



A STUDY OF FETOMATERNAL OUTCOME OF OBESITY IN TERTIARY MEDICAL CENTRE OF BIHAR

Obstetrics & Gynecology

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ABSTRACT

Introduction: Obesity is viewed as sixth important public health problem which causes several diseases like chronic hypertension, diabetes, cardiovascular diseases, stroke, cancer etc. This will cause decreased life expectancy in the future. Pregnancies complicated by obesity has been identified as early as 1945. **Aim and objectives:** To assess the incidence of pregnancy complications and neonatal outcome due to maternal obesity. **Material and methods:** This is a prospective observational study conducted in Narayan Medical College, Jamuhar over 100 patients in a one years duration. Control group was 100 patients with normal BMI. B.M.I is considered as <18.5 undeweight, 19-24.9 normal 25-29.9 overweight 30-34.9 obese >35 morbidly obese. **Result :** In the obese group 41% had preeclampsia, 11% had oligohydromnios, 9% had IUGR, 15% showed post date, 5% recorded abnormal presentation and positions. Only 8% had no associated risk factors. In the control group 60% subjects had no any associated risk factors, 20% had preeclampsia, 10% were post datism, 5% had abnormal presentation. There is significant difference between two groups. **Conclusion:** Our study points out the numerous maternal and perinatal risks in obese pregnant women which pose a considerable challenge to the obstetrical practitioner.

KEYWORDS

Obesity, maternal outcome, neonatal outcome, BMI

INTRODUCTION

In the past, obesity was alien to the developing countries of the world but it is increasingly attaining epidemic level in recent times. Obesity is now seen as a pandemic and was recently described by the World Health Organization (WHO) as one of the most blatantly visible but most neglected public health problems that threatens to overwhelm both developed and developing countries. This trend is also obtainable amongst pregnant women in both developing and developed countries, and may be attributed to the effects of westernization such as increased consumption of diet rich in refined sugars and saturated fats as well as increased physical inactivity and alcohol intake. For example, in the UK about 18.5–20% of pregnant women are obese. In the USA, 18.5–38.3% of pregnant women are obese and about 28–48% are overweight. (1)

Obesity is viewed as sixth important public health problem which causes several diseases like chronic hypertension, diabetes, cardiovascular diseases, stroke, cancer etc. This will cause decreased life expectancy in the future. Pregnancies complicated by obesity has been identified as early as 1945. Pre-pregnancy obesity endangers both maternal and fetal well-being. (2)

An increased association of morbidity and mortality with obesity is well established in both nonpregnant and pregnant women reflecting an increased risk of medical, surgical, or anesthetic complications. Obesity confers a high— risk status to pregnant women in particular, and a high proportion of women who die in pregnancy or postpartum are obese. (1)

The BMI, or Quetelet index (QI) is an internationally used measure of obesity described by the Belgian polymath Adolphe Quetelet during the course of developing "social physics" that compare person's weight in kilograms to height in meter square. There is a significant rising impact of obesity related pregnancy complications. (3) The confidential enquiry into maternal death reported that 35% of all maternal deaths in 2000–2002 were obese women having BMI $\geq 30 \text{ kg/m}^2$ (1)

Mothers who are overweight or obese during pregnancy and childbirth, as measured by increasing maternal body mass index (BMI), are known to be at risk of significant antenatal, intrapartum, postpartum and also neonatal complications. Diabetes, hypertensive disorders including preeclampsia, fetal deaths, big sized babies, postdate pregnancies, caesarean sections have all been associated with maternal obesity. Overweight and obese women are more likely to be induced and require a caesarean section for delivery. There appears to be a dose-dependent relationship between maternal obesity and fetal

macrosomia. In addition, still births and increased mortality of babies in postnatal and perinatal period are found in obese pregnant women. (4)

Maternal obesity impacts the growing fetus/embryo by way of several pathways: genetic, environmental and the diverse network of interactions between them. The exact mechanism in which obesity mediates poor health outcomes for both mother and fetus, are far from clear. Pieces of the puzzle are placed together incorporating knowledge gathered from epidemiological studies, experiments on animals and placenta models. The embryo inherits a given set of genes from both parents. It draws upon this genetic milieu for its continued development and growth. Genome-wide association studies have identified several common genetic variants associated with high adiposity and obesity, each with weak effects. Some of the candidate genes mentioned are those of insulin, insulin-like growth factor and their receptors because these hormones are known to influence fetal growth and body composition. The genetic influence of maternal obesity on the developing child cannot be explained by Mendelian-model inheritance of a given set of genes alone. Children of obese mothers are more at risk of overweight or obesity than those of obese fathers. This illustrates the pivotal role of intrauterine conditions on susceptibility to obesity, type 2 diabetes, and cardiovascular disease in the offspring. (5)

AIM OF THE STUDY

To assess the incidence of pregnancy complications and neonatal outcome due to maternal obesity.

MATERIAL AND METHODS

This is a prospective observational study conducted in Narayan Medical College, Jamuhar over 100 patients in a one years duration. Control group was 100 patients with normal BMI. B.M.I is considered as <18.5 undeweight, 19-24.9 normal 25-29.9 overweight 30-34.9 obese >35 morbidly obese.

INCLUSION CRITERIA

- 1) Women with BMI $> 30 \text{ kg/m}^2$ at first antenatal visit irrespective of parity.
- 2) Women presenting to ANC clinic at first trimester.
- 3) Women in age group of 18- 34 years.

EXCLUSION CRITERIA

- 1) Women with BMI $< 18.5 \text{ kg/m}^2$
- 2) Women who are known case of diabetes mellitus, chronic hypertension, hypothyroidism

BMI was calculated at first booking visit then they were followed

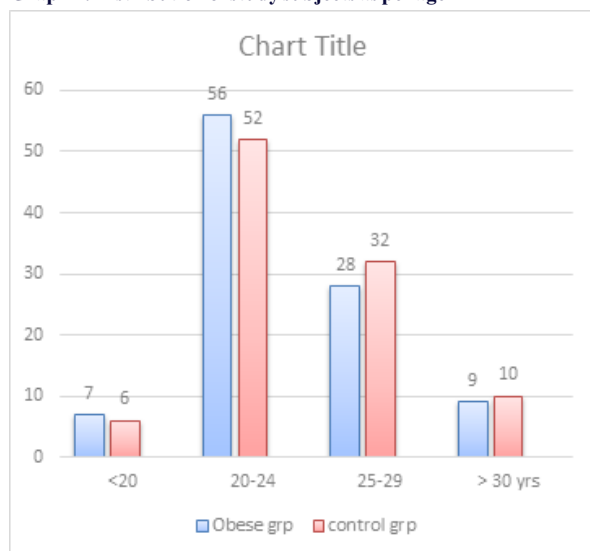
during their antenatal visits for any complication on basis of history, examination and investigations. All the observations regarding mode of delivery, fetal outcome, complications during labour and delivery or postpartum period were recorded.

METHODOLOGY

Pregnant women who were diagnosed with BMI>30kg/m² were invited to take part in the study. This study, done on them was explained in detail to them. An informed consent was obtained. Patients fulfilling the inclusion criteria were included.

RESULTS

Graph 1: Distribution of study subjects as per age



Maximum number of women in the study i.e. 56% in obese and 52% in control group were in the age group 20-24 yrs, 28% obese and 32% in control grp were in the age group 25-29 yrs. least number of women were more than 30 years (9% and 10%) and 7% obese and 6% control women were less than 20 years old.

In the present study of the 100 women in this study, 37 were primigravida and 63 were multigravida, whereas in control group out of 100, 64 study subjects were multigravida and 36 were primigravida.

Table 1: BMI and body weight of study subjects

	Group	Total	Mean	Standard Deviation	P value
Weight at booking	Obese	100	74.88 kg	8.09 kg	<0.001
	Control	100	52.24 kg	4.27 kg	
BMI at booking	Obese	100	31.80	2.46	<0.01
	Control	100	20.83	1.68	

In the obese group body weight at the time of booking was 74.88±8.09 kg whereas it was 52.24±4.27 kg. The BMI in obese group was 31.80±2.46 and in control grp it was 20.83±1.68. There is significant difference in both the group for both body weight and BMI.

Table 2: Distribution of study subjects as per Risk factors.

Risk factor	No of patients (Test)	%	No of patients (control)	%
Preeclampsia	41	41%	20	20%
oligohydromnios	11	11%	2	2%
IUGR	9	9%	2	2%
Gestational diabetes mellitus	11	11%	1	1%
Post dated	15	15%	10	10%
Abnormal presentation and positions	5	5%	5	5%
No any risk factor	8	8%	60	60%
Total	100	100%	100	100%

In the obese group 41% had preeclampsia, 11% had oligohydromnios, 9% had IUGR, 15% showed post date, 5% recorded abnormal presentation and positions. Only 8% had no associated risk factors. In

the control group 60% subjects had no any associated risk factors, 20% had preeclampsia, 10% were post datism, 5% had abnormal presentation. There is significant difference between two groups.

Table 3: Risk factors in association to grades of obesity

		Grade 1 obesity		Grade 2 obesity		Grade 3 obesity	
		No of pt	% of pt	No.of pt	% of pt	No of pt	% of pt
No of risk factors present	0	9	10.5%	0	0%	0	0%
	1	47	49.5%	1	20%	2	66.66%
	2	28	30.7%	2	40%	0	0%
	≥3	8	9.3%	2	40%	1	33.33%
Total		92	100%	5	100%	3	100%

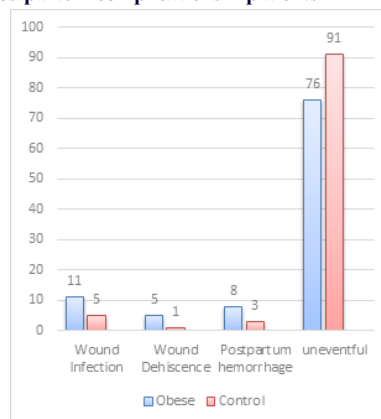
No risk factors were seen in 10.5% grade 1 obese women. Only one associated risk factor was recorded in 49.5% grade 1 obese women, 20% grade 2 obese women and 66.66% grade 3 obese women. More than 3 risk factors were associated in 9.3% women with grade 1 obesity, 40% women with grade 2 obesity and 33.33% women with grade 3 obesity.

Table 4: Distribution of study subjects as per birth weight

Birth weight	No of pt Cases	%	No of pt control	%
<2.5 kg	34	34%	12	12%
2.5-4 kg	42	42%	77	77%
>4 kg	24	24%	11	11%
total	100	100%	100	100%

Maximum number of newborns had a birth weight between 2.5 to 4 kgs (42%), 34% had weight less than 2.5kgs and 24% were born with a weight more than 4 kgs, whereas in control group 77% newborn had weight 2.5- 4kg, 12% had <2.5 kg whereas 11% had birth weight >4kg. In our present study 18% babies had intra uterine growth restriction, 12% babies had macrosomia, 10% had birth asphyxia, 7% shows preterm prematurity, 5% had meconium aspiration, 4% had low birth weight, 1% had icterus, 1% had congenital anomaly and 1 was in ICU because mother was admitted there.

Graph2: Postpartum complications in patients



In the present study 11% had wound infection, 8% women had postpartum haemorrhage, 5% had wound dehiscence, 76% uneventful cases. Whereas in control 5% had wound infection, 3% had postpartum haemorrhage, 1% had wound dehiscence. Odds ratio were 2.2, 5 and 2.67 for these three respectively.

DISCUSSION

In the present study of the 100 women in this study, 37 were primigravida and 63 were multigravida. In a study by **Jennifer Britto John** et al (2016)(4) reported 36% primigravida women in case group and 46% primigravida women in control group, 32 multigravida in case group and 27 multigravida in control group. In a study by **Monu Singh** et al (2020)(6) 44% women were primigravida and 56% were multigravida. In a study by **Ramya S** et al (2018)(7) 70% women were primigravida and 30% multigravida. So almost all study had findings which is in accordance with our study.

Maximum number of women in the study i.e. 56% in obese and 52% in control group were in the age group 20-24 yrs, 28% obese and 32% in control grp were in the age group 25-29 yrs. least number of women

were more than 30 years (9% and 10%) and 7% obese and 6% control women were less than 20 years old. **Idris U. Takai** et al (2021)(1) reported 41% obese women in their study below 36 years of age. In a study by **Lawrence Doi** et al (2020)(8) 27.2% pregnant obese women were in the age group 20-24 years, 32.9% in 25-29 years, 26.9% in 30-34 years and 13% in 35-40 years age group. In a study by **Ramya S** et al (2018)(7) 20% obese women between 18-22 years, 60% between 23-29 years, 20% between 30-35 years. A study by **Sumi Agrawal** et al (2016)(9) found that women who were obese before pregnancy had a mean age of 27.00 as compared to lean women with mean age of 24.25. In the obese group body weight at the time of booking was 74.88±8.09 kg whereas it was 52.24±4.27 kg. The BMI in obese group was 31.80±2.46 and in control group it was 20.83±1.68. In a study by **Idris U. Takai** et al (2021)(1). In a study by **Jennifer Britto John** et al (2016)(4) reported mean BMI of 35 kg/m². In a study by **Meher-un-nisa** et al (2018)(10) 33% women had BMI between 25-29.9 kg/m², 30% had BMI between 30-39.9 kg/m² and 4% had BMI more than 40 kg/m².

In the obese group 41% had preeclampsia, 11% had oligohydramnios, 9% had IUGR, 15% showed post date, 5% recorded abnormal presentation and positions. Only 8% had no associated risk factors. In the control group 60% subjects had no any associated risk factors, 20% had preeclampsia, 10% were post datism, 5% had abnormal presentation. A study by **Dr.E.Shanthi** et al (2007)(11) reported 33.3% preeclampsia, 8.33% IUGR, 25% postdatism and 1 case of Oligohydramnios.

Maximum number of newborns had a birth weight between 2.5 to 4 kgs (42%), 34% had weight less than 2.5 kgs and 24% were born with a weight more than 4 kgs, whereas in control group 77% newborn had weight 2.5-4 kg, 12% had <2.5 kg whereas 11% had birth weight >4 kg. In a study by **Idris U. Takai** et al (2021)(1) abnormal fetal weight (weight <2.5 kg and those ≥4 kg) were seen more (57.8%) in overweight/obese group compared to those with normal weight (35.9%) or underweight group (6.3%) (P = 0.031). In a study by **Jennifer Britto John** et al (2016)(4) the mean birth weight was 3.21 (±0.86) kgs. In a study by **Ravneet Kaur** et al (2017)(12) 19.14% neonates born by obese women weighed <2500 gms, 65.95% weighed between 2501-3499 gm and 14.89% were >3500 gms. A study by **Suresh S Kanakannavar** et al (2019)(13) found that normal weight mothers delivered 75 babies of less than 2.5 kg. Overweight mothers delivered 10% babies less than 2.5 kgs, 78% babies between 2.5 to 3.5 kgs & 12% babies more than 3.5 kgs.

18% babies had intra uterine growth restriction, 12% babies had macrosomia, 10% had birth asphyxia, 7% showed preterm prematurity, 5% had meconium aspiration, 4% had low birth weight, 1% had icterus, 1% had congenital anomaly and 1 was in ICU because mother was admitted there. In a study by **Meher-un-nisa** et al (2018) (10) 7% had macrosomia, 5% had Shoulder dystocia, 10% had prenatal mortality. In a study by **Noureen Yousaf** et al (2017)(3) 1% newborns had birth anoxia, 1% had shoulder dystocia, 4.8% had macrosomia. A study by **Shazia Awan** et al (2015)(14) reported 27% preeclampsia, 13% still births, 5% shoulder dystocia and 11% early neonatal deaths.

In the present study 11% had wound infection, 8% women had postpartum haemorrhage, 5% had wound dehiscence, 76% uneventful cases. Whereas in control 5% had wound infection, 3% had postpartum haemorrhage, 1% had wound dehiscence. Odds ratio were 2.2, 5 and 2.67 for these three respectively. In a study by **Meher-un-nisa** et al (2018)(10) 11.4% women had pregnancy induced hypertension, 7.1% had gestational diabetes, 16% had infections. In a study by **Monu Singh** et al (2020)(6) 35% had GDM, 34.37% had preclamasia, 16% reported wound infection. In a study by **Prabha Kumari** et al (2014)(15) preeclampsia were 3.35 (95%) in the obese group. For GDM, it was 40.622% in the obese group. A similar relationship was observed for PPH 28.12%. The incidence of postoperative wound infection was 12%.

CONCLUSION

Our study points out the numerous maternal and perinatal risks in obese pregnant women which pose a considerable challenge to the obstetrical practitioner. In addition, massive obesity among women of child bearing age is associated with a number of health risks later in life. This stresses the importance of concentrating on trying to reduce the increasing incidence of obesity in fertile women. The best time of intervention may be before a woman considers a pregnancy, because it is not recommended that obese women lose weight during pregnancy.

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