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Original Research Paper

Association of Maternal Body Mass Index with Materno-Fetal Outcome

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ABSTRACT:

Objective: To categorise pregnant women according to their BMI noted in first trimester and to note materno-fetal outcome in each group. Also to note the awareness of pre-pregnancy weight amongst pregnant women. ***Method:*** A cross sectional study conducted in the department of Obstetrics and Gynecology, MGM Medical College and Hospital, Aurangabad from December 2020 to December 2022. Pregnant women with singleton pregnancy having their first trimester height and weight record were included in this study. Total 322 participants that were admitted in the labour room during this period were stratified into 4 group based on obesity classification by WHO. The antenatal, intrapartum, postpartum and neonatal outcome was studied in each BMI category. Postpartum weight loss after 48 hours was also noted. ***Result***: Majority of women did not know their pre conception weight in a developing country like India. Obesity is one of the factors for infertility and a significant women required the need for ART for conception. Abnormal weight gain was seen in abnormal BMI pregnant women and there was significant postpartum weight loss in overweight women. GDM, hypertensive disorder of pregnancy, FGR, failure of induction, mode of delivery are affected by the higher BMI of pregnant women. Macrosomia, lactation failure was also seen in obese women. ***Conclusion:*** Obesity in pregnant women is a serious concern as it can lead to complications during antenatal and perinatal periods, as well as long term effects on both the mother and the baby and close supervision and proper care can greatly improve the outcomes of pregnancy.

Keywords: Body mass index, Maternal obesity, Macrosomia, Gestational diabetes mellitus

INTRODUCTION:

Maternal obesity prevalence is increasing in many countries in the world, including Asia South-East Asian countries and is associated with a greater risk of mother and early neonatal deaths. Worldwide obesity has nearly tripled since 1975, with about 13% of adults being obese and about 39% of adults being overweight[1].Over the last 40 years, the global prevalence of obesity in women has increased 2.5-fold from 6% to 15%[2]. Obesity is defined as pre-pregnancy BMI >30 and <35 kg/m^2; morbid obesity is defined as pre-pregnancy BMI >or=35 kg/m^2. Well-controlled gestational diabetes mellitus (GDM) is defined as mean blood glucose <105 mg/dl[3].Maternal obesity increases the risk of a number of pregnancy complications, including preeclampsia, GDM, and cesarean delivery[4]. Excessive weight gain during pregnancy and postpartum retention of pregnancy weight gain are significant risk factors for later obesity in women[5]. The foetus is at risk of preterm birth, post-term pregnancy, macrosomia and increased neonatal intensive care unit admission. The increasing rate of maternal obesity provides a major challenge to obstetric practice. Maternal obesity can result in negative outcome for both mother and foetus[6]. Maternal obesity increases the risk of a number of pregnancy complications and, as such, requires adjustment to routine prenatal care. Maternal obesity is a risk factor for spontaneous abortion (for both spontaneous conceptions and conceptions achieved through assisted reproductive technology), as well as for unexplained stillbirth (intrauterine fetal demise)[7]. The American College of Obstetricians and Gynaecologists (ACOG) to recommend that at the prenatal visit, height and weight should be recorded for all women to allow calculation of body mass index and appropriate weight gain should be reviewed at the initial visit and periodically throughout pregnancy[8]. India is now facing a burden of under nutrition on one side, and the steadily increasing prevalence of overweight and obesity in affluent societies on the other side. Within Maharashtra, there are significant differences between rural and urban areas with rural areas being more affected by malnutrition and

problems related to underweight are anaemia, low birth weight, premature rupture of membranes and decreased risk of preeclampsia and gestational diabetes[9]. Not only does maternal obesity affect the woman, but it also impacts the health of the child, leading to increased childhood obesity and diabetes[7].Gestational weight gain in healthy women is also influenced by various maternal factors such as pregnancy height-weight, age, parity, socioeconomic status, ethnic origin and physical activity level[10].

The Body Mass Index (BMI) is a simple index of the weight-for-height and it is calculated by dividing a person's weight in kilograms by the square of their height in meters (kg/m2)[11]. It is a measure for indicating nutritional status in adults[12]. The BMI classification of pregnant women is based on the pre-pregnancy weight as it is used frequently as a marker for mother's nutritional state before pregnancy. But in India, due to low health literacy, women are unaware of the concept of preconception counselling and lack prepregnancy weight records[13].

The aim of our study is to evaluate the correlation of maternal body mass index with materno-fetal outcome. The objectives of this study is to categorise pregnant women according to their BMI in four groups, to note the number of pregnant women having their pre-pregnancy weight record and to evaluate the materno-fetal outcome in each group.

MATERIAL AND METHODOLOGY:

Present descriptive study is a cross sectional study conducted in the department of Obstetrics and Gynecology, MGM Medical College and Hospital, Aurangabad from December 2020 to December 2022. Institutional ethics committee approval was taken prior to commencement of this study. A written consent was obtained from all participants before the start of study. Pregnant women with singleton pregnancy having their first trimester height and weight record were included in this study.

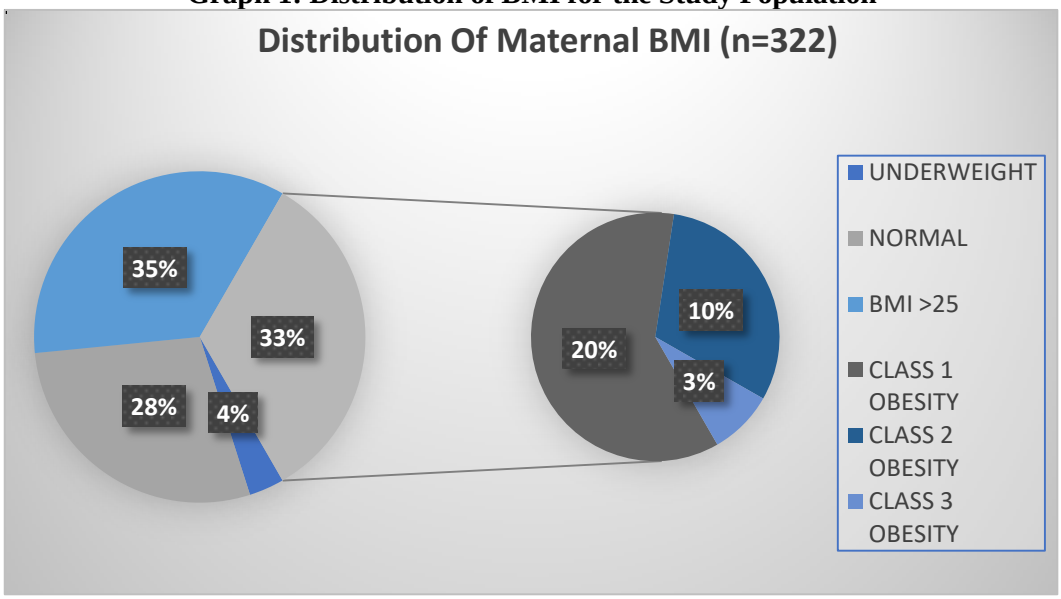
Total 322 participants that were admitted in the labour room during this period were stratified into 4 group based on obesity classification by WHO

- Underweight : less than or equal to BMI 18.5 kg/m2
- Normal : BMI > 18.5 – 24.9 kg/m2
- Overweight : BMI 25 – 29.9 kg/m2
- Obesity : Class 1 Obesity : BMI 30.0 – 34.9 kg/m2
  Class 2 Obesity: BMI 35.0 – 39.9 kg/m2
  Class 3 Obesity: More than or equal to BMI 40.0 kg/m2

The group with the BMI in normal range of 18.5 – 24.9 kg/m2 is used as a reference or the comparison group for analysis. The antenatal, intrapartum, postpartum and neonatal outcome was studied in each BMI category. Postpartum weight loss after 48 hours was also noted. The data was entered in Microsoft Excel and analysed using SPSS version 24.0th Mean and SD was calculated for quantitative variables.Chi-square test was applied to check significance association between different outcomes of study. P-Value of <0.05 was considered statistically significant.

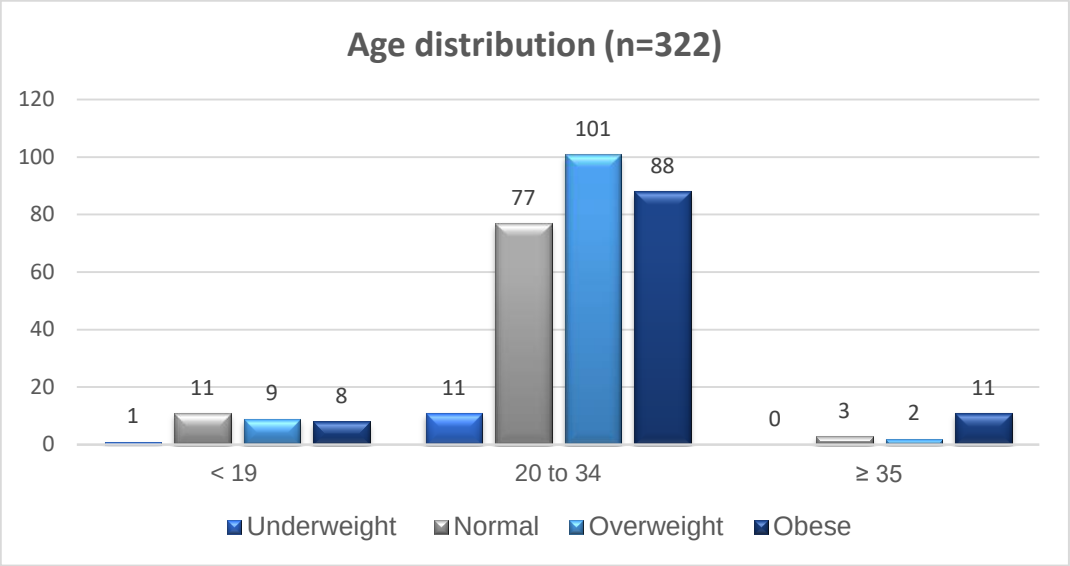
RESULTS:

Graph 1: Distribution of BMI for the Study Population



Graph 1 shows the distribution of participants according to their 1st trimester BMI

Graph 2: Distribution of cases according to Age



Graph 2 shows that advanced maternal age is associated with obesity. (p value- 0.0014, significant)

Table 1(a): Incidence of preterm delivery in underweight women

Sr No	Gestational age	Normal (n=70) n (%)	Underweight (n=10) n (%)	p-value
1	**Preterm**	7 (2.17)	4 (1.24)	**0.00997 (Significant)**
2	**Term**	63 (19.56)	6 (1.8)	

Table 1(b): Incidence of preterm delivery in overweight women

Sr No	Gestational age	Normal (n=70) n (%)	Overweight (n=87) n (%)	p-value
1	**Preterm**	7 (2.17)	17 (5.2)	**0.09**
2	**Term**	63 (19.56)	70 (21.7)	

Table 1(c): Incidence of preterm delivery in obese women

Sr No	Gestational age	Normal (n=70) n (%)	Obese (n=90) n (%)	p-value
1	**Preterm**	7 (2.17)	20 (6.2)	**0.04 (Significant)**
2	**Term**	63 (19.56)	70 (21.7)	

Table 1: In my study it was observed that preterm delivery is significantly seen in underweight and obese women.

Table 2(a): Incidence of prolonged pregnancy in underweight women

Sr No	Gestational age	Underweight (n=8) n (%)	Normal (n=84) n (%)	p-value
1	**Term**	6 (1.8)	63 (19.56)	**0.5**
2	**Prolonged Pregnancy**	2 (0.6)	21 (6.5)	

Table 2(b): Incidence of prolonged pregnancy in overweight women

Sr No	Gestational age	Normal (n=84) n (%)	Overweight (n=95) n (%)	p-value
1	**Term**	63 (19.56)	70 (21.7)	**0.8**
2	**Prolonged Pregnancy**	21 (6.5)	25 (7.7)	

Table 2(c): Incidence of prolonged pregnancy in obese women

Sr No	Gestational age	Normal (n=84) n (%)	Obese (n=87) n (%)	p-value
1	**Term**	63 (19.56)	70 (21.7)	**0.39**
2	**Prolonged Pregnancy**	21 (6.5)	17 (5.2)	

Table 2 shows there was no correlation of prolonged pregnancy with BMI in my study.

Table 3(a): Distribution of cases according to conception in overweight women

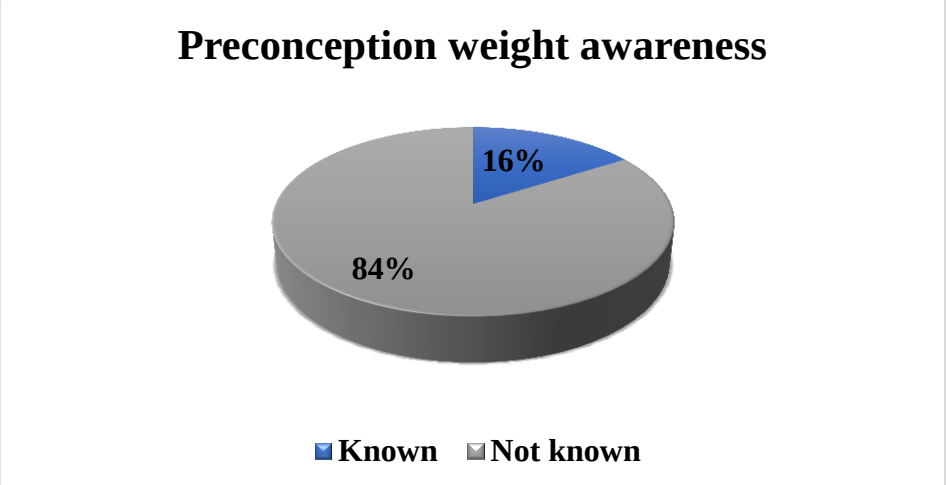
Sr No	Conception	Normal (n=91) n (%)	Overweight (n=112) n (%)	p-value
1	**Spontaneous**	87 (27.01)	102 (31.6)	**0.2**
2	**ART**	4 (1.24)	10 (3.1)	

Table 3(b): Distribution of cases according to conception in obese women

Sr No	Conception	Normal (n=91) n (%))	Obese (n=107) n (%)	p-value
1	**Spontaneous**	87 (27.01)	91 (28.2)	**0.014 (Significant)**
2	**ART**	4 (1.24)	16 (4.96)	

Table 3 shows obesity is one of the factor for infertility and significant number of patient required the need for ART.

Graph 3: Distribution of women on awareness of preconception-weight



Graph 3 shows that majority (84%) were not aware about their preconception weight.

Table 4: Distribution of cases according to weight gain in pregnancy

Sr No	Weight gain in pregnancy (kg)	Underweight (n=12) n (%)	Normal (n=91) n (%)	Overweight (n-112) n (%)	Obese (n=107) n (%)	Total (n=322) n (%)
1	**< 4**	0	1 (0.31)	6 (1.8)	3 (0.9)	**10 (3.1)**
2	**4 to 6**	7 (2.1)	24 (7.4)	28 (8.6)	41 (12.7)	**100 (31)**
3	**6 to 11**	5 (1.5)	59 (18.3)	67 (20.8)	60 (18.6)	**191 (59.3)**
4	**12 to 18**	0	7 (2.1)	9 (2.7)	2 (0.6)	**18 (5.59)**
5	**> 18**	0	0	2 (0.6)	1 (0.31)	**3 (0.9)**

Table 4 shows abnormal weight gain is seen in abnormal BMI.

Table 5: Distribution of cases according to weight loss after 48 hours of delivery

Sr No	Weight loss after 48 hours of delivery (kg)	Underweight (n=12) n (%)	Normal (n=91) n (%)	Overweight (n-112) n (%)	Obese (n=107) n (%)	p-value
1	**2 to 4**	12 (3.7)	68 (21.1)	67 (20.8)	53 (16.4)	**0.0006 (Significant)**
2	**5 to 7**	0	23 (7.1)	43 (13.3)	49 (15.2)	
3	**8 to 10**	0	0	2 (0.6)	5 (1.55)	

Table 5 shows significant postpartum weight loss is seen in overweight patients.

Table 6: Distribution of cases according to BMI independent antenatal risk factors

Sr No	Antenatal complications	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)
1	**Anaemia**	6 (1.8)	39 (12.1)	54 (16.7)	36 (11.1)	**135 (42)**
2	**Infectious disease**	0	2 (0.6)	1 (0.3)	1 (0.3)	**4 (1.24)**
3	**APH**	0	4 (1.24)	1 (0.3)	3 (0.9)	**8 (2.4)**
4	**Prolonged pregnancy**	2 (0.6)	21 (6.5)	25 (7.7)	17 (5.2)	**63 (19.5)**
5	**Heart disease**	0	1 (0.3)	2 (0.6)	0	**3 (0.9)**
6	**Liver disease**	0	0	0	1 (0.3)	**1 (0.3)**
7	**Rh negative Pregnancy**	1 (0.3)	4 (1.24)	4 (1.24)	2 (0.6)	**10 (3.1)**
8	**PROM**	3 (0.9)	12 (3.7)	18 (5.6)	16 (4.9)	**49 (15.2)**
9	**Previous LSCS**	1 (0.3)	14 (4.3)	16 (4.9)	33 (10.2)	**64 (19.8)**
10	**Seizure disorder**	0	2 (0.6)	0	0	**2 (0.6)**

Table 6 shows distribution of incidence of various antenatal risk factors according to BMI classification.

Table 7: Antenatal risk factor affected by underweight BMI

Sr. no.	Antenatal Complications		Underweight (n=12) n (%)	Normal (n=91) n (%)	p-value
1.	Oligohydramnios	Yes	2 (1.94)	35 (33.9)	0.13
		No	10 (9.7)	56 (54.3)	
2.	FGR	Yes	10 (9.7)	42 (40.7)	0.015 (Significant)
		No	2 (1.94)	49 (47.5)	
3.	PROM	Yes	3 (2.9)	12 (11.6)	0.2
		No	9 (8.7)	79 (76.6)	

Table 7 shows that FGR significantly depends on maternal nutritional status.

Table 8: Antenatal risk factor affected by overweight BMI

Sr no.	Antenatal Complications		Normal (n=91) n (%)	Overweight (n=112) n (%)	p-value
1.	PIH	Yes	11 (5.4)	26 (12.8)	0.04 (Significant)
		No	80 (39.4)	86 (42.3)	
2.	GDM	Yes	6 (2.9)	18 (8.86)	0.03 (Significant)
		No	85 (41.8)	94 (46.3)	
3.	Thyroid Disorders	Yes	7 (3.4)	17 (8.37)	0.1
		No	84 (41.3)	95 (43.7)	
4.	Oligohydramnios	Yes	35 (17.2)	36 (17.7)	0.34
		No	56 (27.5)	76 (37.4)	
5.	Polyhydramnios	Yes	6 (2.9)	9 (4.4)	0.69
		No	85 (41.8)	103 (50.7)	
6.	FGR	Yes	42 (20.6)	36 (17.7)	0.04 (Significant)
		No	49 (24.13)	76 (37.4)	

Table 8 shows PIH, GDM and FGR is significantly associated with overweight BMI.

Table 9: Antenatal risk factor affected by obese BMI

Sr. no.	Antenatal Complications		Normal (n=91) n (%)	Obese (n=107) n (%)	p-value
1.	PIH	Yes	11 (5.5)	28 (14.14)	0.013 (Significant)
		No	80 (40.4)	79 (39.8)	
2.	GDM	Yes	6 (3.03)	24 (12.1)	0.0019 (Significant)

		No	85 (42.9)	83 (41.9)	
3.	**Thyroid Disorders**	**Yes**	7 (3.53)	12 (6.06)	**0.4**
		No	84 (42.4)	95 (47.9)	
4.	**Oligohydramnios**	**Yes**	35 (17.6)	34 (17.7)	**0.32**
		No	56 (28.8)	73 (36.8)	
5.	**Polyhydramnios**	**Yes**	6 (3.03)	8 (4.04)	**0.8**
		No	85 (42.9)	99 (50)	
6.	**FGR**	**Yes**	42 (21.2)	44 (22.2)	**0.4**
		No	49 (24.7)	63 (31.8)	

Table 9 shows PIH and GDM is significantly associated with obese BMI.

Table 10: Distribution of cases according to Mode of delivery

Sr No	Mode of delivery	Underweight (n=12) n (%)	Normal (n=91) n (%)	Overweight (n=112) n (%)	Class 1 Obesity (n=65) n (%)	Class 2 Obesity (n=33) n (%)	Class 3 Obesity (n=9) n (%)	Total (n=322) n (%)
1	**Vaginal Delivery With Episiotomy**	8 (2.4)	34 (10.5)	40 (12.4)	14 (4.3)	4 (1.2)	4 (1.2)	**104 (32.2)**
2	**Vaginal Delivery Without Episiotomy**	2 (0.6)	2 (0.6)	3 (0.9)	4 (1.2)	0	0	**11 (3.4)**
3	**Vaginal Delivery With Tear**	0	5 (1.55)	6 (1.8)	3 (0.9)	3 (0.9)	0	**17 (5.2)**
4	**Instrumental Delivery**	0	0	0	1 (0.3)	0	0	**1 (0.3)**
5	**Elective LSCS**	0	9 (2.7)	6 (1.8)	4 (1.2)	5 (1.55)	5 (1.55)	**29 (9.0)**
6	**Emergency LSCS**	2 (0.6)	41 (12.7)	57 (17.7)	39 (12.1)	21 (6.5)	0	**160 (49.6)**

Table 10 shows distribution of cases according to Mode of delivery. In majority of cases i.e. 160 emergency LSCS was performed.

Table 11(A): Comparison of mode of delivery in normal BMI and underweight women

Mode of Delivery	Normal (n=91) n (%)	Underweight (n=12) n (%)	p-value
Vaginal Delivery	41 (39.8)	10 (9.7)	**0.012 (Significant)**
LSCS	50 (48.5)	2 (1.94)	

Table 11(A) shows incidence of LSCS is significantly decreased in underweight women.

Table 11(B): Comparison of mode of delivery in normal BMI and overweight women

Mode of Delivery	Normal (n=91) n (%)	Overweight (n=112) n (%)	p-value
Vaginal Delivery	41 (20.1)	49 (24.1)	**0.85**
LSCS	50 (24.6)	63 (31.03)	

Table 11(B) shows in overweight patient the mode of delivery was comparable.

Table 11(C): Comparison of mode of delivery in normal BMI and obese women

Mode of Delivery	Normal (n=91) n (%)	Obese (n=107) n (%)	p-value
Vaginal Delivery	41 (20.7)	33 (16.6)	**0.03 (Significant)**
LSCS	50 (25.25)	74 (37.3)	

Table 11(C) shows obesity significantly affects mode of delivery.

Table 12: Distribution of cases according to intrapartum complication

Sr No	Intrapartum complication	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)
1	**PPH**	1 (0.3)	27 (8.3)	33 (10.2)	42 (13.04)	**103 (31.9)**
2	**Shoulder dystocia**	0	0	1 (0.3)	2 (0.6)	**3 (0.9)**
3	**Inverted T incision in LSCS**	0	2 (0.6)	1 (0.3)	1 (0.3)	**4 (1.2)**

Table 12 shows PPH is one of the common complication seen in abnormal BMI.

Table 13(A): Incidence of failed induction in normal BMI and overweight women

Failed Induction	Normal (n=29) n (%)	Overweight (n=43) n (%)	p-value
Yes	16 (26.3)	25 (34.7)	**0.8**
No	13 (18.0)	18 (25)	

Table 13B): Incidence of failed induction in normal BMI and obese women

Failed Induction	Normal (n=29) n (%)	Obese (n=34) n (%)	p-value
Yes	16 (25.3)	27 (42.8)	**0.03 (Significant)**
No	13 (20.6)	07 (11.1)	

Table 13 shows failed induction of labour is associated with increasing BMI.

Table 14: Distribution of cases according to postnatal complication

Sr No	postnatal complication	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)
1	**delayed ambulance**	0	2 (0.6)	1 (0.3)	9 (2.7)	**12 (3.7)**
2	**Thromboembolic event**	0	0	1 (0.3)	0	**1 (0.3)**
3	**prolonged catheter**	0	12 (3.7)	13 (4.03)	18 (5.5)	**43 (13.3)**
4	**febrile morbidity**	1 (0.3)	6 (1.8)	4 (1.2)	2 (0.6)	**13 (4.03)**
5	**UTI**	1 (0.31)	2 (0.6)	0	0	**3 (0.9)**

6	**Wound infection**	1 (0.3)	6 (1.8)	7 (2.1)	10 (3.1)	**24 (7.4)**
7	**ICU admission**	0	7 (2.1)	4 (1.2)	6 (1.8)	**17 (5.2)**

Table 14 shows distribution of postnatal complication in various BMI. Incidence of thromboembolic event were less as all postoperative patients with BMI more than 30kg/m^2 and BMI >28kg/m^2 if associated with risk factors such as preeclampsia received LMWH (100%). Increased wound infection was seen with increasing BMI.

Table 15(A): Incidence of lactation failure in normal BMI and overweight women

Lactation failure	Normal (n=91) n (%)	Overweight (n=112) n (%)	p-value
Yes	6 (2.9)	13 (6.4)	**0.22**
No	85 (41.8)	99 (48.7)	

Table 15(B): Incidence of lactation failure in normal BMI and obese women

Lactation failure	Normal (n=91) n (%)	Obese (n=107) n (%)	p-value
Yes	6 (3.03)	28 (14.1)	**0.00027 (Significant)**
No	85 (42.9)	79 (24.5)	

Table 15 shows lactation failure significantly seen in obese women.

Table 16(A): Distribution of cases according to birth weight

Sr No	birth weight (kg)	Underweight (n=12) n (%)	Normal (n=91) n (%)	Overweight (n=112) n (%)	Obese (n=107) n (%)	Total (n=322) n (%)
3	**< 2.5**	7 (2.17)	36 (11.1)	37 (11.4)	36 (11.1)	**116 (36)**
4	**2.5 to 4**	5 (1.5)	55 (17)	74 (22.9)	65 (20.1)	**199 (61.8)**
5	**> 4**	0	0	1 (0.3)	6 (1.8)	**7 (2.17)**

Table 16(B): Distribution of cases according to birth weight

Birthweight (kg)	Normal (n=91) n (%)	Overweight (n=112) n (%)	p-value
2.5-4kg	74 (36.4)	65 (32)	**0.04 (Significant)**
>4kg	1 (0.3)	6 (1.8)	

Table 16 shows developing macrosomia is significantly associated with obese women.

DISCUSSION:

Obstetrician are in a key position to prevent and treat this obesity epidemic with adverse consequences to the mother and baby, therefore it is important to know the risk associated to address this issue with patients, supervise and give proper care to them.

This study was conducted in tertiary care centre during December 2020 to December 2022. We included 322 singleton pregnancies and were classified into four groups according to their BMI. Out of 322 women, majority were from overweight and obese category i.e.35% and 33% respectively followed by 28% normal BMI and 4% underweight. According to fifth and latest national family health survey NFHS-5 (2019-2021), the percentage of obese women was 24%. The

incidence rate of obese is likely to be higher in my study because it is a tertiary care centre.[14]

We observed that increase in maternal age and women belonging to urban areas are associated with increase in BMI. Anjana Verma et al. reported elderly age and higher education belonged to overweight and obese group in 2012.[11]

In our study preterm delivery was associated with underweight (p=0.009) and obese women(p=0.04). In a study conducted by Bodnar in 2005, he demonstrated increased risk of spontaneous and idiopathic preterm births in obese women.[15] Hendler had reported that maternal BMI ≥ 30 Kg/m2 had less chances of spontaneous preterm delivery.[16]

There was no correlation of BMI with prolonged pregnancy in my study. Denison FC et al. reported median BMI noted in first trimester was higher in postdates compared to patients delivering at term.[17] Obesity is associated with activation of HPO axis, increased clearance of cortisol likely to reduce placental corticotrophin releasing hormone production and consequently delivery timing being effected.

Obesity is one of the factors causing infertility and a significant number of obese women (p=0.014) require the need for assisted reproductive technique for conception. Amala Sunder et al. conducted a study in 2972 patients in which 3.7% incidence of IVF conception was reported with p value = 0.009 between BMI groups.[18]

In our study only 16% of women knew their pre conception weight while majority of them that is 84% were unaware of their pre conception weight. There is a need for counselling the women to note their pre conception weight. The system for classifying all pregnant women based on body mass index in normal day- to-day practice is yet to be adopted to prevent associated risk factors.[19]

Our study demonstrates that abnormal weight gain is seen in abnormal BMI. Mary Annfaucher et al. reported 47-72% obese women gained excess weight than recommended, being additional risk factor.[20]

There was significant postpartum weight loss in overweight patients was seen in my study. Bodnar reported his study conducted in 2005 had increased weight loss in class 1 and 2 obese women.[15]

The following were seen to be independent of BMI in our study, Anaemia in my study population was not found significant in obese women. Elmaraigneret et al. reported obesity as a risk factor for iron deficiency anaemia and nutritional anaemia due to extensive release of cytokines from inflamed adipose tissue altering iron haemostasis. [21]

Risk of GDM was observed with women with overweight BMI(p=0.03) and obese BMI(p=0.0019) similar to other studies. Kalk P. et al conducted a study included 2049 mothers in Charite University Hospital reported increased BMI was associated with increased complications like GDM, Hypertension, pedal oedema and foetal macrosomia.[22] Maternal obesity is associated with hyperinsulinemia and hyperlipidemia. This enhances oxidative stress with decreased prostacyclin and increased peroxide production which results in vasoconstriction and platelet aggregation leading to increased risk of hypertensive disorders of pregnancy. With a p value of 0.04 for overweight BMI women and 0.013 for obese women an increase in PIH, this study estimated a significant increase in PIH similar to other studies. Prabha et al. reported that linear relationship between increasing BMI and risk of developing preeclampsia and gestational Diabetes mellitus in a case control study conducted in 6020 pregnant women in 2014.[12]

In our study APH was independent of BMI which is contrary to study by Mamula et al. where increase in risk of antepartum haemorrhage was noticed in obese women which has been attributed to placental abruption.[23] A study conducted by Cedergren et al in 2004 did not find any increased risk for placental abruption in a study which had larger numbers of morbidly obese women, similar to the findings in our study.[24]

There was increased risk of FGR with overweight category (p= 0.04); a trend also noticed in other studies. Also FGR is seen in underweight category (p=0.015). Power et al. in 2019 reported 10.4% of small for gestational age (SGA) births were due to underweight women who gained weight below recommendations.[25]

In our study majority if cases underwent emergency LSCS in the normal and overweight category while the incidence of LSCS decreased significantly in underweight women.Obesity affects the mode of delivery.Obesity was a significant risk factor for both elective and emergency LSCS which was also seen in study conducted by Fyfe et al. They also reported significant risk of prelabour LSCS (p = 0.02) as well as increased rates of caesarean delivery in first stage (OR: 2.89) among obese. They reported similar rates of second stage LSCS among both obese and non-obese.[26]Rode et al. had demonstrated a fivefold increase in odds of instrumental deliveries among obese women. In our study there was only one patient who needed instrumental delivery.[27]

PPH is one of the common complication seen in abnormal BMI. Sebire et al. reported increase in postpartum haemorrhage with higher BMI by 70% .[28]In our study increase in wound infection was seen in obese women (p=0.0002). Stamilio DM et al. conducted a cohort study in 585 women in 2014 which reported two-to-four-fold rise in wound infection, endometritis and wound hematoma in obese women.[29]While the incidence of thromboembolic event was less in all postoperative patients with BMI >30kg/m2 or 28kg/m2 with comorbidities received LMWH as per institutional protocol.

Lactation failure is seen significantly in obese women (p=0.0002). Lisa H Amir et al. conducted a systematic review of obesity and breastfeeding intention,

initiation and duration in 2007 and it was noted delayed lactogenesis in obese women and are less likely to initiate breastfeeding than normal weight women.[30]

In our study there was a significant association between macrosomia and obesity (p=0.04). Inspite of the higher rates of macrosomia, there was no significant increase in shoulder dystocia in most of the obese mothers. Sahu et al had reported significantly higher rates of macrosomia among morbidly obese women (p = 0.02).[31]Sheiner et al. felt that after having adjusted for diabetes mellitus, no significant association was found between macrosomia and obesity alone.[32] Besides, Catalano had already demonstrated that GDM can be a confounding factor in a study between macrosomia and obesity.[33]

CONCLUSION:

In conclusion, obesity in pregnant women is a serious concern as it can lead to numerous complications during prenatal and antenatal periods, as well as long-term effects on both the mother and the baby. It is crucial for pregnant women who are obese to work closely with their healthcare provider to manage their weight and minimize the associated risks. Close supervision and proper care can greatly improve the outcomes of pregnancy for both the mother and the baby.

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