid dysfunction, chronic liver disease, adrenal dysfunction and renal failure, Multiple pregnancy Multipara women, Cesarean section due to fetal distress or malpresentation, Pregnant women more than 40 weeks gestation, BMIs were not within the previously mentioned parameters or didn't know their pregestational weight and Age under 20 years

or over 40 years. **Patients included in this study were subjected to:** **1. Full History Taking Including:** Name, age, occupation, address, obstetric history, medical or operative history and 1st day of last menstrual period (LMP). **2. Clinical Examination:** General examination, Vital signs, Height (in cm) and weight (in kg) measurements and body mass index (BMI) were calculated at time of admission by using the Formula: **Weight in (kg) / Height in (meters) ²** **3. Obstetric palpation (Maneuvers of Leopold):** Fundal level, Fundal grip, Umbilical grip, First pelvic grip. **4. Ultrasound:** Biophysical Profile, number of fetuses, position of the placenta, gestational age, presentation, biparietal diameter, abdominal circumference, and femur length for assessment of normal growth, macrosomia and Intra uterine growth retardation. **5. Investigations:** Complete blood picture, Rh, blood group, urine analysis, fasting blood sugar. **6. Antenatal care:** Every 8 weeks up in first trimester, Every 4 weeks in second trimester, every 2 weeks up to 36 week and every week till labor. **7. Postnatal care:** Wound care, postpartum hemorrhage, periperium sepsis, lactational problems and contraception. **8. Outcomes:** The impact of obesity on maternal, fetal were compared between the three groups. Maternal → The incidence of gestational hypertension, gestational diabetes mellitus, cesarean delivery, postpartum hemorrhage and wound infection. Fetal → Intra uterine growth retardation and macrosomia.

RESULTS

There was a statistically significant relationship between increased body mass index and incidence of gestational hypertension (Table 1). There was statistically significant relationship between increased body mass index and incidence of gestational diabetes (Table 2). There was No statistical significant relationship between increased body mass index and cesarean rate (Table 3). There was a statistically significant relationship between increased body mass index and incidence of postpartum hemorrhage (Table 4). There was No statistically significant relationship between increased body mass index and incidence of wound infection (Table 5). There was statistically significant relationship between increased body mass index and incidence of macrosomia (Table 6). There was No statistically

difference between increased body mass index and incidence of IUGR (Table7).

Table (1): Incidence of gestational hypertension:

			Group			Total
			Normal	Overweight	Obese	
Gestational Hypertension	Yes	Count	10	45	65	120
		% within group	6.7%	60%	86.8%	40%
	No	Count	140	30	10	180
		% within group	93.3%	40%	13.3%	60%
Total		Count	150	75	75	300
		%	100%	100%	100%	100%

Table (2): Incidence of gestational diabetes mellitus:

			Group			Total
			Normal	Overweigh t	Obes e	
Gestationa l Diabetes	Ye s	count	30	65	70	165
		% withi n group	20%	86.7%	93.3 %	55%
	No	count	120	10	5	135
		% withi n group	80%	13.3%	6.7%	45%
Total		Count	150	75	75	300
		%	100%	100%	100 %	100 %

Table (3): Incidence of cesarean delivery:

			Group			Total
			Normal	Overweight	Obese	
Cesarean delivery	Yes	count	100	50	55	205
		% within group	66.7%	66.7%	73.3%	68.3%
	No	count	50	25	20	95
		% within group	33.3%	33.3%	26.6%	31.7%
Total		Count	150	75	75	300
		%	100%	100%	100%	100%

Table (4): Incidence of postpartum hemorrhage:

			Group			Total
			Normal	Overweight	Obese	
Postpartum hemorrhage	yes	Count	10	35	43	88
		% within group	6.7%	46.6%	57.3%	29.3%
	No	Count	140	40	32	212
		% within group	93.3%	53.4%	42.7%	70.7%
Total		Count	150	75	75	300

	%	100%	100%	100%	100%
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Table (5): Incidence of wound infection:

			Group			Total
			Normal	Overweight	Obese	
Wound infection	yes	Count	10	5	7	22
		% within group	6.7%	6.7%	9.3%	7.3%
	No	Count	140	70	68	278
		% within group	93.3%	93.3%	90.6%	92.6%
Total		Count	150	75	75	300
		%	100%	100%	100%	100%

Table (6): Incidence of macrosomia:

			Group			Total
			Normal	Overweight	Obese	
Macrosomia	yes	Count	5	55	67	127
		% within group	3.3%	73.3%	89.3%	42.3%
	No	Count	145	20	8	173
		% within group	96.6%	26.7%	10.7%	57.7%
Total		Count	150	75	75	300
		%	100%	100%	100%	100%

Table (7): Incidence of Intra uterine growth retardation (IUGR):

			Group			Total
			Normal	Overweight	Obese	
IUGR	yes	Count	1	3	2	6
		% within group	0.6%	4%	2.6%	2%
	No	Count	149	72	73	294
		% within group	99.4%	96%	97.3%	98%
Total		Count	150	75	75	300
		%	100%	100%	100%	100%

DISCUSSION

Obesity is a wide world health problem. The prevalence of obesity in adults was 65.0% ⁽⁶⁾. Many studies confirmed that obesity is associated with many complications as gestational diabetes, pregnancy induced hypertensive disorders, macrosomia, and stillbirth. The effect of obesity is more in nulliparous ⁽⁷⁾. **Regarding to other studies;** there was a strong association between increasing BMI and pregnancy induced hypertension. The systemic review of O'Brien showed that a high strong positive correlation between maternal pre- pregnancy BMI and the risk of developing pre-eclampsia ⁽⁸⁾. Our

results agree with the previous studies which have shown an association between increasing BMI and hypertension. We also found that 86.8 % of obese women and 60% of overweight women had gestational hypertensive disorders compared to 6.7% of the normal weight. According to gestational diabetes; a study documented that 17% of obese women compared to 6% of normal weight women, develop gestational diabetes mellitus within pregnancy ⁽⁹⁾. Our study is consistent with the previous study as we found that increased BMI leads to increase in the incidence of gestational diabetes (93.3% in the obese group, 86.7% in overweight group and 20% in normal weight group). Several researches have documented that obese have an 18 – 26% increased chance to deliver large-for-date babies, even after the control of maternal diabetes ⁽¹⁰⁾. There was a statistically significant direct relationship between obesity and incidence of macrosomia in our study. It was about 89.3% in obese group and 73.3% in over weight compared to 3.3% in normal weight group. As regard to IUGR it was lower in obese women in contrast to macrosomia which was much more common in obese group ⁽¹¹⁾. IUGR affected only 2% of all groups 2 cases in the obese (2.6%), 3 cases in overweight group (4%) and only one case (0.6%) in the normal weight group which means not statistically significant data. Pregnancy outcomes of obese excluding hypertensive disorders and diabetes mellitus showed significant association between obesity and cesarean section ⁽¹²⁾. In our study 68.3% of women were performed cesarean delivery, 73.3% in obese group and 66.7% in obese group and also 66.7 of normal weight group. Although the rates of cesarean sections were high, yet these results failed to show statistical significance difference due to elective cesarean deliveries by women desire. Our research showed no significant results as regard wound infection. These results agree with other studies who found no increased risk of uterine and wound infections ⁽¹³⁾. They speculated whether this difference could be due to the Practice of giving antibiotics prophylaxis at cesarean section. Other studies findings disagree with our results as increasing the maternal weight, the risk of wound infection increased ⁽¹⁴⁾.

CONCLUSION

Maternal obesity carries significant risks for the mother and fetus, including maternal outcomes as increased incidence of hypertension,

gestational diabetes, cesarean rates, and postpartum hemorrhage. Fetal outcomes as macrosomia.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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