

Pregnancy Outcomes in Obese and Non-Obese Females

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Sadia Rashid, Shazia Kadri, Safia Izhar and Asma Abdullah

ABSTRACT

Objective: To study the Pregnancy outcomes in obese and non-obese female and association with ultrasonographic measurements.

Study Design: Comparative Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Radiology, Medicare Cardiac and General Hospital, Karachi from July 2021 to December 2021.

Materials and Methods: In this study total 200 women of body mass index (BMI) 20-35 were included in this study. Among them 100 women had BMI between 20-24.9 and 100 women had BMI 25-30 kg/m².

Results: Out of 100 obese women, 74 babies were spontaneous vaginally delivered, 13 were assisted delivered through instrument (i.e. vacuum and forceps) and 13 women underwent LSCS. On other hand in 100 non-obese, 88 were spontaneous vaginally delivered, 7 were assisted instrumental deliveries and 5 underwent LSCS. This data revealed significantly higher rate of instrument and operative delivered in obese group ($p=0.038$). There were 4 (4%) fetal mortalities, 3 neonatal deaths 3 (3%) and 1 still birth in obese group and 2 (2%) fetal mortality in non-obese group. On Ultrasound imaging Expected fetal weight of obese group found to be higher than non-Obese group. 10 neonates of obese group and 3 (3%) of non-Obese group were found macrosomic (Birth weight 4000 gm or above), however, this difference of proportions of macrosomia between two groups was statistically insignificant.

Conclusion: Obesity during pregnancy is associated with adverse maternal and fetal outcomes like significantly higher rate of instrumental vaginal delivery, caesarian section and fetal birth asphyxia. Obese pregnant women should be considered high risk and recommended to maintain weight to reduce any complications.

Key Words: obese, non-obese, ultrasound

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INTRODUCTION

Obesity is a growing epidemic¹. It is a contributory factor to the development of chronic disease as well as complicated pregnancies affecting the well-being of not only mother but also the baby. The prevalence of obesity is rising making pre-gravid overweight one of the most common high risk obstetric situation^{2,3}. Pregnancy with obesity is associated with the significantly increased risk of antepartum, intrapartum, postpartum and neonatal complications⁴. Physiologic changes during pregnancy result in ideal weight gain for women with a normal BMI from 11 to 16 kg⁵. Whereas body mass index (BMI), defined as weight (kg)/height (m²).

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It is used as a marker of obesity⁶. The World Health Organization (WHO) recommended guidelines to establish optimal pregnancy outcomes but still there is a need to determine the appropriate relevance of these recommendations⁷. Maternal obesity impacts on Fetal growth and ultrasonography plays a significant role in obese and non-obese pregnant female to rule out Fetal growth. Sonography of obese pregnant female is technically difficult because of increase adipose tissues and needs multiple scan as compare to non-obese pregnant female to find out any abnormality and Fetal growth⁸. Obesity may increase a steady degradation in Fetal scan quality and poor visualization of vital structures^{9,10}.

MATERIALS AND METHODS

Study Design: Comparative Cross-sectional study.

Study Place and Duration of Study: This study was conducted in Medicare cardiac and general hospital from 1st July 2021 to 31st December 2021.

In this study non-probability, purposive sampling technique was used to select the women. 200 women were included in this study in whom 100 women were obese and 100 were non obese. All booked (more than three antenatal visits) primi and multigravida, Women with previous normal vaginal deliveries, Singleton pregnancy and women having Fetus with cephalic

presentation were included in the study. However, the Women with associated medical disorders like diabetes, hypertension and endocrine disorders, bad obstetrical history i.e. intrauterine dead baby, history of congenital malformed baby and History of Preterm baby were excluded.

Data was collected and Statistical analysis was performed through SPSS version- 10.0. All categorical variables like parity status, mode of delivery, intrapartum complications, postpartum complications, fetal outcome, neonatal birth weight and neonatal complications were presented by frequencies and percentages; chi-square test was applied to compare the above mentioned categorical variables between obese and non-obese groups and Fisher's Exact test was applied according to the condition of Pearson's Chi-square test that if any cell count is less than 5, where it was needed.

Numeric response variables like age and neonatal apgar score were presented by Mean ± SD; Students t-test (unpaired) was applied to compare the means of these numeric response variables between obese and non-obese groups.

Statistical significance was taken at $p \leq 0.05$.

RESULTS

Mean age of 36 Obese of severe obstetric morbidities was 25.4 ± 3.9 years and of 36 non-obese was 24.8 ± 4.5 years. The difference of mean age between two groups was statistically insignificant ($p=0.260$).

Majority of obese and non-obese group were primiparous i.e. 58% and 64% respectively, followed by multiparous 37% and 35% and grand multiparous were 5% and 1% respectively. Data revealed insignificant difference of parity status between obese and non-obese groups ($p=0.221$).

Significantly high number of women in obese group involved intrapartum complications (17% vs. 4%, $p=0.025$) than non-obese group, as shoulder dystocia was observed 8% vs. 2% followed by non-progress of labor 7% vs. 2% and failed instrument 2% vs. 0% comparing obese and non-obese groups respectively (Table-1).

Out of 100 obese women, 74 were spontaneous vaginally delivered, 13 were assisted delivered through instrument (i.e. vacuum and forceps) and 13 women underwent LSCS. On other hand in 100 non-obese, 88 were spontaneous vaginally delivered, 7 were assisted instrumental deliveries and 5 underwent LSCS. This data revealed significantly higher rate of instrument and operative delivered in obese group ($p=0.038$) as shown in figure-1.

There were observed 41 (4%) fetal mortalities in obese group and 2 in non-obese group. Number of neonatal deaths were 3 (3%) in obese group and 2 (2%) in non-obese group. Only one fresh still birth was observed in obese group. Healthy take home baby rate

in obese group was 96% and of non-obese group was 98% that revealed insignificant difference regarding fetal outcome in both groups (Table-2).

Ten neonates of obese group and 3 (3%) of non-obese group were found macrosomic (Birth weight 4000 gm or above), however, this difference of proportions of macrosomia between two groups was statistically insignificant (Figure-2).

Proportion of postpartum complications in obese group was significantly higher than non-obese group (17% vs. 5%, $p=0.011$). Postpartum haemorrhage was the commonest postpartum complications that was higher in obese versus non-obese groups (Table-3).

Table No.1: Comparison of Intrapartum Complication between Obese and Non-Obese

Intrapartum Complications	Group	
	Obese (n=100)	Non-Obese (n=100)
Shoulder Dystocia	8 (8)	2 (2)
Non-progress of labor	7 (7)	2(2)
Failed Instrument	2(2)	0 (0)
None	83 (83)	96 (96)

Table No.2: Comparison of Fetal Outcome between Obese and Non-Obese Groups

Fetal Outcome	Group	
	Obese (n=100)	Non-Obese (n=100)
Alive	96	98
Neonatal Death	3	2
Fresh Still Birth	1	0

Insignificant difference between two groups ($X^2=1.221$, $p=0.543$)

Table No.3: Comparison of Postpartum Complications between Obese and Non-Obese Groups

Postpartum Complications	Group		p-value
	Obese (n=100)	Non-Obese (n=100)	
Postpartum Hemorrhage	12	4	0.065
Need of Blood Transfusion	6	2	0.279
Wound Infection	5	1	0.212
Nil	83	95	0.011

Note: Six obese women and 2 non-obese women had more than one postpartum complication.

Apgar score at 1 minute and 5 minutes was found significantly high in non-obese group ($p=0.042$ and $p=0.037$ respectively), that revealed significantly good apgar score in non-obese group than obese group. Total 7 neonates out of 100, were found with complications in obese group as compared with non-obese group were only two out of 100 neonates

were found with complications. The difference of proportions of neonatal complications between two groups was statistically insignificant ($p=0.325$).

By maternal obesity status, there was no significant difference in AC, HC/AC ratio, or BPD on ultrasound imaging. The estimated foetal weight (EFW) of obese women's fetuses was considerably higher at 30 weeks and beyond. Neonatal weight was over 100 grammes greater in fat women's babies than in non-obese mothers' babies.

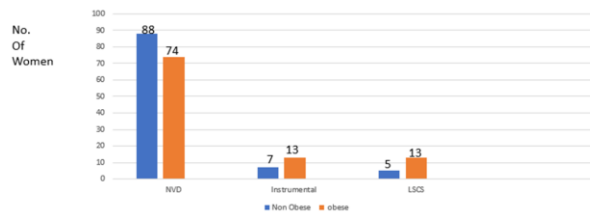


Figure No.1: Comparison of Mode of delivery between Non-Obese and Obese groups

NVD –Normal vaginal delivery

Instrumental –vacuum or forceps assisted delivery

LSCS- Lower segment caesarian section

Significant high rate of caesarian section in obese group $X^2=6.56, P=0.038$

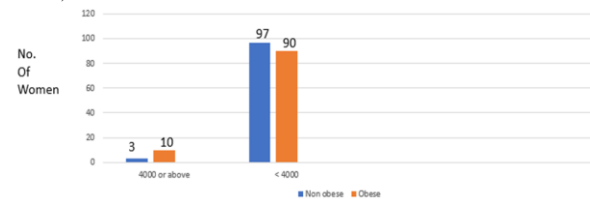


Figure No.2: Comparison of Neonatal birth weight between Non-Obese and Obese groups

Neonatal birth weight (grams)

Insignificant difference between 2 groups(Fisher's exact test, $p=0.082$)

DISCUSSION

Obesity is characterized by excess of body fat and woman with body mass index is in the range of 30.0–34.9 kg/m^2 ¹¹. It is not only a social concern worldwide but also contributory factor to the development of chronic disease as well as complicated pregnancies^{12,13}. The prevalence of obesity is rising making pre-gravid overweight one of the most common high risk obstetric situation. Pregnancy with obesity is associated with the significantly increased risk of antepartum, intrapartum, postpartum and neonatal complications.

Maternal obesity impact on Fetal growth which can be assessed by ultrasonography. A population based study done to compare outcomes of pregnancies of obese and non-obese and found no statistical difference between obese and non-obese regarding maternal age and parity¹⁴.

The result of our study showed a significant increased risk of intrapartum complications in obese women as compared to non-obese women (17% vs. 4%, patient

value=0.025). Shoulder dystocia was the commonest followed by non-progress of labour and failed instrumental delivery.

Indarti et al also studied that the rate of maternal and perinatal complications in obese women is greater and requires proper handling of the pregnancy¹⁵.

Li Li et al conducted a study suggested that maternal obesity was associated with a significantly higher risk of caesarean delivery¹⁶. Results of our study also showed an increased risk of assisted vaginal delivery in women with obesity 13% vs. 7% in non-obese women. Majority of the instruments were applied due to prolonged second stage of labour.

Zhou L. et al¹⁷ conducted retrospective study of 6786 pregnant women in Beijing from September 1st, 2014 to August 31st, 2015 and found that prepregnancy BMI and gestational weight gain affects labor duration and CS prevalence during delivery.

Al-Kubaisy, et al¹⁸ also found that Obese women with or without a prior history of Caesarian section should be considered as high risk and managed appropriately during pregnancy. Weight management prior to or during pregnancy could help reduce the need for CS. The result of our study showed a significant increased risk of post-partum complications in obese women as compared to non-obese women (17% vs. 5%, $p=0.011$). Postpartum hemorrhage was the commonest postpartum complication in obese women (12% vs. 4%) in non-obese women.

Heslehurst, N.¹⁹ also highlighted the adverse outcomes of obesity which increases with increasing maternal BMI.

The result of our study showed significant increased risk birth asphyxia in neonates of obese women as compared to non-obese women. Apgar score at 1 minute and 5 minutes was found significantly high in non-obese group (patient=0.042 and $p=0.037$ respectively), that revealed significantly good apgar score in non-obese group than obese group.

Alfadhli, E.M at al²⁰ studied that Maternal obesity associated with a high birth weight and a greater risk of macrosomia resulting in cesarean delivery.

The result of our study showed macrosomia in ten neonates of obese group and 3 (3%) of non-obese group. (Birth weight 4000gm or above), however this difference of proportions of macrosomia between two groups was statistically insignificant (p value=0.082). Our study results also showed that there were 4% fetal mortalities in obese group and 2 % in non-obese group. Healthy take home baby rate in obese group was 96% and on non-obese group was 98% that revealed insignificant difference regarding fetal outcome in both groups. Total 7% neonates were found with complications in obese group as compared to 2% in non-obese group. The difference of proportions of neonatal complications between two groups was

statistically insignificant ($p=0.325$). This could be due to small sample size.

The strength of this study is that exposure information (weight and height) was recorded in early pregnancy and therefore prospective regarding the pregnancy outcome variables. Recall bias was thus avoided. A number of confounding factors (gestational diabetes and hypertension) associated with maternal obesity were adjusted for this study.

The problem concerning studies in this field is the definition of obesity. Different values for defining obesity were used in different studies, which make it difficult to compare risk estimates. To facilitate such comparisons, we present risk estimates in group with BMI > 25 kg/m² as obese group.

The drawback of the study are as the BMI was calculated using weight at booking and weight increases with advancing pregnancy, late bookers may potentially have artificially contributed to an increase in the numbers in the raised BMI group. Some studies used maternal memory of pre-pregnancy weight, we aimed to use a simple measure applicable in the antenatal clinic to predict adverse pregnancy outcome. Greater understanding is needed of the pathophysiological link between obesity and various adverse outcomes of pregnancy so that effective and safe management strategies can be devised.

CONCLUSION

The pregnancy with obesity is a high risk pregnancy and associated with several maternal and fetal complications. We found that fetuses born to fat mothers had high weight, larger bone lengths and head circumference than those born to non-obese women. The processes behind the changes' long-term health effects are unclear. Further research work and long-term follow-up is the requirement of time as this will be useful in developing gestation-specific therapies for obese mothers in order to improve foetal development and health outcomes.

Author's Contribution:

Concept & Design of Study:	Sadia Rashid
Drafting:	Shazia Kadri, Safia Izhar
Data Analysis:	Asma Abdullah, Safia Izhar
Revisiting Critically:	Sadia Rashid, Shazia Kadri
Final Approval of version:	Sadia Rashid

Conflict of Interest: The study has no conflict of interest to declare by any author.

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