Association of Obesity with Adverse Maternal and Perinatal Outcome in Pregnant Women

RUQQIYA AZHAR1, SUNDAS MUSHTAQ2, MAMOONA RIAZ2, HUMAIRA AMAN3, RUBINA QADEER5, SADIA AMAN6
1Senior Registrar gynae Department, POF Hospital Wah Cantt
2Consultant Gynaecologist, DHQ Hospital Kotli Azad Kashmir
3Senior Registrar Gynaecology, POF Hospital Wah Cantt
4Senior Registrar Gynaecology, DHQ Hospital Kotli Azad Kashmir
5Consultant Gynaecologist, Social Security Hospital Lahore
6Consultant Gynaecologist, Jinnah Hospital Lahore
Correspondence to: Ruqqiya Azhar, Email: ruqaeyasaqib@gmail.com, Cell: 0321-4531919

ABSTRACT

Introduction: Obesity is a current issue that has an impact on all healthcare services. Several prenatal and postpartum problems have maternal obesity as one of their risk factors. Many studies have shown that women with BMI≥30Kg/m² experience increased incidence of intrapartum and perinatal complications.

Objective: The objective of this study was to determine the association of obesity with adverse maternal and perinatal outcome in pregnant women.

Study design: Prospective cohort study.

Setting: Obstetrics and Gynecology Unit – II, Jinnah Hospital, Lahore.

Material and methods: Total 232 pregnant women aged between 20-45 years presenting at ≥37 weeks of gestation. These patients were evaluated for obesity and two groups of patients were assimilated; those with obesity (BMI≥30 Kg/m²) and healthy controls (BMI 18.5-24.9 Kg/m²). Frequency of various fetomaternal outcome measures was noted and compared among these groups.

Results: The age range from 20 years to 40 years with a mean of 28.40±5.30 years. Majority (n=210, 63.3%) of the patients were aged between 20-30 years. The mean gestational age was 39.06±1.59 weeks. There were 157 (47.3%) primiparas and 175 (52.7%) multiparas. 187 (56.3%) patients were booked. Both the study groups were comparable in terms of mean age (p=0.613), mean gestational age (p=0.317), mean parity (p=0.168) and age (p=0.820), gestational age (p=0.071), parity (p=0.099) and booking status (p=0.580) groups distribution. The frequency of instrumental vaginal delivery (16.3% vs. 5.4%; p=0.001), cesarean delivery (36.1% vs. 10.2%; p<0.001), post-partum hemorrhage (10.8% vs. 1.8%; p=0.001), poor Apgar score (15.1% vs. 4.8%; p=0.002) & NICU admission (33.7% vs. 9.6% in the non-obese group, P value > 0.05). The incidence of instrumental vaginal delivery was 3(1.2%) in obese group vs. 2(0.8%) in non-obese group, P < 0.05. Only women with a BMI under 35 kg/m² were shown to have a significantly higher chance of developing gestational diabetes, preeclampsia, dystocia, and having babies with an Apgar score under 7 after 5 minutes. In 2018 study showed 33.32% of neonates admitted to neonatal unit in obese group and 9.3% in non-obese group.

Conclusion: Maternal obesity was found to be associated with significantly higher frequency of instrumental vaginal delivery, cesarean delivery, post-partum hemorrhage, fetal macrosomia, poor Apgar score at 5.0 minutes & NICU admission regardless of patient’s age, gestational age, parity and booking status.

Keywords: Maternal Obesity, Pregnancy, Maternal Complications, Fetal Complications

INTRODUCTION

The prevalence of obesity has increased significantly both in the UK and around the world. Obesity is a current issue that affects all aspects of healthcare, not only maternity services. Universally, obesity is classified by using the Body Mass Index (BMI). It is a basic index that is created by dividing a person’s weight in kilos by their height in square meters.

Maternal obesity is more common than ever and is now considered an epidemic. A study of 287,213 females in London stated a BMI greater than 30kg/m² in 10.9% of the cohort. More recent study that focused specifically on the rise in maternal obesity incidence rates showed a significant increase of 22.0% in the year 2010 that they extrapolated from the trend they found. Several prenatal and postpartum problems have maternal obesity as one of their risk factors. For instance, obese women are more likely to develop gestational diabetes during pregnancy, Thromboembolic and hypertensive conditions, as well as a higher chance of miscarriage and fetal foetal loss; and at the time of birth, Obese women have a much higher risk of having an artificial birth and a caesarean section during pregnancy, Increased neonatal critical care needs are present in their infants due to postpartum haemorrhage, infection, and prolonged hospital stays. According to current clinical recommendations, women with a BMI more than 35 kg/m² should be informed that giving birth in an obstetric unit would be expected to lower the risks of bad outcomes for both the mother and the foetus.

Although recent research by Kim Thomas suggests this may not be true for all pregnant women, it still provides valuable evidence that modifies this understanding and will help women make better informed decisions about their care. Pregnant women with a high Body Mass Index (BMI) are thought to be at higher risk of adverse outcomes.

In the 2020 study, the rate of caesarean sections was considerably greater in the obese group (33.1% vs. 13.2%). Whereas another study done by Hollowed J et al. in 2014, found that intrapartum caesarean section in obese group was 13.4% vs. 9.6% in the non-obese group with P value > 0.05. The incidence of instrumental vaginal delivery was 3(1.2%) in obese group vs. 2(0.8%) in non-obese group, P < 0.05. Only women with a BMI under 35 kg/m² were shown to have a significantly higher chance of developing gestational diabetes, preeclampsia, dystocia, and having babies with an Apgar score under 7 after 5 minutes. In 2018 study showed 33.32% of neonates admitted to neonatal unit in obese group and 9.3% in non-obese group.

The rationale of the study is to determine the association between obesity and adverse maternal and fetal outcome. Many studies proved that women with BMI>30kg/m² experienced increased incidence of intrapartum and perinatal complications but conflicting results also there. Even a research article by Kim Thomas published in 2014 provides valuable evidence that this may not be true for all women and risk associated with obesity in pregnant women is lower than previously thought. So this study results will enable women to make better informed decision about care.

METHODOLOGY

This prospective Cohort study was conducted 05/11/2019 to 04/05/2022 from Obstetrics and Gynecology Unit – II, Jinnah Hospital, Lahore. Sample size of 332 cases (166 in each group) was calculated with 80% power of test, 5% level of significance & taking expected percentage of Apgar score <7 at 5 min. in both groups i.e. 14% in obese group versus 5% in non-obese group.

Patients age between 20-45 years, Singleton pregnancy assessed on USG, Cephalic presentation (Confirmed on USG),
Obese women having BMI > 30 kg/m². Gestational age at term i.e. > 37 weeks assessed on dating scan and Para up to 4 were included.

Age range 20-45 years. Women suffering from medical disorders like diabetes mellitus (assessed by RBS levels > 200gm/dl), urinary tract infection (on complete urine examination), history of hypertension (B.P > 140/90 mmHg, and thyroid disorder (assessed by T3 and T4 levels) and Women presented in pre-term labour (i.e. <37 weeks of gestation on dating scan) were excluded. The study was approved from ethical committee of the hospital. The patients were enrolled after informed consent. The data was collected regarding patients profile, age, parity, height, weight, booking status. Duration of gestation was confirmed by the ultrasound performed at presentation. Both groups were informed about confidentiality of data. Body mass index was calculated at admission by the formula:

\[ \text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2} \]

Patients were divided into two groups: Obese and Non-Obese (as per inclusion criteria). Patients of both groups were followed till delivery by researcher herself for the study variables. Assisted instrumental delivery was carried out if required in second stage of labour. Cesarean section (emergency or elective) was carried out if there was fetal distress or instrumental delivery not possible. Postpartum haemorrhage was noted as per operational definition. At birth all babies were assessed for perinatal outcome i.e. fetal macrosomia, Apgar score of baby was assessed at 5 minutes, and NICU admission.

Data was analyzed through SPSS version 20. Age and gestational age have been presented by mean ±SD. Parity, instrumental vaginal delivery, cesarean section, PPH, poor Apgar score, macrosomia and NICU admission have been presented by frequency & percentage. Chi-square test has been applied to compare the frequency of instrumental vaginal delivery, cesarean section, PPH, poor Apgar score, macrosomia and NICU admission among women with and without obesity taking p-value ≤0.05 as statistically significant and RR has been calculated taking RR=1 as significant. Data has been stratified for age, gestational age, parity and booking status to address effect modifiers.

RESULT

The age range from 20 years to 40 years with a mean of 28.40±5.30 years. Majoritn1(63.3%) of the patients were aged between 20-30 years. The patients' gestational ages ranged from 37 to 42 weeks, with a mean of 39.06±1.59 weeks, while their parity ranged from 1 to 4, with a mean of 2.08±1.19 weeks. There were 157 (47.3%) primiparas and 175 (52.7%) multiparas.

Table 1: Descriptive of age Gestational Age, Parity

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<thead>
<tr>
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Table 2: Baseline Characteristics of Groups

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Table 3: Comparison of variables with Groups

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DISCUSSION

Obesity is defined by a body mass index (BMI) below 30 kg/m², which is harmful to women's reproductive health as well as the health of their children.12, 13 Obese women are more likely to experience adverse pregnancy outcomes like gestational diabetes, preeclampsia & gestational hypertension.14 Additionally, there is a higher risk of Caesarean section, shoulder dystocia, postpartum haemorrhage, and induction of labour.15 Additionally, maternal obesity is linked to a higher risk of unfavourable neonatal outcomes, such as a greater rate of preterm birth, large-for-gestational-age (LGA) newborns, admission to the intensive care unit (NICU), congenital malformations, and perinatal mortality.16

Obesity is a current issue that has an impact on all healthcare services.17 Several prenatal and postpartum problems have maternal obesity as one of their risk factors.18 Numerous studies have demonstrated that problems during pregnancy and delivery are more common in women with BMIs below 30 kg/m².19

In this study, the mean age was 28.40±5.30 years. Asif et al.16 reported similar mean age of 28.73±4.62 years among such women presenting at Services Hospital, Lahore135. Similarly, a similar mean age of 28.67±3.30 years was observed by Shafqat et al. in full term obese women.21 John et al. reported the mean age of 29.5±2.9 years in Nepalese women.22 There were 210(63.3%) of patients were aged between 20-30 years. Our result is in line with that of Syed et al. reported that 66.8% of such women presenting at Lady Reading Hospital, Peshawar were aged between 20-30 years.23 John et al. also observed similar higher proportion of this age group in Nepalese such women and reported it to be 62.0%.22

We observed that 47.3% of such women were primiparas. Davies-Tuck et al. reported the frequency of primiparas to be 45.1% in Australian obese women.24 While John and Ojha et al. reported it to be 46.0% and 49.6% in Nepal.22, 25

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We observed that the frequency of instrumental vaginal delivery (16.3% vs. 5.4%; p=0.001, RR=1.60, 95% CI=1.28-1.99), cesarean delivery (36.1% vs. 10.2%; p=0.001, RR=1.88, 95% CI=1.55–2.26), post-partum hemorrhage (10.8% vs. 1.8%; p = 0.001, RR=1.80, 95% CI=1.46–2.22) was significantly higher in obese women compared to non-obese controls. A similar significant difference in the frequency of instrumental vaginal delivery has been reported previously by 2020 (12.32% vs. 5.21%; p=0.001)(26) and Davies-Tuck et al. in 2016 (13.6% vs. 1.0%; p=0.001)(27) Awan et al. (44.0% vs. 16.0%; p=0.0024), Asif et al. (33.3% vs. 13.3%; p=0.06) also reported similar significant difference in the frequency of C-section between obese and non-obese pregnant women in local population.(28) In the present study, we also observed that the frequency of fetal macrosomia (18.1% vs. 6.6%; p=0.002, poor Apgar score (15.1% vs. 4.8%; p=0.002 and NICU admission (33.7% vs. 9.0%; p=0.001 was significantly higher in obese women compared to non-obese controls. Our results are similar to those of Jaleel et al. (16.2% vs. 6.1%; p=0.024), Fatima et al. (26.0% vs. 4.0%; p<0.001 and Vinayagam et al. (19.0% vs. 7.0%; p<0.05) who also reported similar significant difference in the frequency of fetal macrosomia. Vinayagam et al. also reported similar significant difference in the frequency of poor Apgar score (14.0% vs. 5.0%; p<0.05) [2.2 Gallier-Dereure et al. reported similar significant difference in the frequency of NICU admission (33.32% vs. 9.3%; p<0.05) between newborns of obese and non-obese mothers [9]9. The results of the present study are comparable to existing literature with minimal differences attributable to population differences perhaps. The current study was conducted on 500 cases, the exclusion criteria, and stratification of study outcomes for effect modifiers are its merits. In the present study, maternal obesity was found to be associated with significantly higher frequency of instrumental vaginal delivery, cesarean delivery, post-partum hemorrhage, fetal macrosomia, poor Apgar score at 5 minutes and NICU admission regardless of patient’s age, gestational age, parity and booking status. Once an obese pregnant woman is seen in antenatal clinic she should be considered high risk and optimal anticipated measures should be taken to reduce the maternal and neonatal complications. A strong limitation to the present study was that we didn’t evaluate the effect of maternal weight control over various fetomaternal outcome measures which would further highlight the problem and will help in planning the management of such patients.

CONCLUSION
Maternal obesity was found to be associated with significantly higher frequency of instrumental vaginal delivery, cesarean delivery, post-partum hemorrhage, fetal macrosomia, poor Apgar score at 5.0 minutes & NICU admission regardless of patient’s age, gestational age, parity and booking status.

REFERENCES