Maternal obesity and its adverse impact on labor outcome

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Abstract:

Objective: to study the impact of maternal obesity on the outcome of labour. **Setting:** Al zahraa University hospital.**Design:** prospective randomized control study.**Patients:** a total of (80) pregnant women were included in this study from April 2009 to March 2010. **Patients and Methods:**According to the BMI the patients were classified into two groups. **Group (I):** (Control Group):Included (30) patients with (body mass index) (BMI) ranging from 20 to 25 kg/m^2.**Group (II):** (Obese Group): Included (50) patients with (BMI) ranging from 25 to 30kg/m^2. Each patient were subjected to full clinical examination (General) Abdominal and pelvic) U/S pelviabdominal examination that is to confirm the inclusion and exclusion criteria of the study. **Results :** A significant differences was noticed between 2 groups as regard the BMI. The current study showed significant difference in cases subjected to induction of labour with p-value < 0.001. Also significant difference between control group and obese group regarding failed induction, failure to progress 1st stage, 2nd stage, shoulder dystocia with p-value < 0.01.Case of C.S showed the highest significant diff. with P-value < 0.0001 .In the present study no sig. diff. between cases of both groups as regard 3rd stage complication, 4th stage (PPH) and blood transfusion with P-value 0.658, 0.684 and 0.658 respectively. A high significant diff. between the two groups as regard case of macrosomia, Apgar score < 7 1st minute, and birth injury with p-value < 0.01. A significant diff. were showed between the cases of both groups as regard the incubation with p-value > 0.05.No significant diff. were noticed between the 2 groups as regard the cases with Apgar score < 7 at 5 minutes with p-value 0.06. A positive correlation coefficient between the BMI (25-29), (29-33) kg/m^2 with the case of induction of labour, failure to progress 1st stage, shoulder dystoca, cesarean section and fetal low Apgar score. While a negative correlation was recorded between the BMI of the control group and all the adverse outcomes. **Conclusion:**Obesity of the gravid women is a sensitive predictor of the adverse outcome during pregnancy, labour, and post partum. Researches are needed into effective, applicable and acceptable community -based program for obese women planning a pregnancy.

Key words: Maternal obesity. labor

Introduction:

The World Health Organization (WHO) describes obesity as: one of the most blatantly visible, yet most neglected, public-health problems that threatens to overwhelm both more and less developed countries'. A recent study showed that 1 in 5 women booking for antenatal care in 2002-2004 were obese. The increased risk of complications in obese women during pregnancy and delivery coupled with the rising epidemic of obesity among women emphasise the need for the specialists involved in treating obese women to be aware of the risks and complications and their management . (Kanagalingam *et al* 2005) The obesity-related, adverse-pregnancy outcomes with a brief outline of the possible physiological mechanisms involved, followed by a discussion of the best practise in managing obese mothers from pregravid to postpartum and their effectiveness in reducing the risk of the obesity-related, adverse outcomes in pregnancy . (Castro *et al*., 2002) . The study of (Stekkinger *et al*.,2009) reported the effect of maternal obesity on pregnancy complications with minimal confounding bias. The study supports existing evidence that woman with a BMI > 30 kg/m^2 have a 1-2-fold higher risk of cesarean section. The researchers advocate that this may be an effect of the increased rate of large for gestational age infants leading to disproportion during labour .Controversy exists regarding maternal obesity as a risk

factor for shoulder dystocia. It has been argued this association could be related to the correlation of obesity with diabetes mellitus. A case control study by (Robinson *et al*.,2003) showed that the strongest predictors of shoulder dystocia are related to fetal macrosomia. Furthermore, they found that for obese non-diabetic women carrying fetuses whose weights are estimated to be within normal limits, there In tin Increased risk of shoulder dystocia. Therefore, for obese women, the predictors of shoulder dystocia are similar to those of non-obese women. (Sheiner *et al*.,2004). has shown that obese women tend to have higher rates of postpartum hemorrhage; the increased incidence of cesarean sections among obese women has been implicated as a causal factor. However, (Usha *et al*., 2005)showed the increased rate of cesarean section might not be the only factor influencing the blood loss in this group. Obese women who had a vaginal delivery had a greater than 500 ml blood loss compared to those with a BMI of 20-30 kg/m^2. In the study of (Heslehurst *et al*.,2010) proved that macrosomia has been associated with multiple factors, including maternal age and weight. However, increased maternal pre-pregnancy weight and decreased pre-pregnancy insulin sensitivity are strongly correlated with fetal growth, in particular fat mass at birth. During pregnancy, 2-10 kg of fat is stored in women's bodies. About 14-20% of women are unable to lose this weight, on average gaining 5 kg or more post-

pregnancy. However, in obese and overweight women, it remains to be determined whether reduced gestational weight gain can reduce the number of complications during pregnancy and delivery.

Aim of the work: This prospective study aiming to study the impact of maternal obesity on the outcome of labour (maternal and fetal).

Patients and Methods : This is a prospective study was conducted on a total of 80 pregnant women admitted at Al zahraa university Hospital for delivery from April 2009 to March 2010 .For each patient: Full history taking including age, parity, calculated gestational age, past hist. to exclude any disease could affect body weight. Full clinical examination. The clinical examination included :Blood pressure, chest, heart, abdominal examination for fundal level, Fundal Grip, and pelvic examination .According to the body mass index the patients were divided into two groups :**Group I:** included (30) patients with BMI <25 kg/m^2 and >20 kg /m^2 they served as control group.**Group II:** included (50) patients with BMI <30 kg/m^2 who served as study group.

Inclusion criteria: Single pregnancy - Cephalic presentation, Gestational Age at term - No previous Cesarean Section - Placenta fundal - Intact membrane .

Exclusion criteria:

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- Any disease could affect the maternal body weight (Hypertension, diabetes mellitus, etc……).
- Any factor could indicate C.S (malpresentation, placenta previa, previous C.S,etc…..).
- Any factor affect the progress of labour (malposition, inadequate pelvis,etc …..).
- For both groups of patients**:** The full history and clinical examination helping to confirm the inclusion and exclusion criteria also pelviabdominal U/S were performed for each patient. The BMI were calculated to classify the patients group according to its values.

Laboratory investigations:
- Blood sugar test.
- Complete blood picture.
- Blood group and RH-factor.

A partogram with electronic fetal monitoring were applied for each case during labour to study the progress of labour and to find out any protraction or failure to progress during 1st stage, 2nd stage, select the patient for C.S. The output of the study were tabulated and analysed statistically. They included. Induction of labour, failure to progress 1st stage, 2nd stage and 3rd stage complication (postpartum Hg).

The statistical analysis:
Data were collected coded and analysis using SPSS, both T test and person's correlation were applied. p-value $> 0.05 =$ non significant P-value $< 0.05 =$ significant p-value$<0.01=$Highly significant

Results:
Table (I): showed no significant difference between the 2 groups regarding age and parity. A significant difference was noticed between 2 groups as regard the BMI.

Table II: Showed significant difference in cases subjected to induction of labour (p < 0.001). Also significant increase in the control group than obese group as regard

failed induction, failure to progress 1st stage, 2nd stage and shoulder dystocia (p < 0.01).Cases of C.S showed significant increase in obese group when compared to control group(P < 0.0001).Also table II showed no sig. diff. between cases of both groups as regard 3rd stage complication, 4th stage (PPH) and blood transfusion with P-value 0.658, 0.684 and 0.658 respectively. Table III showed significant increase in the obese group than in control group as regard macrosomnia, Apgar score < 7 1st mm. and birth injury. (p < 0.01). A significant increase were showed in cases of obese group than control group as regard cases of incubation(p < 0.05). No significant diff. were noticed between the 2 groups as regard the cases with Apgar score < 7 at 5 minutes .Table IV showed a positive correlation between the BMI 25-29, 29-33 kg/m^2 with the cases of induction of labour, failure to progress 1st stage, shoulder dystocia, cesarean section and fetal low Apgar score. While Negative correlation was recorded between the BMI of the control group and all the previous items.

Table (I): Shows patients data in both groups (mean±S.D).

Item	Control G n=30	Obese G n=50	P value
Age	31.1±2.4	30.9±1.1	NS
Parity	2.1±1.1	2.2±1.3	NS
B.M.I	21.±1.2	29.1±0.8	H.S

p-value > 0.05 = non significant P-value < 0.05 = significant,
p-value <0.01 = Highly significant

Table (II): Shows comparison between adverse parturition outcome in both groups.

Item	Control G(N=30)	Obese G(N=50)	OR	95% CL	p-value
Induction of labour	8.7%	18.3%	2.3	2.1-2.6	0.001
Failed induction	1.6%	6%	4.0	3.2-4.9	0.01
Failure to progress(F.P) (1st stage)	5.9%	9.2%	1.6	1.3-1.9	0.01
(F.P)2nd stage	4.3%	8.1%	1.8	1.4-2.2	0.01
Shoulder dystocia	3.9%	7.8%	1.5	1.1-1.9	0.01
Cesarean section	7.2%	21.8%	3.2	2.7-3.7	0.0001
4th stage (PPH)	0.4%	0.6%	1.0	0.5-2.1	0.684
Blood transfusion	3.2%	4.0%	1.0	0.8-1.3	0.658

Table (III): Shows comparison between adverse fetal outcome in both groups.

Item	Control G(N=30)	Obese G(N=50)	OR	95% CL	p-value
Macrosomia	1.9%	5.2%	1.6	1.2-2.1	0.01
Apgar score < 7 1st minute	2.1%	6.9%	3.0	2.1-3.9	0.01
Apgar score <7 5 minute	1.9%	2.3%	1.3	0.9 -1.7	0.06
Incubation	0.9%	2.8%	1.4	1.1-1.7	0.05
Birth injury	1.7%	4.9%	1.8	1.3-2.3	0.01

P value < 0.05 S   ,   P. value < 0.01 H.S

Table (IV): Shows correlation coefficient of BMI to the adverse maternal and fetal outcome.

Item	BMI 25-29	BMI 29-33	Control G
Induction of labour	0.831**	0.652***	0.942*
1st stage failure to progress (FTP)	0.851**	0.683***	0.951*
2nd stage FTP	0.838**	0.654***	0.981*
Shoulder dystocia	0.633***	0.611***	0.982*
Cesarean section	0821**	0.815**	0.922*
Low apgar score	0.825**	0.638***	0.916*

* statistically non significant with - ve correlation.

*** statically significant with + ve correlation.

Discussion :

Nuthalapaty study proved that the Obese women have increased of labour induction by 1.1-2.2 fold. This finding is coincidence to the result of this current study which revealed a significant increase in cases of induction among obese pregnant women comparing to control group with (P-value < 0.001).Maternal obesity is an independent risk factor for CS this statement come in agreement with the outcome of the present study which showed a significant increase in cases of CS among obese group when compared with control group with(p-value < 0.001).Also IQ proved in their study that the CS rate for obese women was over 20% compared to nearer 10% for normal weight women.The study of Andreasen &Chauhan proved that pregnant women with BMI > $30kg/m^2$ have a 3 fold higher incidence in CS.This finding is also found in the present study which showed a statistical significant increase and positive correlation between the BMI over 25-33 and the rate of CS.In the present study there was a significant difference in the cases of shoulder dystocia for the obese group than in the control group with (p-value < 0.01). These findings were similar to the study of (Heslehurst *et al*., 2010) which concluded that shoulder dystocia complicated about 2.1% of obese mothers . Case report study by Baxley and Robinson, they found that for obese non diabetic mothers obesity is a predictor for

shoulder dystocia.This is coincidence with the outcome of the current study which found that the BMI > $30kg/m^2$ has a highly significant difference and appositive correlation with the shoulder dystocia.In support to the study of Watkins , Cedergren and Catalano they, found that obese patients have higher incidence of failure to progress during labour than non obese. This out put were similar to the results of the present study which staled that failure to progress during labour (1st stage and 2nd stage) were associated with obese group when compared to control group with (p-value <0.001).Nalhalapaty , Walker and Galtier contradict to the present study found no significant diff. between obese group and non obese (control group) as regard the post partum haemorhage.This finding could be explained by the difference in patients quality or delivery circumstances. Recently Abrams and Olson proved that the associated between low Apgar score for fetus of obese mothers are of high incidence this observations were in agreement with the output of the current study which revealed significantincrease in the (low Apgar score especially in the 1ˢminutes) in fetus of obese mothers when compared to control group with(p-value <0.01).

Conclusion: Obesity of the gravid women is a sensitive predictor of the adverse

outcome during pregnancy, labour, and post partum. Researches are needed into effective, applicable and acceptable community -based program for obese women planning a pregnancy.

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الملخص العربى
تأثير البدانة على الأمهات على نتائج الولادة وصحة الجنين

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تعتبر منظمة الصحة العالمية أن البدانة والسمنة أصبحت مرض مستقل بذاته دون أى مشاكل مرضية , كما أن هذا البحث الحالى قد أثبت أن البدانة فى الأمهات بدرجاتها المختلفة (متوسطة أو مفرطة) تؤثر تأثيراً سلبياً على الحمل وحالة الجنين , وقد أثبتت الدراسة الحالة أن الأم البدينة معرضه لمشاكل منها التحريض على الولادة والولادة القيصرية بنسبة مضاعفة للأمهات ذات الوزن الطبيعى , كما ان الأمهات البدينات يتعرضن للتعثر فى المراحل الأولى والثانية للولادة الطبيعية مقارنتاً ب الأمهات ذات الوزن الطبيعى , كما أنهن يتعرضن لمشاكل المرحلة الثالثة من الولادة (تأخر إنفصال المشيمة) , كما أظهر البحث الحالى أن الأمهات البدينات يتعرضن للنزف بعد الولادة أكثر من ذوات الوزن الطبيعى بمعدل إحصائى ملموس , وقد أسفرت نتائج هذا البحث أن حديثى الولادة للأمهات البدينات بتعرضون لمشاكل الولادة وبنسبة أكثر مشكلة إنحشار الكتف وبالإضافة إلى حصولهم على معدل درجات منخفض (معدل أبجار) لأقل من سبع درجات فى أول دقيقة بعد الولادة , كما أثبت البحث أن المعدل الإحصائى لإصابات الولادة للأطفال حديثى الولادة فى المجموعة المحتوية على الامهات البدينات أكثر من المجموعة المحتوية على الأمهات ذوات الوزن الطبيعى , وبذلك يلخص البحث طبقاً لما سبق أن بدانة الامهات تعرضهن إلى مشاكل خطيرة أثناء الولادة وما بعدها , كما ان أطفالهن يتعرضن لمخاطر جسيمة قد تؤثر سلبياً على صحة الأطفال فى المستقبل , ولذا ينوه البحث إلى تكاتف الجهود البحثية فى التدخل لإصلاح المشاكل الصحية للأمهات والإهتمام بتعليمهم قبل القدوم على حمل فى المستقبل .