

FREQUENCY OF ADVERSE OBSTETRIC AND FETAL OUTCOME AMONG OVERWEIGHT AND OBESE WOMEN

Nadia Bokhari¹, Zartaj Hayat², Nosheen Akhtar³, Saadia Asmat⁴

¹⁻⁴ Department of Gynecology and Obstetrics, Fauji Foundation Hospital, Rawalpindi - Pakistan.

Address for correspondence:

Nadia Ahmad Bokhari

House No. 172, Street No. 12, Sector B, Phase 8, Bahria Town, Rawalpindi - Pakistan.

Email: nadia67bukhari@hotmail.co.uk

Date Received:

July 17, 2018

Date Revised:

May 31, 2019

Date Accepted:

June 10, 2019

ABSTRACT

Objective: To determine the frequency of adverse fetomaternal outcome in obese and overweight pregnant women.

Methodology: This cross sectional study was conducted in the Department of Obstetrics and Gynecology, Fauji Foundation Hospital, Rawalpindi from 1st October 2016 to 30th September 2017. Total 200 pregnant females with body mass index (BMI) >25 kg/m² and gestational age of up to 20 weeks were selected by convenience sampling. Patients were followed up for maternal antenatal, natal, postnatal and fetal complications. Hospital Medix TM was used for data collection.

Results: In our study, 20% of women were overweight, 30% were obese while 50% were morbidly obese. These women had high frequency of miscarriages (8.5%), gestational diabetes mellitus (33%), pregnancy induced hypertension (25%), preeclampsia (16%), eclampsia (2%), preterm delivery (18.5%) and post-date pregnancies (10.5%). The rate of induction of labour was 36.7% among these women. Instrumental delivery rate was 6.5%, while cesarean section rate was 38%. Postpartum hemorrhage was noted in 5.5%, while wound infection, endometritis and deep venous thrombosis (DVT) affected 7%, 2% and 0.5% respectively. Regarding fetal complications, congenital malformations were seen in 4%, intrauterine death in 4%, macrosomia 13%, shoulder dystocia in 2%, low birth weight in 5.5%, neonatal intensive care unit admissions in 21.5% and early neonatal death in 5.5%.

Conclusion: Obese and overweight pregnant women had increased frequency of maternal and fetal complications.

Key Words: Obesity, Body mass index, Fetomaternal outcome

This article may be cited as; Bokhari N, Hayat Z, Akhtar N, Asmat S. Frequency of adverse obstetric and fetal outcome among overweight and obese women. *J Post Grad Med Inst* 2019; 33(2): 140-5.

INTRODUCTION

The prevalence of obesity has increased over the past few decades and is considered as a global health problem now a days. BMI ≥ 30 kg/m² is defined as obesity¹. The overall world wide obesity rate is 15-20% and accounts for 2-7% of the health care cost. According to WHO, the prevalence of maternal obesity ranges from 1.8-25.3%.^{2,3} Maternal obesity is associated with poor pregnancy outcome and increased risk of antenatal, natal, post natal and neonatal complications^{4,5}. It is associated with an increased risk of first and second trimester miscarriage and congenital anomalies with two fold increased risk of open neural tube defects^{6,7}. Other defects include cardiovascular anomalies, facial clefts, hydrocephalus, omphalocele, diaphragmatic hernia and anal atresia⁸. Although the exact mechanism is unknown but one possibility may be underlying undiag-

nosed diabetes or insulin resistance which results in increased levels of triglycerides, uric acid, estrogen, insulin, various inflammatory, metabolic and prothrombotic agents released by excess adipose tissues^{7,8}.

Maternal obesity poses technical difficulty in ultrasound in determining nuchal translucency, fetal anomalies; and in later pregnancy, difficulty in visualizing fetal heart, liquor volume and growth parameters⁹. There is a 2-4 fold increased risk of developing pregnancy induced hypertension, pre-eclampsia and gestational diabetes in obese pregnant women¹⁰. There are complex mechanisms involved but development of insulin resistance, dyslipidemia, systemic micro-vascular dysfunction and low grade inflammation are considered important¹⁰. Other complications include increased risk of thromboembolic events and urinary tract infection in antenatal and postnatal period¹⁰.

Maternal obesity is associated with fetal macrosomia which means increased risk of shoulder dystocia, birth trauma and low APGAR score at birth and perinatal death¹¹. Various intrapartum complications in obese women include higher rates of induction of labour, failed induction, prolonged labour with three fold increased risk of failure of progress of first stage of labour and instrumental vaginal delivery. Cesarean section rates are much higher among obese women with two to three fold increased risk of emergency cesarean sections¹²⁻¹⁶. There is also increased risk of third and fourth degree perineal tears. Anesthesia complications include increased risk of failed epidural, difficulty in intubation, obtaining intravenous access, blood pressure monitoring and increased risk of aspiration pneumonia. During puerperium, obesity increases risk of primary postpartum hemorrhage (PPH), deep vein thrombosis (DVT), endometritis leading to secondary postpartum hemorrhage, wound infection and dehiscence and prolonged hospital stay¹⁷.

There is threefold increased risk of still birth probably due to fetoplacental dysfunction in fetus. There is increased risk of neonatal intensive care unit (NICU) admissions among infants of obese women¹⁸. The offsprings of obese women are more prone to childhood obesity, diabetes and hypertension later in life². Studies have shown that obesity is one of the leading causes of maternal mortality. The average cost of care is five times and duration of hospital stay is three to six fold higher in obese women¹⁹. This study will help to promote evidence based awareness among health care professionals and women of reproductive age regarding obesity in pregnancy, thus the importance of maintaining normal weight in women of reproductive age.

METHODOLOGY

This cross sectional study was carried out in Fauji Foundation Hospital, Rawalpindi from October 2016 to September 2017. A total of 200 pregnant women were selected by convenience sampling. Inclusion criteria were gravid women with BMI >25kg/m² with singleton pregnancy and gestational age up to 20 weeks. While women with multiple pregnancy, having booking visit after 20 weeks of gestation, with comorbidities like diabetes mellitus, hypertension, renal disease or systemic lupus erythematosus were excluded from the study.

All patients were evaluated by history, examination and routine investigations. The BMI was calculated on booking visit by trained health care professional. Patients were followed up till delivery. Any antenatal complication like pregnancy induced hypertension (PIH), gestational diabetes (GDM) and preeclampsia were entered in proforma. For PIH/pre-eclampsia blood pressure and urine dipstick was done on every visit as per NICE guidelines recommendation. Women with a blood pressure >140/90 on two occasions four hours apart were labelled as having PIH. Proteinuria >+1 on dipstick in a woman with BP of more than 140/90 was confirmed by 24 hours urine protein analysis. Women having >300mg proteinuria in 24 hours urine were diagnosed as preeclampsia. Any woman with preeclampsia who had fits was diagnosed as eclampsia.

All women had a routine oral glucose tolerance test (OGTT) around 24 to 28 weeks to diagnose GDM (fasting blood sugar (FBS) >5.6 mmol/l & 2 HR >7.8 mmol/l). The mode of delivery, Intrapartum and postpartum complications and fetal complications like intrauterine death (IUD), early neonatal death (ENND), macrosomia (birth weight >4.5kg), low birth weight (birth weight <2.5kg) and NICU admission were also recorded on a preformed proforma.

The data were analyzed using SPSS version 21 and chi square test was applied to determine association between BMI and maternal and fetal complications. Cross tabulation was done between BMI levels and obstetrics and fetal outcomes. Results were presented in frequencies and percentages in tables.

RESULTS

In this study, 200 pregnant patients with BMI ≥25 kg/m² were recruited. Frequency distribution according to BMI is shown in Table 1. Parity distribution of obese women was primigravida 24%, multigravida 47% and grand-multigravida 29%.

The different obstetric complications associated with obesity are listed in Table 2. The most common maternal complication among obese women was hypertensive disorders in pregnancy i.e. pregnancy induced hypertension, Pre-eclampsia and eclampsia affecting 44% of patients followed by gestational diabetes 33%, whereas 13% patient had both PIH and GDM.

Table 1: Frequency distribution according to BMI (n=200)

BMI	Frequency	Percentage
Overweight (25-29 kg/m ²)	40	20
Obese (30-34.9 kg/m ²)	60	30
Morbidly Obese (35-39.9 kg/m ²)	100	50

Table 2: Maternal antenatal complications according to BMI

BMI	Maternal antenatal complications							Total
	GDM	PIH	PE	GDM +PIH	Ecclampsia	UTI	Anemia	
Overweight	40	0	0	0	0	0	0	40
Obese	26	34	0	0	0	0	0	60
Morbidly Obese	0	17	33	26	4	7	13	100
Total	66	51	33	26	4	7	13	200

Table 3: Fetal complications according to BMI

BMI	Macro-somia	LBW	Mis-carriage	Con-genital Anoma-lies	IUD	ENND	Shoul-der Dysto-cia	NICU admis-sion	None	Total
Overweight	26	11	3	0	0	0	0	0	0	40
Obese	0	0	14	10	7	11	4	14	0	60
Morbidly Obese	0	0	0	0	0	0	0	29	71	100
Total	26	11	17	10	7	11	4	43	71	200

In this study, preterm delivery was seen in 18.5% of patients while 10.5% had postdates pregnancy. Regarding mode of delivery, 62% patients had vaginal delivery while 38% had cesarean delivery. Among those who delivered vaginally, 6.5% had instrumental delivery. Among those who were delivered by cesarean section, 15% had elective cesarean section while 23% had emergency cesarean sections. The rate of induction of labour was higher (36.7%) for various indications. Postnatal complications seen in our patients included primary PPH 5.5%, wound infection 7%, endometritis 2% and DVT 0.5%.

Details of fetal complications are listed in Table 3. The most common complication was fetal macrosomia followed by miscarriage.

When chi square test was applied to determine the correlation between BMI levels and obstetrics outcomes, p value was found <0.05 showing significant difference among them. Similarly chi square test for correlation between fetal complications and BMI showed positive association as p value was <0.05.

DISCUSSION

It was observed that maternal obesity is associated with poor obstetric outcomes and our results are consistent with other studies showing that increasing ma-

ternal BMI is associated with increased risk of developing GDM, PIH, pre-eclampsia, induction of labour, fetal macrosomia, congenital anomalies, intrauterine death, more frequent NICU admissions and increased cesarean section rate^{20,21}.

In this study 20% of gravid women were overweight, 30% were obese and 50% were morbidly obese. Similar results were found by Oteng-Ntim et al²² who showed that 24% women were overweight, 14% were obese and 55% were morbidly obese. In our study, 24% of women were primigravida, 47% were multigravida and 29% were grandmultigravida. Comparable results were shown by John et al²³ where 36% women were primigravida, 36% women were multigravida and 20% were grandmultigravida. Results contrary to this study were shown by Awan et al²⁴ where 17% were primigravida and 83% were multigravida. While study by Oteng-Ntim et al²² showed 62% primigravida, 35% multigravida and 2.2% were grandmultigravida.

The present study showed that most frequent antenatal complication among obese and overweight women was hypertensive disorders of pregnancy affecting 44% of patients, among which 25.5% had PIH and 16% had pre-eclampsia. This was followed by GDM affecting 33% of patients. In addition, 16% had both PIH and GDM. Similarly, Awan et al²⁴ in her study showed 44% had hypertensive disorders of pregnancy (PIH and

pre-eclampsia) while 32% had GDM. John et al²³ showed that 32% had GDM and 24% had PIH. Similar associations between maternal obesity and above mentioned complications have been shown in many studies²⁵⁻²⁸. In contrast to the results of this study, Gitana et al²⁶ found that 23% had GDM, 17.1% had PIH and 9.3% had pre-eclampsia. Blomberg et al²⁸ also reported a lower frequency of these disorders among obese women with GDM affecting 7.6-19.6% and preeclampsia affecting 13-17.5 % of patients. Hashmi et al²⁹ showed that frequency of PIH was 19% while that of GDM was 7.2% which is lower than that shown in our study.

In this study, preterm delivery was seen in 18.5% of patients while 10.5% had postdate pregnancy. Cesarean section rate was 38%. Induction of labour was done in 36.7%. Comparable results were shown by Bhattacharya et al² where 10-20.4% of women had preterm delivery and 6.6-7.3% had post term delivery. Induction of labour was done in 33-42% of patients. Cesarean section rate among obese women was 24-42%. However instrumental delivery was conducted in 24-48% of patients which is much higher than our study. Similarly, higher cesarean section rate was found in a study by Awan et al²⁴ showing cesarean section rate among obese women to be 44%; while Ngoga et al³⁰ showed 35% cesarean section rate among obese women. Similarly Hashmi et al²⁹ showed induction of labor rate to be 32% and CS rate to be 37%. John et al²³ showed induction of labour in 20% of women and CS in 38% of women. Another study by Gitana et al²⁵ showed that induction of labour was done in 30.8% of women while cesarean section in 42.8 % of women. Results contrary to our study were shown by Meenakshi et al³¹ where instrumental delivery rate was 23% and cesarean section rate was 52% which was much higher than our study. On the other hand, Oteng-Ntim et al²² showed cesarean section rate of 52% among obese women which was higher than our study.

Maternal obesity is also associated with postnatal complication as shown in our study where 5.5% had primary PPH, 7% had wound infection and 0.5% had DVT. Awan et al²⁴ showed that 5% had primary PPH and 3% had wound infection. Comparable results were shown by John et al²³ while Hashmi et al³⁰ showed that 0.9% had DVT. In contrast to our study, Bhattacharya et al² showed that primary PPH was present in 13-23.6% of patients. Meenakshi et al³¹ showed infected wound in 38% of patients and endometritis in 8.3% of patients.

Regarding fetal outcome, the most frequent complication was macrosomia seen in 13%. Intrauterine death was seen in 4%, 21.5% of babies had NICU admission and ENND was seen in 5.5% of the newborns. Similarly, Bhattacharya et al² showed that 10-15.9% of fetuses were macrosomic and 6.2% were low birth weight. John et al²³ showed that IUD occurred in 2% of cases, still birth in 10% of cases and need for NICU admission in

22% of babies. Comparable results were seen by a study conducted by Hashmi et al²⁹ showing that 14.5% were admitted in NICU and 6.3% of newborn had ENND. In contrast to our study, Awan et al²⁴ showed that 13% of fetuses were still born, 47% needed NICU admission and 11% had ENND. Gitana et al²⁵ in contrast showed that 29.3% had macrosomia which is higher than that seen in our study. Meenakshi et al³¹ showed that 15% of fetuses had still birth, 49.3% required NICU admission and 52.9% had ENND.

LIMITATIONS

In this study, maternal BMI was calculated during pregnancy and mostly patients visited in second trimester. Ideally, BMI should have been calculated before conception. Moreover, the comparison of obese with normal weight women in the same hospital and same duration would have resulted in a better statistical analysis.

CONCLUSION

Obese and overweight pregnant women had increased frequency of various maternal complications like gestational diabetes mellitus and gestational hypertension as well as fetal complications such as macrosomia, increased rate of admissions to NICU and early neonatal deaths.

RECOMMENDATIONS

Maternal obesity is a high risk factor for adverse fetomaternal outcomes. Excessive weight gain in women with increased BMI should be discouraged to reduce fetal and maternal complications. Obese women entering into pregnancy should be managed by multidisciplinary approach including dietician. Lack of pre pregnancy clinics in our set up demands the need for counseling of patient regarding weight reduction and achieving optimal BMI prior to next pregnancy in the postpartum period.

REFERENCES

1. Stewart FM, Ramsay JE, Greer IA. Obesity: impact on obstetric practice and outcome. *Royal Coll Obstet Gynecol* 2009; 11:25-31.
2. Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of BMI on pregnancy outcome in nulliparous women delivering singleton babies. *BMC Public Health* 2007; 7:168.
3. Sirimi N, Goulis DG. Obesity in pregnancy. *Hormones (Athens)* 2010; 9:299-306.
4. Usha kiran TS, Hemmandi S, Bethal J. Outcome of pregnancy in a women with increased body mass index. *Br J Obstet Gynaecol* 2005; 112:768-72.

5. Seibre NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW et al. Maternal obesity and pregnancy outcome: a study of 287,213 pregnancies in London. *Int J Obes Relat Metab Discord* 2001; 25:1175-82.
6. Martinez-Frias ML, Frias JP, Berrmejo E, Rodriguez-Pinilla E, Prieto L, Frias JL. Pre-gestational maternal body mass index predicts an increased risk of congenital malformations in infants of mother with gestational diabetes. *Diabet Med* 2005; 22:775-81.
7. Leddy MA, Power ML, Schulkin J. The impact of maternal obesity on maternal and fetal health. *Rev Obstet Gynaecol* 2008; 1:170-8.
8. Walkins ML, Rasmussen SA, Honein MA, Botto LD, Moore CA. Maternal obesity and risk for birth defects. *Pediatrics* 2003; 111:1152-8.
9. Wolfe HM, Sokol RJ, Martier SM, Zador IE. Maternal obesity: a potential source of error in some graphic findings. *Perinatal diagnosis. Obstet Gynaecol* 1990; 76:339-42.
10. O'Brien TE, Ray JG, Chan WS. Maternal body mass index and the risk of preeclampsia; a systemic overview. *Epidemiology* 2003; 14:268-74.
11. Perlow JH, Morgan MA. Massive maternal obesity and perioperative caesarean morbidity. *Am J Obstet Gynecol* 1994; 170:560-5.
12. Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. *Br J Obstet Gynaecol* 2005; 112:768-72.
13. Kabiru W, Raynor BD. Obstetric outcomes associated with increase in BMI category during pregnancy. *Am J Obstet Gynecol* 2004; 191:928-32.
14. Weiss JL, Malone FD, Emig D, Ball RH, Nyberg DA, Comstock CH et al. Obesity, obstetric complications and caesarean delivery rates—a population based screening study. *Am J Obstet Gynaecol* 2004; 190:1091-7.
15. Callaway LK, Prins JB, Chang AM, McIntyre HD. The prevalence and impact of overweight and obesity in an Australian population. *Med J Aust* 2006; 184:56-9.
16. Sheiner E, Levy A, Menes TS, Silverberg D, Katz M, Mazor M. Maternal obesity as an independent risk factor for caesarean section delivery. *Paediatr Perinat Epidemiol* 2004; 18:196-201.
17. Stephansson O, Dickman PW, Johansson A, Cnattingius S. Maternal weight, pregnancy weight gain, and the risk of antepartum stillbirth. *Am J Obstet Gynecol* 2001; 184:463-9.
18. Kristensen J, Vestergaard M, Wisborg K, Kesmodel U, Secher NJ. Prepregnancy weight and the risk of stillbirth and neonatal death. *Br J Obstet Gynaecol* 2005; 112:403-8.
19. Galtier-Dereure F, Boegner C, Bringer J. Obesity and pregnancy: complications and cost. *Am J Clin Nutr* 2000; 71:1242S-8S.
20. Kaiser PS, Kirby RS. Obesity as a risk factor for cesarean in a low risk population. *Obstet Gynaecol* 2001; 97:39-43.
21. Ehenberg HM, Durrwald CP, Catalano P, Mercer BM. The influence of obesity and diabetes on the risk of cesarean delivery.. *Am J Obstet Gynaecol* 2004; 191:969-74.
22. Oteng-Ntim E, Kopeika J, Seed P, Wandiembe S, Pat Doyle P. Impact of obesity on pregnancy outcome in different ethnic groups: calculating population attribution fraction. *PloS One* 2013; 8:537-49.
23. John J, Mahedran M. Maternal and fetal outcome in obese pregnant women: a prospective cohort study. *Int J Reprod Contracept Obstet Gynaecol* 2017; 6:725-9.
24. Awan S, Bibi S, Makhdoom AU, Farooq S, Tahir SM, Qazi RA. Adverse fetomaternal outcome among pregnant overweight women. *Pak J med Sci* 2015; 31:383-7.
25. Ramoniene G, Maleckiene L, Nadisauskiene RJ, artuseviciene E, Railaite DR, Maciuleviciene R et al. Maternal obesity and obstetric outcome in a tertiary care referral centre. *Medicine (Kaunas)* 2017; 53:109-13.
26. Mandal D, Manda S, Rakshi A, Dey RP, Biswas SC, Banerjee A. Maternal obesity and pregnancy outcome : a prospective analysis. *J Assoc Physician India* 2011; 59: 486-9.
27. Athukorsa C, Rumbold AR, Willson KJ, Crowther CA. The risk of adverse pregnancy outcome in women who are overweight and obese. *BMC Pregnancy Childbirth* 2010; 10:56.
28. Blomberg M. Maternal and neonatal outcome among women with weight gain below the new institute of medicine recommendation. *Obstet Gynaecol* 2011; 117:1065-70.
29. Hashmi A, Soomro JA, Iqbal Z, Soomro TK, Saleem K. Maternal obesity a global health problem and implication on metabolism and fetal health. *Reprod Sys Sexual Disord* 2012; 1:103.
30. Ngoga E, Hall D, Matheysse F, Grove D. Outcome of pregnancy in morbidly obese women. *Afr J Online* 2009; 51:39-41.

31. Meenakshi, Srivastava R, Sharma NR, Kushwaha KP, Aditya V. Obstetric outcome and pregnancy outcome in overweight and obese women. Placental and fetal complications and risks in relation to maternal overweight and obesity. *J Obstet Gynaecol India* 2012; 63:276-80.

CONTRIBUTORS

NB conceived the idea, designed the study and wrote literature review. ZH, NA and SA helped acquisition of data, did statistical analysis and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.