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Original Research Article

Chubby mothers-maternal and perinatal outcome in high body mass index

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ABSTRACT

Background: Obesity is a state of excess adipose tissue mass. Body mass index (BMI) is a crucial predictor of nutritional status of pregnant women. High BMI may lead to various adverse maternal and perinatal outcomes. This study is designed to see the effect of maternal BMI on pregnancy outcome and perinatal outcome according to Asian standards.

Methods: This is an institutional retrospective, descriptive study of 100 pregnant women conducted in the department of obstetrics and gynaecology of a rural tertiary centre Dr. PSIMS and RF, Chinaoutpalli, Gannavaram, Vijayawada, AP, India from June 2017 to July 2019.

Results: It was observed that as BMI increased risk of complications increased like hypertension disorders in pregnancy, gestational diabetes mellitus, preterm labour. Also risk of macrosomia, operative delivery, Neonatal intensive care unit (NICU) admissions increased.

Conclusions: As maternal BMI is a good predictor has strong correlation with pregnancy complications and outcomes, measures should be taken to motivate for pre pregnancy counselling regarding weight management and close surveillance in antenatal period to diagnose at the earliest any complications.

Keywords: Body mass index, Macrosomia, Caesarean section, Pre-eclampsia, Neonatal intensive care unit

INTRODUCTION

Obesity is the state of excess adipose tissue mass. Adipose mass increases by enlargement of adipose cells as well as by increase in number of adipocytes.¹

A healthy foetus from a healthy mother was coined by Sir Julius Huxley. The global safe motherhood initiative launched in 1987, is designed to improve antenatal care and counselling throughout the world. Obesity causes or exacerbates many health problems, both independently and in association with other diseases.²

Pregnancy by itself alters the physiology in women, which increase many medical problems increasing the morbidity and mortality if not supervised and managed accordingly. The prevalence of obesity on raise in young

women in the recent world which has a major impact on the reproductive outcomes, which have been documented by several researchers.

The raising rate of obesity is a major public health concern more so in the developing countries like India as very few females come for pre conceptional counselling, and so pre pregnancy weight record is not available and thus the women even from rural areas are unaware of their weights.³

Obesity is an independent as well as associated risk factor which causes or exacerbates many health problems. It is associated with development of type 2 diabetes mellitus, coronary heart disease, and increased incidence of cancer, respiratory complications and osteoarthritis of large and small joints in the later years.⁴

Obese pregnant women are at increased risk for an array of maternal and perinatal complications and the risks accomplished with increasing degree of maternal obesity.^{5,6}

It has been estimated that, quarter of pregnancy complications like gestational hypertension, pre-eclampsia, gestational diabetes, preterm birth is attributable to excess gestational weight gain.⁶

The worldwide obesity epidemic continues to be a major public health challenge particularly in women of child bearing age.⁷⁻⁹

BMI calculation values vary in developed and in developing countries. BMI calculation based on Asian standards have low cut off value than that given by WHO.

In our study, we classified patients with BMI, according to Asian standards and studied correlation with complications, maternal and perinatal outcome.

METHODS

This present study is an institutional retrospective, descriptive study of 100 pregnant women conducted from June 2017 to July 2019. In the department of obstetrics and gynaecology of a rural tertiary centre PSIMS and RF, Chinaoutpalli, Gannavaram, Vijayawada, AP, India.

Data is collected from the case sheets, traced through medical record department and classified according to their BMI in Asian standards and pregnancy complications, maternal and perinatal outcomes studied. Statistical analyses done by MS excel software.

Table 1: Asian standards for classification of BMI.

BMI (kg/m ²)	Interpretation
<18.5	Underweight
18.5-22.9	Normal
23-24.9	Overweight
≥25	Obese

Table 2: WHO standards for classification of BMI.

BMI (kg/m ²)	Interpretation
<18.5	Under weight
18.5-24.9	Normal
25-29.9	Over weight
≥30	Obese
30-34.9	Class 1 obese
35-39.9	Class II obese
≥40	Class III obese

Inclusion criteria is Singleton pregnancy, age>20 years and <35 years, BMI>18.5 kg/m.²

Exclusion criteria is multiple pregnancy, age <20 years and >35 years, pre-existing comorbidities like hypertension, overt diabetes, SLE etc.

Antenatal women were categorised into 3 groups according to their BMI as follows (on the basis of Asian standards).

RESULTS

Figure 1 shows sample size is 100 antenatal women. Normal BMI 26 women (26%), overweight 24 women (24%) and obese 50 women (50%)

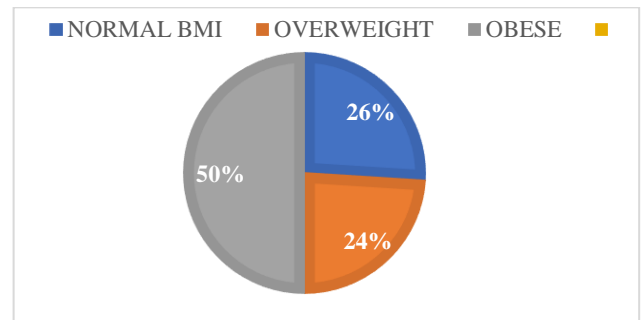


Figure 1: Sample size according to Asian classification of BMI.

Table 3: BMI and pregnancy outcome.

Pregnancy outcome	Normal, (n=26) (%)	Overweight, (n=24) (%)	Obese, (n=50) (%)
Gestational hypertension	00	00	3 (6)
Pre-eclampsia	1 (3.84)	3 (12.5)	14 (28)
Eclampsia	0	00	2 (4)
Gestational diabetes	0	2 (8.33)	5 (10)
Hypertensive retinopathy	0	0	1 (2)
Preterm labor	2 (7.69)	1 (4.16)	5 (10)

Table 3 shows in our study, we had 3 cases of pre-eclampsia, 2 cases of GDM and one preterm labour in overweight group. Whereas 20 cases of hypertension disorders in pregnancy along with hypertensive retinopathy and 5 cases of GDM in obese group which indicate as BMI increases, pregnancy complications increase.

Table 4: BMI and mode of delivery.

Mode of delivery	Normal, (n=26) (%)	Overweight, (n=24) (%)	Obese, (n=50) (%)
Vaginal	18 (69.2)	20 (83.3)	18 (36)
LSCS	7 (26.9)	4 (16.6)	28 (56)
Instrumental	1 (3.84)	0	4 (8)

Table 4 shows in our study, vaginal delivery rate is decreasing and caesarean section rate is increasing with increasing body mass index. Caesarean section rate increased to 56.6% and instrumental delivery rate is 8% in obese women. Incidence of caesarean section rate doubled in obese when compared to normal body mass index.

Table 5: BMI and perinatal outcome.

Perinatal outcome	Normal, (n=26) (%)	Overweight, (n=24) (%)	Obese, (n=50) (%)
Preterm birth	2 (7.69)	1 (4.16)	5 (10)
Stillbirth	0	0	0
IUD	0	0	0
APGAR			
0-3	0	0	0
4-6	1 (3.84)	0	1 (2)
7-10	25 (96.15)	24 (100)	49 (98)
NICU admissions	1 (3.84)	2 (8.33)	17 (34)
Perinatal mortality	0	0	0
Birth weight (kg)			
≤2	0	0	1 (2)
2.0-2.49	1 (3.84)	3 (12.5)	5 (10)
2.5 -2.99	13 (50)	11 (45.83)	16 (32)
3.0-3.49	12 (46.1)	10 (41.6)	22 (44)
3.5-3.99	0	0	3 (6)
4-4.49	0	0	3 (6)

Table 5 shows risk of macrosomia, preterm birth and NICU admission increased with increased body mass index. Macrosomia in 12%, NICU admissions 34%, preterm birth 10% in obese women. There is no perinatal mortality.

Table 6: BMI and maternal morbidity.

Maternal morbidity	Normal, (n=26) (%)	Overweight, (n=24) (%)	Obese, (n=50) (%)
Wound infections	0	1 (4.16)	2 (4)
Secondary suturing	0	1 (4.16)	2 (4)
DVT	0	0	0
Blood transfusions	1 (3.84)	2 (8.33)	2 (4)

Table 6 shows rate of wound infections and secondary suturing increased with body mass index. Due to high body mass index, rate of wound infections, secondary suturing is increased. PPH is seen in 8.33% in overweight and 4% of obese women due to prolonged labor and atonicity.

DISCUSSION

A number of systems have been used to define and classify obesity. The BMI also known as Quetelet index, is currently most often used. The BMI is calculated as weight in kilograms divided by square of the height in meters (kg/m^2).

In our present study, 100 pregnant women who attended antenatal OPD at Dr. PSIMS and RF were included who met with inclusion and exclusion criteria.

They were classified based on Indian standards: Overall distribution of cases-Normal weight-26%, over weight-24%, obese-50%. then the outcome is also compared with WHO standards.

In our present study, maternal outcomes such as preeclampsia was seen in normal weight (3.84%), overweight (12.5%) and obese (28%) pregnant women but if we take according to WHO standard, preeclampsia was seen in 31.5% of women with pre-obesity, 20% in obese I, 42.8% in obese II, 25% in obese III. In another study carried by Santos et al, preeclampsia was seen in 34.6% of women with maternal overweight and obesity (according to WHO).¹⁰ In present study and the other study conducted by Bhushan et al, preeclampsia was found to be significant in women with high BMI.¹⁴

If we take according to WHO standards, we would miss 4 cases (16.34%) of pre-eclampsia cases undiagnosed. Gestational hypertension was 6% in obese women (Asian standards). Study carried out by Santos et al, the percentage was increased to 35.6% with obese women (WHO).¹⁰

If we take WHO standards as obese, we would have missed 6% as they fall under normal BMI.

Present study shows increase in percentage of gestational HTN with increase in BMI correlating with the study conducted by Bhushan et al.¹⁴

Another study conducted by Bhuvaneshwari et al gestational hypertension was found in 33% of obese women followed by overweight 9%.¹⁵

GDM in present study was seen in 18.33% in overweight and obese (Asian), whereas it is 34.46%(WHO).

Similar studies done by Santos et al, the risk of GDM in obese and overweight women was 42.8%. Therefore, DM is associated with increasing overweight and obesity (WHO).¹⁰

In study by Bhuvaneshwari et al, gestational diabetes was found in 13% in obese women followed by overweight women 7%.¹⁵ In another study conducted by Ramya et al GDM was found in 13%.¹⁶

If we take WHO standards, we would miss 4% of GDM.

The risk of preterm labor was increased from 10.5% in pre-obese women to 28.5% in obese II women and 25% in obese class III according to WHO, whereas it is 4.16% in overweight and 10% in obese women according to Indian standards but it has got no significance in studies conducted by Santos et al.¹⁰

Bhuvaneshwari et al in their study found that preterm labor was seen in obese 11% and overweight 6%.¹⁵

We would miss 3 cases, if WHO standards considered.

Caesarean section rate has increased from 16.6% in overweight women to 56% in obese women according to Indian standards, whereas it is 51.6% in preobese, 45% in obese class I, 71.4% in obese class II and 50% in obese class III women. Dr. Bhuvaneshwar et al reported caesarean delivery in 55% obese women which correlated with our study¹⁵

Similar studies were seen with Bhushan et al and Ramya et al where the risk of caesarean sections and instrumental deliveries increases significantly with increase in BMI.^{14,16} Another study conducted by Lisonkaya et al obese women had higher rate of caesarean delivery, previous LSCS, labor induction rates (WHO).⁹

The rate of instrumental delivery was 25% in obese III individuals according to WHO standard.

Regarding perinatal outcome in our present study, as BMI increases, there was increase in birth weight of baby, correlating with studies of James et al and Kumar et al.^{3,13}

Bhubaneshwar et al in her study found that babies >3.5 kg were seen in obese women (22%) followed by overweight women 5.2% which correlates with our study.¹⁵

The average Apgar score at 5min was 7-10 in 100% of babies with overweight mother and 98% of babies with obese mothers. There is no correlation between BMI and APGAR score in our study which correlates with study conducted by Ramya et al.¹⁶

The rate of NICU admission was 34% in babies with obese mother according to Indian standards, which correlates with study conducted by Bhuvaneshwar et al where NICU admissions was seen in 33% of obese women.¹⁵ Similar studies are seen with Bhushan et al and Ashok Kumar et al where the number of NICU admissions increased significantly with increase in BMI.^{13,14}

There was no stillbirth, IUD, maternal mortality in our study. The study of effect of maternal BMI shows strong association with adverse maternal and perinatal outcome.

Hence adequate pre conceptional counselling is necessary to attain normal BMI and meticulous antenatal care to screen, diagnose and treat medical disorders. Proper intrapartum and postpartum care to decrease morbidity has to be taken. Obesity is a modifiable risk factor. High BMI is associated with dyslipidaemia, Type 2 DM and chronic hypertension in future. So, maintaining physical health is the first step to prevent the morbidity.

Limitations

With good sample size more significant outcome would be measured.

CONCLUSION

Asian population have different ethnicity, stature, socio economic status and there is every chance of missing the cases undiagnosed if we take WHO criteria for BMI calculation, which may lead to adverse maternal and perinatal outcome. So, Asian standards may have to be considered for calculating BMI and thus counselling and managing the cases.

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