

Impact of Maternal Obesity on Pregnancy Outcome

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ABSTRACT

Background: Maternal obesity increases the risk of complications of pregnancy, labor, and neonate. It has been associated with gestational hypertension, eclampsia, pre-eclampsia, gestational diabetes, cesarean delivery, instrumental delivery, abortion, post-partum haemorrhage, puerperal infection and perinatal outcome like macrosomia, still birth and congenital anomaly, birth asphyxia. **Aims:** To evaluate the effect of maternal obesity on pregnancy outcome. **Methods:** The hospital based observational study conducted in the department of Obstetrics & Gynaecology at Nepalgunj Medical College Teaching Hospital Kohalpur between September 2015 to August 2016. **Results:** Mean age of participant's in the study group was 28 ± 5.77 and youngest participant's age was 19yrs and oldest participant was 45yrs. Among the fifty five ladies, 10 were grand multigravida, 30 were multi and 15 were primigravida. 63.6% delivered by cesarean section, 1.8% delivered by forceps with episiotomy, 9.1% delivered by svd, 20% by svd with episiotomy and 5.5% by vacuum with episiotomy. Ten participants (18.18%) had hypertensive disorder during pregnancy. The mean BMI was 33 ± 2.4 . Under obese class 1 and class 2 were 49.1% and 50.9% respectively. Among the study population 56.36% had complications. Mean BMI was 33 minimum being 30 and maximum was 39.81. Regarding body weight maximum was 90 kgs. and minimum was 68 kgs and mean weight being 78kgs. Regarding maternal height maximum was 2.7 m^2 , minimum was 2.01 m^2 and mean was 2.33 m^2 . Total 7 newborn (13%) were macrosomic. Among 55 cases 27 fall under obesity class 1, 11 ladies with complication and among 28 ladies under obesity class 2, 22 had complications. **Conclusion:** The obesity has adverse effects on pregnancy outcome both for mother and the foetus.

Keywords: Obesity, BMI

INTRODUCTION

Obesity, at the present time, has become a globally prevalent problem due to change in life style and there is no clear cut definition of obesity. Over weight and obesity is defined as abnormal or excessive fat accumulation that may impair health. The world health organization (WHO) defines "overweight" as a BMI equal to or more than 25 kg/m^2 and "obesity" as a BMI equal to or more than 30 kg/m^2 .¹ At the booking visit BMI should be calculated for all pregnant women ideally using pre-pregnancy weight. If pre-pregnancy weight is unknown and BMI being calculated in the first trimester, it is recommended that 1 kg should be deducted before performing calculation. BMI is usually calculated according to following formula (the Quetlet's index). $\text{BMI (Quetlet's index)} = \frac{\text{weight (kg)}}{\text{height (m)}^2}$ Obesity is also classified into obese class 1, BMI 30 to 34.9 kg/m^2 ; obese class 2, BMI 35 to 39.9 kg/m^2 ; morbid obesity class 3, $\text{BMI} \geq 40 \text{ kg/m}^2$. Obstetrician need to be aware of the maternal and fetal risk associated with obesity. Women should be advised about life style and diet.²

The increasing prevalence of obesity also constitutes a major problem in obstetrics practice. Complications associated with obesity in pregnancy are gestational diabetes mellitus, hypertensive disorders and thromboembolic complications during labor are augmentation, early amniotomy, cephalopelvic disproportion, cesarean section and peri-operative morbidity and in fetus are macrosomia, shoulder dystocia, small for gestational age, late fetal death and congenital malformation especially neural tube defect. It is well established that the strong association exists between obesity and complications of pregnancy and delivery.³

The global obesity epidemic has been escalating over four decades, yet sustained preventive efforts have barely begun, an emerging science that uses quantitative models has provided key insights into the dynamics of this epidemics and enabled researchers to combine evidence and to calculate the effect of behaviors, interventions, and policies at several levels – from Individual to population. Forecasts suggest that high rate of obesity will affect future population, health and economics.⁴

Maternal complication include early miscarriage, pregnancy induced hypertension and preeclampsia, gestational diabetes, thrombo-embolic disease, infections, sleep apnea, prolonged labor and increased risk of interventions like induction of labor, operative delivery, shoulder dystocia and post partum hemorrhage. Perinatal complication include birth defect mainly neural tube defect, macrosomia, still birth, preterm birth and need for intensive care admission.⁵

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The perinatal mortality increases with increasing maternal pre-gravid body weight. This would include the increasing frequencies of dizygotic twinning, diabetes mellitus, acute chorioamnionitis and major congenital malformations which is final risk responsible for perinatal mortality increase with increasing maternal body weight. Quetlet's index in (pregravid weight kg/ht (m²) was used to measure relative weight. According to Quetlet's index values: < 20kg/m² (thin), 20-24 kg/m²(normal), 25 -30kg/m² (mildly overweight) and > 30kg/m²(obese)⁶.

The importance of obesity from above studies can well be appreciated regarding the prevalence of obesity and associated maternal and perinatal outcome. This study was aimed to explore the effect of maternal obesity on pregnancy outcome.

MATERIAL AND METHODS

Hospital based Observational study was conducted from September 2015 to August 2016 at Nepalgunj Medical College Teaching Hospital, Kohalpur, Banke, Nepal. 55 women with Maternal Obesity were included in the study. The pregnant women attending obstetrics department having BMI ≥30 kg/m² with single pregnancy were included.

This study was aimed to explore the effect of maternal obesity on pregnancy outcome. All the patients were subjected to routine ANC investigations, ultrasonogram for foetal assessment and Biophysical profile of foetus, maternal scan to rule out gall stone diseases, serology to rule out Hepatitis A, B, C, E. and liver function Tests. Patients were admitted in the hospital depending upon the severity of symptoms, state of liver and period of gestation at the time of presentation. Babies were evaluated for features of prematurity, weight, meconium aspiration at Birth and for any other complications.

RESULT

Distribution according to age group

The mean age of participant's in the study group was 28 ± 5.77. The youngest participant's age was 1.9 yrs and oldest participant was 45 years.

AGE IN YEARS	FREQUENCY	PERCENTAGE (%)
15-20	2	3.6
21-25	22	40
26-30	15	27.3
≥31	16	29.1
TOTAL	55	100

Table I: Distribution according to maternal age

Distribution according to gravidity:

Among study group of 55 ladies, 10 of them were grand multigravida, 30 were multi and 15 were primigravida.

GRAVIDITY	FREQUENCY	PERCENTAGE
GRAND MULTI	10	18.2
MULTI	30	54.5
PRIMI	15	27.3
TOTAL	55	100

Table II: Distribution according to gravidity

Distribution of patient according to mode of delivery:

Among study population 63.6% delivered by cesarean section, 1.8% delivered by forceps with episiotomy, 9.1% delivered by svd, 20% by SVD with episiotomy and 5.5% by vacuum with episiotomy

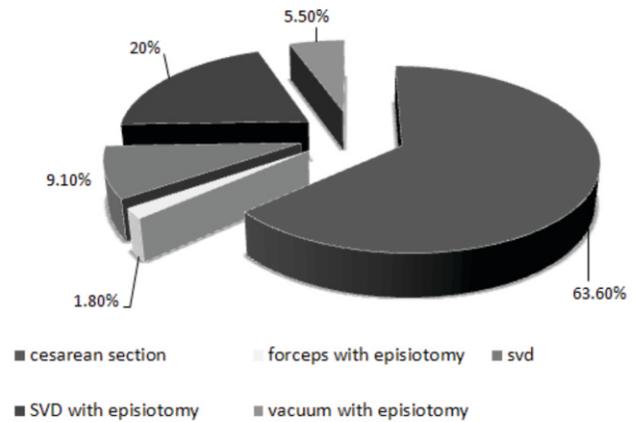


Figure1: Distribution according to mode of delivery

Distribution of patients according to the gestational age:

In this table, it shows that study participants 1.8% pregnancy were preterm, 70.9% pregnancy were term and 27.3% pregnancy were post-term.

GESTATIONAL AGE	FREQUENCY	PERCENTAGE
PRETERM	1	1.8
TERM	39	70.9
POST TERM	15	27.3
TOTAL	55	100

Table III: Distribution according to maternal age

Association of hypertensive disorder in pregnancy with BMI:

Regarding hypertensive disorder in pregnancy 10 participants (18.18%) had hypertensive disorder during pregnancy. Statistically significant difference was not observed between maternal obesity and hypertensive disorder during pregnancy as shown in Table IV.

Incidence of fetal outcomes

Among the study population 56.36% had complications. There was statistically significant difference observed between maternal obesity and fetal complications as shown in table V.

Determination of baby birth weight

Seven newborn (i.e 13 %) babies were macrosomic. There was statistically significant difference observed between maternal obesity and baby birth weight. The rate of macrosomia increases with increase in maternal obesity.

Maternal complications and BMI

Among 55 cases 27 fall under obesity class 1, 11 ladies with complication and among 28 ladies under obesity class 2, 22 had complication. This study shows that pregnancy related complications were more with obesity class 2. There was statistically significant difference observed between maternal obesity according to class with the pregnancy related maternal complications as shown in table VII.

Hypertension	BMI		Total	p Value	OR (95% CI)
	Class 1	Class 2			
Normal BP	30	15	45	0.839	0.857 (0.194-3.795)
Hypertension	7	3	10		
Total	37	18	55		

Table IV: Association of hypertensive disorder in pregnancy with BMI

BMI	Fetal Complications		Total	p Value	OR (95% CI)
	Present	Absent			
Class 1	12	15	27	0.04	0.379 (0.126 – 1.136)
Class 2	19	9	28		
Total	31	24	55		

Table V: Incidence of fetal complication in relation to maternal obesity

Baby Birth Weight	BMI		Total	p Value	OR (95% CI)
	Class 1	Class 2			
Macrosomic \geq 4kg	7	-	7	0.048	1.6 (1.285 – 1.992)
Not macrosomic $<$ 4kg	30	18	48		
Total	37	18	55		

Table VI: Relationship between baby birth weight and maternal obesity

Maternal complication	BMI classification		Total	p Value	OR (95% CI)
	Class 1	Class 2			
Present	11	22	33	0.006	0.188 (0.057-0.613)
Absent	16	6	22		
Total	27	28	55		

Table VII: Association between maternal complications with obesity class

Distribution of patients according to the obesity class:

Here the mean BMI was 33 and standard deviation (s.d.±) was 2.4 among the study participants 49.1% were under obese class 1, 50.9% were under obese class 2.

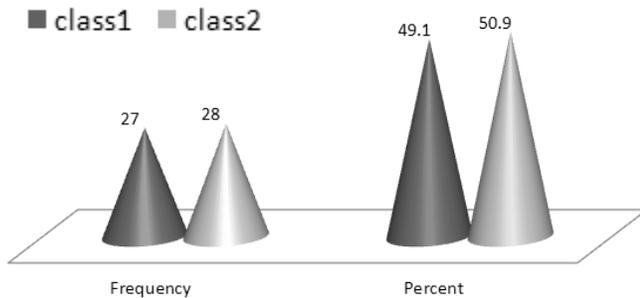


Figure 2: Distribution according to obesity class

DISCUSSION

This study was conducted to explore the relationship between maternal obesity and pregnancy outcome. Obesity is reaching pandemic proportion worldwide. It increasingly being recognized as a risk factor during pregnancy. The mean of maternal age for the participants mothers in the current study was 28 years and the youngest participant age is 19 years and oldest participant age is 45 years about 70% participants were less than 30 years and standard deviation (S.D.) is 5.77. In this study, maximum number of women 54.5% were multigravida and 27.3% were primigravida only 18.2% constituted grand multigravida. Mendes MS and Matozinhos FP (2006)⁷ recorded minimum age was 15 years and maximum being 40 years mean was 27.5 years which is almost coinciding with present study while Goons (2013)⁸, obesity and overweight status were found to be significantly associated with age, women aged 31 and above were more likely to be obese which is not coinciding with present study where about 70% participants were less than 30 years.

The prevalence of hypertension disorder in pregnancy is 18.18%, in the current study among the total participants. While Mandal D et al. (2011)⁹ the rate of hypertensive disorder in pregnancy is 13% which is lower than current studies. Dietary habits and environmental factor might be counted as a factor for high incidence of gestational hypertension. The target population of the current study was obese pregnant women. So their BMI are 30 and over and the average weight was 78kgs and height is 2.4 m² and average BMI was 33.

The obesity was classified as Class I obesity = 49.1% and Class II obesity = 50.9% which is similar to Kabiru W, Raynor B (2004)¹⁰ 49.8% under moderate obesity. In Sebrine NJ et al (2001)¹¹, 24.3% study population come under moderate Obesity and 9.6% under very obese group but while our study maximum women come under moderate obesity i.e. 50.9%. Maternal

obesity is becoming a global health problem affecting health of both mother and child. Optimization of weight prior to conception should be the goal. BMI should be calculated in all pregnant women ideally using the pregnancy weight of women with BMI over 30 to be considered to be higher risk.

The delivery of infants through cesarean section was 63.6%, Spontaneous vaginal delivery with episiotomy is 20%, spontaneous vaginal delivery is 9.1% and instrumental delivery was 7.3%. Chauhan et al. (2001)¹², delivery through cesarean section was 57%, vaginal birth was 43%. As compared to present study the cesarean section rate is slightly lower and rate of vaginal birth is higher in their series. While Mandal et al. (2011)⁹, the rate of cesarean section in their study population was 36% and the instrumental delivery rate was 12.32% but in present study instrumental delivery rate was found to be 7.3%. So the rate of cesarean section was lower and the instrumental delivery rate was higher in their study as compared with present study.

The different study like Aimukhametova G et al. (2012)¹³ the rate of preterm delivery <37 weeks of gestations is 8.3% and >37 weeks of gestation was 91.7% and the incidence of fetal macrosomia is 23.5% and intra uterine growth restriction is 5.9%. According to the current study fetal distress is common in pregnancy with obesity followed by big baby, the rate of birth asphyxia was 3.6%, any fetus with gross congenital anomaly was not detected in the study group. So increase in BMI brings lots of complications to mother as well as to the fetus. Finally current study shows that 13% of babies were macrosomic having birth weight ≥4kgs.

The current study shows that nonprogress of labor is more common complication faced by pregnant lady with obesity followed by cephalopelvic disproportion which are major cause of increasing cesarean section rate in obese and the rate of postpartum hemorrhage is 1.8%. According to Paiva LV and Nomura RM (2012)¹⁴ the rate of wound infection was 16.7% which was very high. In Sebire NJ et al. (2001)¹¹ the rate of post partum hemorrhage was 18% which is almost ten times higher than the present study. Maternal complications increases with increase in BMI. Excessive fat accumulation hinder wound healing and provide environment for growth Of organisms and uterine muscle do not contract efficiently with presence of obesity so rate of post partum hemorrhage and wound infection is high with increase in BMI.

CONCLUSION

Obesity is a serious public health problem worldwide. It has adverse effects on pregnancy outcome both for mother and the fetus. Obstetricians need to be aware of maternal and fetal risk associated with obesity and the client should be given appropriate dietary and life style advice.

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