EFFECTS OF OBESITY ON PREGNANCY AND ITS OUTCOME

Humaira Choudhry, *Abeera Choudhry, **Naila Azam, Shahida Jan

CMH Mailsi, *CMH Multan, **CMH Malir

ABSTRACT

Objective: The objective of study was to find out adverse effects of obesity on pregnancy.

Study Design: A case - control study comparing outcome of pregnancy in obese women with a control group of non obese.

Place and Duration of Study: Obstetrics unit of Military Hospital Rawalpindi from 20th December 2004 to March 2006.

Subjects and Materials: The study included 100 obese ladies with body mass index (BMI) 28-35 and 100 non obese ladies with BMI 18-25

Results: Pregnancy in obese women associated with increased risk of complications. These women had a higher frequency of pregnancy-induced hypertension (RR 1.75; 95% CI 1.08 – 2.81) and gestational diabetes mellitus (RR 3.0 ; 95% CI 1.13 – 7.94), a higher cesarean section rate (RR 1.78 ; 95% CI 1.91 – 2.67) , increase in postpartum hemorrhage (RR 3.50; 95% CI 1.19 – 10.27) and higher babies weight (RR 2.83; 95% CI 1.50 – 5.15).

Conclusion: This study concluded that obes woman were at high risk of antepartum, intrapartum and postpartum complications with an increased risk of operative delivery.

Keywords: Obese, Body mass index, Pregnancy Induced Hypertension

INTRODUCTION

Obesity is a significant health problem and the rate is growing rapidly [1] and has reached epidemic proportions in the developed and developing countries [2].

Maternal obesity is associated with increased risk of adverse pregnancy outcomes including gestational diabetes, pregnancy induced hypertension, cesarean section, infectious morbidity, post partum hemorrhage, delivery of large for dates babies and more recently still-birth [3]. Obese women are more prone to give birth to large for gestational age infants, which make them more prone to intrapartum complications [4].

Moreover; in obese women it is difficult to assess fetal presentations and fetal growth in the conventional way i.e. by measuring the fundal height [5]. The aim of the study was to see how obesity adversely affects the outcome of pregnancy in terms of hypertension, diabetes, postpartum haemorrhage, fetal macrosomia and mode of delivery.

SUBJECT AND METHODS

This case control comparative study was conducted in the Gynecology and Obstetrics unit of Military Hospital Rawalpindi.

The study included 100 patients in each of obese and non obese groups. These patients reported to the gynecology and obstetrics out patient department of Military Hospital Rawalpindi between Dec 2004 to March 2006. These patients were booked either during their first trimester or till the 14th week of gestation. The data was colleted through convenient sampling.

Inclusion Criteria

- BMI 28-35 in obese group and BMI 18 – 25 in non obese group (at booking or till 14 weeks)
- Primigravidas 30%, remaining multigravidas
- Age between 20 -35 years
- Height more than 5 feet.

Exclusion Criteria

- Placenta praevia
- Known diabetics
- Known hypertensive
- Recurrent miscarriage
- Scarred uterus

Detailed history including patients profile, age, parity, gestation at first antenatal, the body mass index was calculated by the

Correspondence: Lt Col Abeera Choudhry, Classified Gynaecologist, Combined Military Hospital, Multan

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formula (BMI= weight (Kilograms)/Height (Meter^2)

History of other associated symptoms, were also noted. A detailed general and systemic examination was done and findings recorded. Blood pressure and weight were noted at each visit along with the fundal height and fetal presentation and the fetal heart rate. Ultrasonography was done thrice during the pregnancy for these patients but was repeated more often for high risk patients. Routine investigation included blood complete picture, routine urine examination, blood group and Rhesus factor and blood sugar random. Specific investigations for patients having different variables were undertaken. These are as follows. For fifty patients with pregnancy induced hypertension serum ALT, uric acid, creatinine along with coagulation profile were performed as often as indicated. For twenty patients with gestational diabetes mellitus, blood sugar profile with ultrasonography for fetal macrosomia and amniotic fluid index were done. Mode of delivery, blood loss at delivery and weight of newborn baby was noted.

Data Analysis

Data has been analyzed using SPSS version 10. Frequency and percentage were used to describe qualitative variables. Relative Risk (RR) and 95% confidence interval have been calculated.

RESULTS

Two hundred patients were included in this study 100 in each group. The patients included in the study in either arm were between 20 – 35 years to prevent factors like early age parity and late age complications (Fig.1&2). All of the patients generally belonged to the low socioeconomic class.

In each group 30% of patients were primigravida and 70% were multigravidas. (Fig.3)

The frequency of pregnancy induced hypertension and gestational diabetes mellitus was more in obese patients (Table 1 & 2).

Mode of delivery is given in Table 3 and

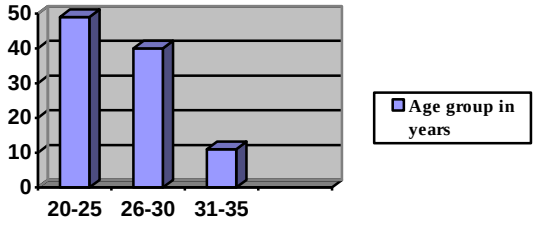

Fig.1: Graphic representation of the age distribution of obese patients (n= 100)

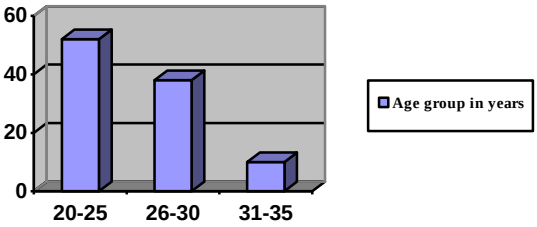

Fig.2: Graphic representation of the age distribution of non obese patients (n=100)

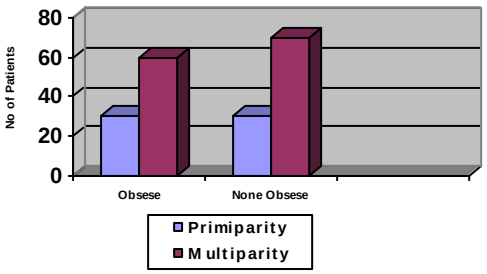

Fig.3: Parity distribution in both groups (n= 200)

Table 4 determines the extent to which obesity escalates the risk of postpartum haemorrhage. Obese women are more than twice as likely to have excessive haemorrhage in the third stage of labour.

Macrosomia is fetus weighing more than 4 kilograms (Table 5). Obesity was linked to risk of macrosomia.

The patients included in the study in either arm were between 20 – 35 years to prevent factors like early age parity and late age complications (Fig. 1 & 2).

DISCUSSION

The present study was aimed to test the hypothesis that obesity as determined by maternal BMI is associated with adverse out comes for mother and baby and to qualify the risk after allowing few possible confounding

factors. In this study BMI during first 1st 14 weeks of pregnancy was used as sensitive indicator of obesity. Weight gain in pregnancy could not bias results.

Some Swedish studies [5] have concentrated on excessive weight gain in pregnancy as a marker of obesity where as we used booking BMI in our inclusion criteria. Weight gain during pregnancy was disregarded.

The risk of development of preeclampsia were increase in those with raised BMI (RR=1.75, CI=1.08-2.81). This is important because reports on confidential enquiry into maternal death in UK show that pregnancy induced hypertension remains the commonest cause of maternal death. Thromboembolic disease was not considered in this study as the group under consideration was very small. Other studies used maternal mid arm circumference as a marker of obesity [6-8]. Almost similar results have been coded by AJ Roopnarinesingh [9], from Trinidal. Our results also verify that pregnancy induced hypertension is the principal medical complication in obese mothers. Findings of Sebire [10] show a lower trend in pregnancy induced hypertension but this large study only considered protein uric hypertension. In my study though pre-existing hypertension was part of exclusion criteria but majority of patients had no pre-pregnancy blood pressure record. Again 1/3 of the patients booked themselves in 2nd trimester and had no 1st trimester blood pressure record. This could have confounded the results. Most other

Table 1: Pregnancy induced hypertension (n = 200)

	Group		Total	Relative risk	95% confidence interval
	Obese	Non-obese			
No	65	80	150	1.75	1.08-2.81
Yes	35	20	50		
Total	100	100	200		

Table 2: Gestational diabetes mellitus (n = 200)

	Group		Total	Relative risk	95% confidence interval
	Obese	Non-obese			
No	85	95	180	3.00	1.33-7.941
Yes	15	5	20		
Total	100	100	200		

Table 3: Mode of delivery (n = 200)

	Group		Total	Relative risk	95% confidence interval
	Obese	Non-obese			
Operative	44	25	69	1.78	1.91-2.67
Spontaneous vaginal delivery	56	75	131		
Total	100	100	200		

Table 4: Post partum hemorrhage (n = 200)

	Group		Total	Relative risk	95% Confidence interval
	Obese	Non-obese			
No	86	96	182	3.50	1.19-10.27
Yes	14	4	18		
Total	100	100	200		

Table 5: Frequency of Macrosomia in two groups (n = 200)

	Group		Total	Relative risk	95% Confidence interval
	Obese	Non-obese			
Yes	34	12	46	2.83	1.56-5.15
No	66	88	154		
Total	100	100	200		

Key: GP: Group, RR: Relative risk, CI: Confidence Interval

studies11 report a much higher prevalence of preeclampsia and even eclampsia.

If a normal sized cuff is used for BP measurement in obese women false high reading will be obtained and large sized cuff should be demanded and used as in our study. In our study it was also noted that obese women required longer period of antenatal hospitalization due to pregnancy induced hypertension compared to lean women. Luckily in my prospective study none of the ladies in either arm developed eclampsia. One of the ladies in obese group but none in non obese group developed haemolytic anaemia, elevated liver enzymes and low platelet count (HELLP syndrome)

Overweight is a risk factor for carbohydrate intolerance in pregnancy. There is increased risk of gestational diabetes in obese group (RR=3.0, CI=1.133-7.41). Though even moderate overweight increases risk of gestational diabetes. In a study by Roopnariensingh [9] the difference in risk of gestational diabetes between obese and non obese was no statistically significant, but most other studies tend to show the same trend [11]. Screening for gestational diabetes in obese individual must be performed early and repeatedly throughout pregnancy. In obese, mothers it has been shown that insulin treatment during pregnancy does not increase maternal weight gain during pregnancy nor long term adiposity in off spring.

Along with obesity gestational diabetes macrosomia has been consistently reported by many researches to be associated features5, (RR=2.83, CI=1.56-5.15). Macrosomia increases need for obstetric intervention and consequent morbidity in mother and baby. However, In obese patients with macrosomia expected fetal weight is hard to determine either clinically or by ultrasound. Fat is a very poor conductor of ultrasound and expected fetal weight gives a fallacy of + 20% by either method. This fact was confirmed by our study as expected fetal weight calculated in macrosomic babies antenatally had significant deviation from actual weight of new born. One lady in the obese arm delivered a five kilogram baby whereas the expected fetal weight was placed around 4.2 kilograms. There was severe shoulder dystocia but fortunately the baby suffered no long term harm.

Because of high risk status of these patients and macrosomia more babies in the obese arm were sent to neonatal intensive care unit (NICU). This just goes to prove the great burden obesity puts on the care of the women and new born both. Later on, Presence of an obese adult in house hold quadruples the risk of obesity in children [12].

Obesity is associated with increased rates of caesarean section (RR=1.78, CI=1.91-2.67). Though it has not been proved in our study, in other studies it has been shown that prenatal control of obesity could reduce 10% of caesarean section. Obese women are also associated with high risk of post date pregnancy and induction of labor, though we did not assess these outcomes in our study. Higher risk of induction of labour leads to a cascade of events leads to higher rate of instrumental and operative delivery. Compared to non obese women both elective and emergency caesarean sections are higher [13]. The relevance of raised caesarean section rate in this group is considerable, because of increase risk of associated complication like infections morbidity. Increased risk of emergency caesarean could be due to sub optimal uterine contractility increased fat in soft tissue of pelvis and macrosomia. It was noted that despite senior staff involvement in caesarean section administration of spinal block took longer. The operation itself also took longer in obese patients and the post operative hospital stay in sectioned patients was again longer in obese arm.

Risk of wound infection is said to be higher in other studies [14]. In our study this issue was not assessed due to limited follow up and was not the aim of my study either.

Though our study did not address this issue there is also evidence of more traumatic delivery with higher risk of 3rd and 4th degree perineal tears [15].

Risk of postpartum hemorrhage in obese women has been shown to be consistently increased in all studies. Even after accounting for predisposing factors like caesarean section. In my study (RR=3.5, CI=1.19-10.27) obese women also have higher risk of blood transfusion from post partum haemorrhage. Not only was the risk of blood transfusion higher but amongst women who were transfused blood more units were transfused in obese arm. UK confidential inquiry into maternal deaths 1996 – 1999 has confirmed that triad of obesity, uterine atony and post partum hemorrhage (PPH) is associated with risk of dying. Thus my study confined that maternal obesity carries significant risk for mother and fetus. The risk persists even after accounting for confounding factors

CONCLUSION

It can be concluded from this study that obese pregnant women are at a greater risk of hypertension, gestation diabetes, post partum hemorrhaged, fetal macrosomia and also intrapartum complications causing increased risk of both emergency and elective operative delivery even after controlling for confounding factors.

Screening for gestational diabetes must be performed early to allow for efficient management. Once pregnant, the treatment options are limited to intensified obstetric surveillance.

Greater understanding is needed of the pathophysiological link between obesity and various adverse outcomes of pregnancy.

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