

Obesity - A Pandemic in 21st Century

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Received: 24-09-2022 / Revised: 08-10-2022 / Accepted: 15-10-2022

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Conflict of interest: Nil

Abstract

Introduction: Obesity among fertile women is reaching epidemic proportions. Mothers who are overweight or obese during pregnancy and childbirth are known to be at risk of significant antenatal, intrapartum, postpartum and neonatal complications. So the aim of the current study was to evaluate the effect of obesity on the maternal and perinatal outcomes in pregnancies complicated by obesity.

Material and Methods: It is a prospective observational study conducted over 100 cases in Department of O & G of MKCG MCH, Berhampur from October 2019 to September 2021. The mode and duration of delivery along with the antepartum, intrapartum and postpartum complications were recorded.

Results: The mean BMI was 30 ± 3.53 with a statistically significant association was observed with maternal weight gain in pregnancy, associated with preterm labour, induced labour, increased rates of caesarean section and prolonged hospital stay indicating that maternal obesity is a major risk factor for antepartum, intra-partum and postpartum complications. An increased risk of hypertensive disorders of pregnancy, gestational diabetes mellitus (GDM), pre-eclampsia, induction of labour, caesarean section, postpartum complications like wound infection, atonic PPH (post-partum hemorrhage), the longer length of maternal stay in hospital and preterm birth were observed among obese subjects.

Conclusion: Pregnancy complications related to maternal BMI is a growing problem. Maternal obesity is a risk factor for gestational diabetes, preeclampsia, labor induction, cesarean for fetal distress and wound infection.

Keywords: BMI, Caesarean, Maternal Obesity

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Introduction

Pregnancy is defined as high risk, when the probability of an adverse outcome for the

mother or child is increased over the base line risk of that outcome among the general

population by the presence of one or more ascertainable risk factors. [1] One such pre-existing maternal morbidity that makes a pregnancy high risk is obesity. Worldwide obesity is the most prevalent chronic medical condition. WHO describes obesity as “one of the most blatantly visible, yet most neglected public health problems that threaten to overwhelm both more and less developed countries. [2] Obesity is a “Killer disease” at par with HIV and malnutrition according to WHO. [3] Obesity contributes to development of many chronic diseases like type-2 Diabetes Mellitus, hypertension, heart diseases, joint diseases, gall bladder diseases and certain cancers. The prevalence of obesity in the general population and among women of childbearing age has increased dramatically during past 25 years. [4,5] The rate of obesity in pregnant women is rising, increasing the significance of its impact on obesity-related pregnancy complications. Antenatally, obesity has been associated with an increase in the risk of abortion, gestational diabetes, gestational hypertension and pre-eclampsia. [6] It has also been associated with prolonged pregnancies, prolonged labour, increased rates of caesarean deliveries and postnatal infections with prolonged hospital stay. [7,8] Obesity is also associated with a higher risk of adverse neonatal outcomes including still births, congenital anomalies, neonatal intensive care admissions and perinatal mortality rates. [9] With increasing prevalence of overweight and obesity in India, the need to determine its effect on maternal and fetal outcome is alarmingly increasing. The need of the day is to address this issue and strategies must be made to reduce the frequency of this disease particularly among the females of reproductive age group.

Aims and Objectives

To evaluate the effect of obesity on maternal and perinatal outcomes in pregnancies complicated by obesity.

Materials and Methods

The current study is a prospective observational study conducted in the Department of O & G, MKCG Medical College and Hospital, Berhampur; Odisha from October 2019 to September 2021 over 100 cases. Among antenatal mothers attending antenatal outpatient department or getting admitted to labour room, women were chosen in their 1st trimester with BMI ≥ 25 kg/m² as study population. Pregnant mothers were selected according to inclusion and exclusion criteria as follows: inclusion criteria: (a) singleton pregnancies (b) with BMI ≥ 25 kg/m² (c) pregnant women coming for ANC in the 1st trimester and with exclusion criteria: (a) multifetal gestation, (b) known diabetic and known hypertensive, (c) known medical disorders like renal disease, thyroid disorders, heart disease. (d) Mothers not booked at 1st Trimester. (d) women who could not be followed until delivery. All women were subjected for detailed history followed by complete general and physical examination. Relevant history such as age, parity, socioeconomic status, menstrual history, infertility, hypertension, diabetes, hypothyroidism, or other medical illnesses, history of previous pregnancy outcome was obtained in detail in these women along with family history of obesity, hypertension and diabetes were enquired. Relevant hematological, biochemical investigations, USG were also done. They were followed up to delivery and postpartum until discharge and outcome studied. Height was recorded once using a stadiometer, with the individual standing straight next to the wall with the heels, buttocks, shoulders and occiput touching the wall. Weight was measured twice at the beginning (First: antenatal record at 1st visit in 1st trimester and Second: end of pregnancy using normal weighing machine). The difference between the two weights was taken as net weight gain in pregnancy. The data were used to calculate Quetelet index or the BMI.

The QUETELET INDEX is equal to a person's weight divided by their height. BMI is calculated as weight in kilograms/height in meters [2]. The Current recommended cut-offs of BMI by WHO10 is (a) Normal: 18.5-24.9 kg/m² (b) Overweight: 25.0-29.9 kg/m² (c) Obesity: ≥ 30 kg/m². The Consensus meeting statement based on various studies all over India¹¹ (a) Normal BMI: 18.5-22.9 kg/m² (b) Overweight: 23.0-24.9 kg/m² (c) Obesity in Indians: ≥ 25 kg/m²

In current study pregnant women having BMI ≥ 25 kg/m² will be considered as obese. Maternal outcomes to be studied include gestational diabetes, gestational hypertension, pre-eclampsia, malpresentation, fetal growth restriction, induction of labour, non-progress of labour, fetal distress, instrumental delivery, LSCS and its related complications, shoulder dystocia and post-partum hemorrhage. Fetal outcomes were studied which

included birth weight, low APGAR score, neonatal intensive care admissions and number of preterm birth and stillbirth. Statistical analysis was performed using SPSS version 21.0 (IBM, IL, Chicago) sheet.

Results

The results of the above study conducted in the Department of Obstetrics and Gynecology of MKCG Medical College, Berhampur; Odisha were as follows. Out of 100 cases studied 46 cases (46%) belonged to BMI range of 25-29.9 kg/m², 31 cases(31%) in range of 30-34.9 kg/m², 16cases(16 %) cases in BMI range 35-39.9 kg/m² and 7 cases(7%) belonged to BMI of ≥ 40 kg/m² category i.e. highest prevalent of obesity seen in BMI range of 25-29.9 kg/m².(Figure-I). The current study included 63 cases (63%) of primigravida and 37 cases (37%) of multigravida who were having BMI of more than 25 kg/m².

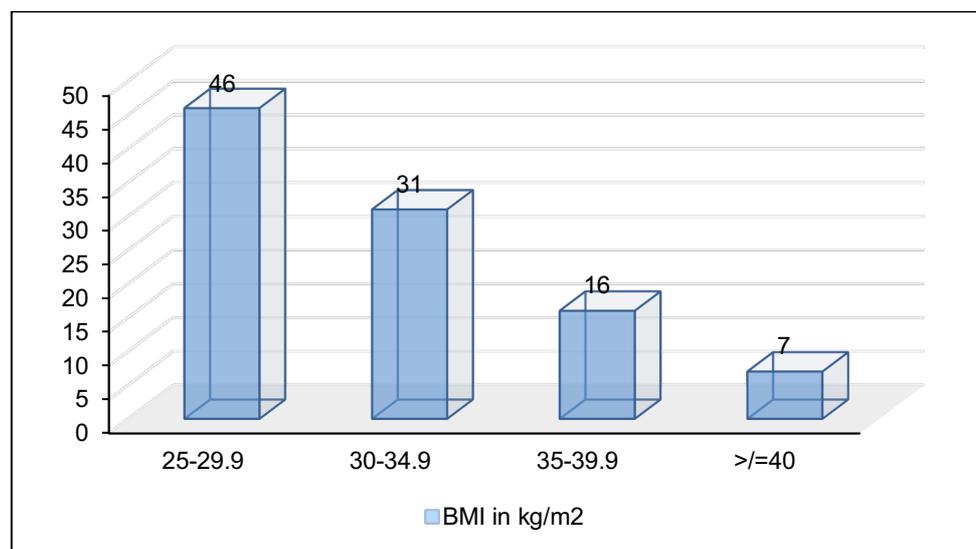


Figure 1: Maternal BMI

Among all cases observed, maximum cases i.e. 61 cases(61%) presented with more than average weight gain during pregnancy followed by 28 cases(28%) are within normal limit of weight gain and 11cases(11%) below the normal limit of weight gain. Antepartum complications

were present in 72 cases(72%) out of these cases, 5 cases(5%) had miscarriage, 30 cases(30%) had Preeclampsia, 12 cases(12%) developed Gestational hypertension, 4 cases(4%) developed Eclampsia, 10 cases(10%) had GDM, 8

cases(8%) had FGR and 12 cases(12%) had preterm labour.(Table-I)

Table 1: Antepartum Complications

Antepartum Complications	Number of Cases	Percentage
Present	72	72
Abortion	05	05
Preeclampsia	30	30
Gestational Hypertension	12	12
Eclampsia	04	4
GDM	10	10
FGR	08	8
Preterm	12	12
Absent	28	28

Out of 100 cases, maximum cases i.e. 87 cases(87%) delivered at 37-42 weeks followed by 10 cases(10%) delivered at 33-36 weeks, 2 cases(2%) delivered at 28-32 weeks and one case(1%) delivered at more than 42 weeks(post term).

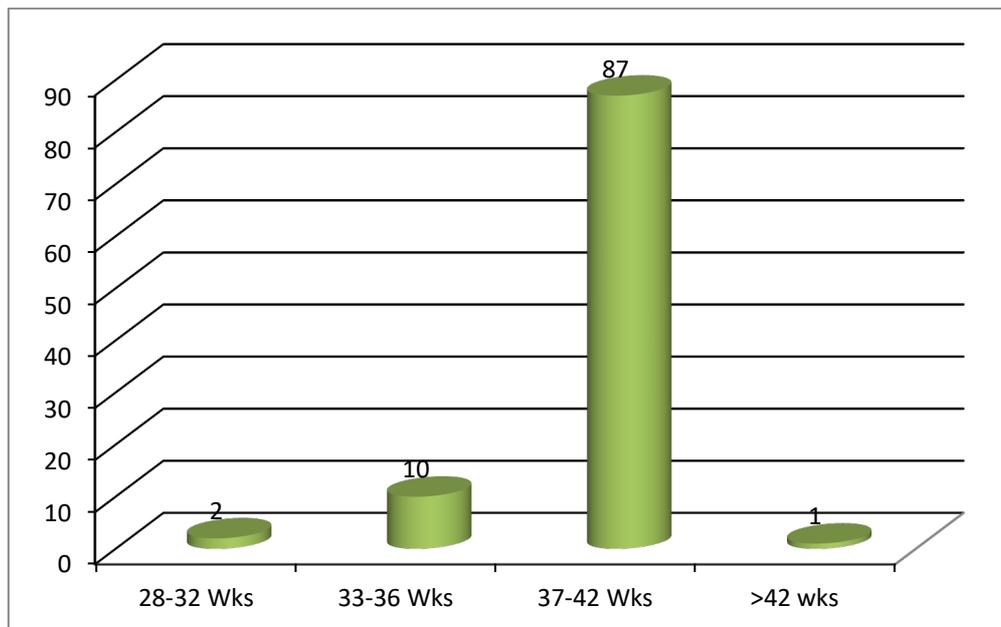


Figure 2: Gestational Age at Delivery

Among all, 42 cases (42%) delivered by VD whereas 58 cases (58%) delivered by LSCS. Out of all, 78 cases (78%) went into labour among which in 47 cases (47%) have spontaneous onset of labour and in 31 cases (31%) have induction of labour. Out of 58 cases of LSCS, 13 cases (22.5%) and 45 cases (77.5%) had undergone Elective and Emergency LSCS respectively. Out of 13 cases of Elective LSCS, 5 cases (38.5%)

were of HDP, 3 cases each of (23%) of previous uterine scar and CPD, 2 cases (15.5%) were of malpresentation. Out of 45 cases of Emergency LSCS, 10 cases (23%) of fetal distress, 8 cases (19%) of induction failure, 6 cases (13%) each of CPD and prev. LSCS, 7 cases (15%) of arrest of cervical dilatation, 3 cases (6%) of malpresentation, 2 cases (4%) each

eclampsia and DTA and 1 case (2%) of placenta praevia seen.

The most common indication of induction of labour was PIH. Induction was done in 7 cases (22.5%) of Preeclampsia, 8 cases (26%) of GDM, 4 cases (13%) of gestational hypertension, 5 cases (16%) of PROM, 6 cases (19%) of post-datism and 1 case of eclampsia (3%).

Out of all, 34 cases (34%) had intrapartum complications with maximum cases i.e. 16

cases(16%) had fetal distress, 7 cases (7%) had non progress of labour(NPOL), 8 cases (8%) had failed induction and 3 cases (3%) had shoulder dystocia(Table-II). Among 9 cases found to have postsurgical complication of LSCS, 5 cases (55%) were of wound infection and 4 cases (45%) were of wound dehiscence. No cases of DVT found in current study. Out of total 42 cases of VD 37 case (88%) had spontaneous VD, ventouse was applied in 4 cases (10%) and forceps was applied in 1 case (2%).

Table 2: Intrapartum Complications

Intra-Partum Complications	Number of Cases	Percentage
Present	34	34
(a) Fetal Distress	16	16
(b) Non Progress of Labour(NPOL)	07	07
(c) Failed Induction	08	08
(d) Shoulder Dystocia	03	3
Absent	66	66
Total	100	100

Out of 42 cases of VD, postpartum complications were seen in 12 cases (28.5%), which included 7 cases (16.5%) of PPH and 5 cases (12%) of cervical or vaginal tear. (Table-III)

Table-III: Postpartum Complications

Postpartum complications	Number of Cases	Percentage
Present	12	28.5
(a) PPH	07	16.5
(b) Cervical/ Complete Perineal Tear	05	12
Absent	30	71.5
Total	42	100

Out of 17 cases of PPH, there were 9 cases (53%) of atonic PPH, 4 cases (23.5%) of traumatic PPH and 4 cases (23.5%) of mixed PPH. No case of maternal mortality found. Among 58 cases of LSCS, complications were observed in 19 cases (33% which included 10 cases (17%) of intra-operative and 9 cases (16%) of postoperative complications like wound infections.

Among the neonatal complications, 2 cases (2%) had IUD, 2 cases (2%) had still birth, 5 cases (5%) had neonatal mortality and 51 cases (51%) had neonatal morbidities which included 3 cases (3%) of birth

trauma, 14 cases (14%) of meconium aspiration and birth asphyxia, 4 cases (4%) of congenital anomaly, 8% cases (8%) of prematurity, 10 cases (10%) of LBW and 11 cases (11%) of macrosomia. There were 40 cases (40%) normal new born found. On examination of birth weight, it was found that maximum number of cases i.e. 77 cases(77%) had birth weight of 2.5 to 3.5 kg followed by 12 cases(12%)had birth weight < 2.5 kg and 11 cases(11%) had birth weight of more than 3.5 kg. Total of 36 number of newborns were admitted to NICU, out of which, 10 cases (28%) were admitted for meconium aspiration, 8 cases

(22%) or preterm, 4 cases (11%) for asphyxia, 4 cases (11%) or diabetic mother, 4 cases (11%) for congenital anomaly, 3 cases (8%) for macrosomia, 2 cases (5%) for Transient tachypnea of newborn and 1 case (3%) for FGR.

Discussion

In the recent times, obesity has emerged as a health hazard worldwide and results in a decline in life expectancy in the future. [10,11] The antepartum, intrapartum, postpartum and neonatal assessments were done and outcome of each pregnancy in terms of maternal and perinatal morbidities & mortalities were studied. The body mass index (BMI), or Quetelet index, is used to assess the degree of obesity in a patient, based on an individual's weight and height. Due to COVID-19 pandemic the number of pregnant women attending ANC clinic in their 1st trimester was very less and many patients were lost to follow up. Total 105 cases of singleton pregnancy with BMI ≥ 25 kg/m² were taken for study. Among them, 5 pregnant women had spontaneous abortion. The remaining 100 women were studied for the maternal and perinatal outcome.

Most of the cases (59%) belonged to Class-I obesity according to Kuppaswamy classification. Maximum cases i.e. 61% cases gained weight above the recommended normal limit during the study period. Preterm labour occurred in 12% of cases in the current study which was comparable to that of Debasmita M et al (7.58%) and Shuchi et al (10%). [13,12]. Most cases, 87% cases had their delivery at term and the result tallied with that of Shuchiet al (90%) [12].

In our study 10% cases delivered within 33-36 wks which was higher than that of Debasmita M et al (5.31%) [13] and comparable to Shuchi et al (10%) [12], 2% cases within 28-32 wks which was less than that of Debasmita M et al (7.72%) [13] and 1% case were post term (>42 weeks), in

contrast to Shuchi et al [12] showing no post term delivery in their study. Regarding antepartum complications in pregnancy, results of our study coincided with many studied conducted earlier. Antepartum complications were associated in 72% of cases which was comparable to that of Shuchi et al (68%) [12]. Preeclampsia was reported in 30% cases which were comparable to the figure of Shuchi et al (38%) and Voigt et al (37.9%) [12,14] but more than that of Debasmita M et al (8.76%) and Meher-Un-Nisa (11.4%) [13,15]. Eclampsia was found in 4% cases which were comparable to that of Shuchiet al (2%) [12] and this is similar to that of Baeten JM [16] who found the incidence of eclampsia increased with increasing BMI. The rate of gestational diabetes mellitus was 10% which was more or less similar to that of Shuchi et al (6%), Meher-Un-Nisa et al (7.1%), Bianco AT et al (14.2%), Debasmita M et al (19.43%) and less than Lu (30%) [12,15,17,13,18]. While Kongubol A and Phupong V et al [19] said that pre-pregnancy obesity without metabolic problems did not increase the risk for GDM. The reason of obese women being at higher risk of developing GDM has yet to be fully delineated, but is likely related to an increase in insulin resistance. As a result of the continued production of counterregulatory (anti-insulin) hormones by the growing placenta, insulin resistance increases progressively throughout pregnancy [20]. The frequency of FGR was found to be 8% which is concurrent with the figure of Perlow JH et al (8.1%) [21] and comparable to that of Shuchi et al (6%) [12]. Suchi et al stated that this could be due to a possible confounding effect of preeclampsia, as obese patients have higher prevalence of pre-eclampsia, which has been associated with FGR for long. In contrast, Baeten JM [16] found that FGR in the overweight and obese group was 5.1% and 5.6% respectively, compared with 6.1% in the non-obese group.

Intrapartum complications were seen in 34% of cases. Fetal distress was the most common intrapartum complication in 16% cases which is more than that of Bianco et al [17] having 12.4%. Non Progress of labour (NOPL) was found in 7% cases which was less than that of Bianco et al (12.9%) and Debasmita M et al (14.7%) [17,13]. This in contrast to Shuchi et al (0%) [12] who stated that they actively managed labour patients in their hospital and any abnormality in progress of labour was quickly detected. The difference in values could be due to the smaller sample size in their study. Failure of induction of labour occurred in 8% of cases while shoulder dystocia was seen in 3% of cases which was almost comparable to that of Shuchi et al (2%), Debasmita M et al (2.6%) [12,13].

In current study out of 42% cases of vaginal delivery (VD), 16.5% cases had PPH and 12% cases had cervical/ complete perineal tear which was little more than that of Debasmita M et al (9.5%) [13]. Shuchi observed that there is an increased risk of post-partum complications like PPH and cervical /paravaginal tear in cases of vaginal delivery, which was supported by Usha Kiran et al and Liu X et al [22,23]. Most common type of PPH was atonic PPH (53%) in present study. Postoperative Wound infection was found in 15.5% of LSCS cases which was more than that of Shuchi et al (6%) and Debasmita M et al (9.95%) [12,13] and supported by Satpathy H K et al, Alanis MC et al and Mandal et al [24,25,26]. The local changes, such as an increase in adipose tissue, an increase in local tissue trauma related to retraction, the immune dysfunction, increased association of diabetes with obesity and lengthened operative time, may contribute to the increased incidence of surgical site infections caused by obesity (Shuchi et al) [12]. Alanis MC et al [25] reported that avoidance of subcutaneous drains and

increased use of transverse abdominal wall incisions should be considered in massively obese parturients to reduce operative morbidity. Prophylactic antibiotics are, therefore, indicated to prevent endometritis after Cesarean section in obese women Meher-Un Nisa et al [15]. Fortunately, no maternal mortality case was seen in this study.

The major concern in obese pregnant women was fetal macrosomia that was seen in 11% of cases, which was almost similar to that of Chu SY et al [27] (13.3%), Meher-Un-Nisa et al (7%) and Debasmita M et al (7.6%) [15,13] but less than that of Ørskou et al (20%) [28]. Most newborns i.e. 66% cases had birth weight within 2.5-3.5kg. [29]

Conclusion

Higher prevalence of complications to both fetus and mother was seen when BMI is more than 25 kg/m² in mother with obesity. Women with BMI ≥ 25 kg/m² were associated with significantly increased incidence of preeclampsia and caesarean sections than women with BMI less than 25 kg/m²; there was an increase in eclampsia, gestational diabetes mellitus, fetal growth restriction, preterm labour pains, malpresentation, and shoulder dystocia. Also elective caesarean section, intraoperative complications, inductions of labour, postpartum hemorrhage, cervical/paravaginal tears, post-operative wound infection and macrosomia were higher in cases with BMI more than 25 kg/m² group. With regards to the perinatal outcome in the BMI more than 25 group, post-dates, fetal distress, non-progress of labour, low birth weight, NICU admissions were also higher which implicates the need of pre-pregnancy advice and counseling to young women. Healthcare professionals need to encourage and assist obese women to make life style changes, to lose weight pre-conceptually in an attempt to optimize and potentially decrease the risk of complication in pregnancy. Pregnancies

among obese women must be classified as high-risk pregnancies and appropriate care should be provided with heightened surveillance, anticipation and diagnosis of the complications and intervene earlier if complications arise. Pre-conceptional

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weight loss and optimal pregnancy weight gain can be helpful in achieving the goal we all strive for, a healthy mother and a healthy baby.

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