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Original Research Article

Retrospective study to assess the prevalence of overweight and obese women delivering at tertiary care centre in Pune

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ABSTRACT

Background: Obesity is a modern-day epidemic affecting women in reproductive age group. Increase in obesity in pregnant women is associated with increased rates of complications.
Methods: A retrospective study was conducted based on available hospital data between January 2020 and March 2020. Pregnant women who have had their first visit at this centre before 20 weeks period of gestation were included and were classified into normal body mass index (BMI), overweight and obese. The rates of caesarean delivery, hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), assisted reproductive techniques (ART) for conception and neonatal intensive care unit (NICU) admissions were studied.
Results: A total of 582 pregnant women were included in the study. The estimated prevalence of obesity was 29.3% (n=171) whereas 27.8% (n=162) were overweight. There was statistically significant association seen between obesity and caesarean delivery rates, HDP, NICU admission.
Conclusions: The results reveal high prevalence of obesity in pregnant women. There is a need for a comprehensive and clinically effective approach to tackle obesity.

Keywords: BMI, Obesity, Overweight, High risk pregnancy

INTRODUCTION

Obesity is a condition characterized by excessive body fat resulting in significant impairment of health. Quantitatively it has been defined by WHO as a BMI of ≥30 kg/m^2. Overweight is defined by a BMI ≥25 kg/m^2. The definition has further been modified for Asian population. The BMI range being 23-24.9 kg/m^2 for overweight and ≥30 kg/m^2 for obese. The WHO has declared obesity as a major public health problem in 2000 and based on estimates 1.5 billion adults are overweight worldwide of which around 300 million being obese women.[1] From 1975-2016, the proportion of adult women with obesity increased from 6% to 15% globally.[2,3] Based on Indian statistics available the proportion of overweight/obese adult women nearly doubled from 12.6% in 2006 to 20.7% in 2016.[4]

Obesity in pregnancy is fraught with complications, both for the mother and the fetus. Difficulty in obese reproductive age women starts preconceptionally and may have everlasting complications. Obese women have

associated menstrual irregularities, anovulation, coexisting polycystic ovarian syndrome, subfertility hypertension and diabetes mellitus (DM). After conception there is an increased risk of HDP and GDM. Obesity aggravates the normal complaints of pregnancy like pedal edema and breathlessness. Obese women are more likely to have labor dystocia, operative delivery, postpartum hemorrhage, postop wound infection, deep vein thrombosis and lactation failure.[5]

Obesity with its associated complications in the form of HDP and GDM may negatively affect fetal development through epigenetic process causing preterm birth, macrosomia, congenital anomaly, still birth and neonatal death.[6-9]

Aim and objectives

The aim of this study was to estimate the prevalence of overweight and obese women at our centre and to correlate with fetomaternal outcomes in the form of associated HDP, GDM, caesarean delivery, ART conception, NICU admission.

METHODS

The study was a retrospective analysis of hospital data of women undergoing delivery at a tertiary care centre in Pune between January 2020 to March 2020. The study included women delivering at our centre who had their first visit before 20 weeks period of gestation and for whom the pre pregnancy/first trimester weight was available. BMI was calculated based on the available height and weight,

$$BMI=\frac{weight\ (kg)}{height\ (m^2)}.$$

BMI of 23-24.9 kg/m^2 was considered as overweight whereas BMI ≥25 kg/m^2 was taken as obese.[10] As per review of literature the prevalence of obesity (BMI >25 kg/m^2) was 12%, with 95% CI and precision of 5%, the sample size was calculated as 16211. A total of 647 deliveries took place during the study period, of which required data was available for 582 women.

The data was collected and tabulated in excel sheet. The data was analysed using IBM statistical package for social sciences (SPSS) version 23.0. The categorical variables were summarized using frequency, proportions and ratios, while the Z test for equality of proportions was used to determine the association between study variables. A p value of <0.05 was considered statistically significant.

RESULTS

Out of the 582 women studied, 162 women were overweight making prevalence of 27.8% while 171 women were obese with prevalence of 29.3%. The age wise distribution of overweight women and obese women is as shown in Table 1. The distribution of overweight and obese women based on parity is as shown in Table 2.

Parameters studied were caesarean rates, GDM, HDP, NICU admission and assisted reproduction. For the purpose of caesarean delivery, only primary caesarean rates were considered. Caesarean done for conditions where vaginal delivery was contraindicated (absolute and relative) like breech presentation, low lying placenta, twin with first twin non vertex was excluded. GDM case was defined as carbohydrate intolerance of variable severity, first detected during pregnancy. ART conception included ovulation induction, intra uterine insemination and *in vitro* fertilization. The distribution of the above parameters is shown in Table 3.

Table 1: Age wise distribution of overweight and obese ladies.

S. No.	Age group (years)	Overweight (BMI 23-24.9)	Obese (BMI >25)
		N (%)	N (%)
1.	<20	17 (10.4)	12 (07.0)
2.	21-25	55 (33.9)	61 (35.6)
3.	26-30	64 (39.5)	69 (40.3)
4.	31-35	18 (11.1)	23 (13.4)
5.	36-40	8 (04)	6 (03.5)
6.	Total	162 (100)	171 (100)

Table 2: Distribution based on gravidity.

S. No.	Age group (years)	Overweight (BMI 23-24.9)	Obese (BMI >25)
		N (%)	N (%)
1.	Primigravida	62 (38.2)	52 (30.4)
2.	Gravida 2	48 (29.6)	45 (26.3)
3.	Gravida 3	28 (17.2)	62 (36.2)
4.	Gravida 4	24 (14.8)	12 (07.0)
5.	Total	162 (100)	171 (100)

Table 3: Distribution of study parameters based on BMI.

Study parameters	Normal (BMI 18.5-22.9)	Overweight (BMI 23-24.9)	Obese (BMI >25)
	N (%)	N (%)	N (%)
Total Number (N)	249	162	171
LSCS	30 (12.05)	21 (12.96)	33 (19.30)
GDM	34 (13.65)	23 (14.20)	24 (14.04)
HDP	12 (4.82)	17 (10.49)	16 (9.36)
NICU	9 (3.61)	13 (8.02)	15 (8.77)
ART	19 (7.63)	10 (6.17)	13 (7.60)

There was significant difference in caesarean rates between obese and normal BMI ladies; however no statistically significant difference existed between normal BMI and overweight ladies. Similarly, the rates of HDP were also significantly greater in obese and overweight when compared with normal BMI pregnant ladies. The rates of NICU admission were also higher in obese and overweight individuals. The prevalence of GDM was higher in obese and overweight individuals, but when analyzed these were not statistically significant ($p>0.05$). There was also no statistically significant difference in ART conceptions among overweight and obese.

DISCUSSION

Obesity is amongst the commonest metabolic conditions affecting women in reproductive age group. With the increase in machine dependency there had been a shift from an active lifestyle to a more sedentary one. Food habits have also undergone significant change over the years with the fast-paced life needing food on the go. This had over the years adversely affected health. The prevalence of obesity in pregnant women in our study was 29.3% whereas the prevalence of overweight was 27.8%. This was comparable with the prevalence shown in the study by Mansi et al wherein Maharashtra was found to had a prevalence ranging from 25-40%.

The increase in adipose tissue mass in obese individuals was associated with increased inflammation and release of inflammatory cytokines.[12,13] This led to insulin resistance and endothelial dysfunction. Insulin resistance had now been found to be one of the underlying causes of anovulation and polycystic ovarian syndrome (PCOS) leading to difficulty in conception. Insulin resistance would also explain the increase incidence of GDM in obese ladies. The endothelial dysfunction would explain the increased rates of HDP in obese ladies. Various studies have found a 2-3-fold increase in HDP rates among obese patients.[14,15] In the current study also it was seen that there was significant difference in HDP among obese and overweight individuals.

Obesity was also associated with increased rates of cesarean delivery.[16] Obesity, with its associated co-morbid conditions, made the pregnancy a high-risk pregnancy. There was increased chance of labor induction and labor dystocia in obese ladies. In obese individuals undergoing caesarean delivery, there was an increased chance of difficult anaesthesia (regional as well as general), anaesthetic complications, and surgical difficulties. Postoperative period complications like deep vein thrombosis (DVT) and wound dehiscence was also higher among obese individuals.[17] In this study also the rates of caesarean delivery were higher among obese when compared with normal BMI.

Rates of NICU admission was also seen to be higher in obese individuals compared to patients with normal BMI. The explanation was the co-existing medical illness, associated labor dystocia and difficult delivery and increased operative deliveries.[18] The current study also conformed to similar trends.

It was worthwhile to note that if BMI of 25-29.9 kg/m^2 was taken as the range for overweight then the prevalence would come down to 22.3%. Similarly, if the BMI cut off for obesity was taken as >30 kg/m^2, then the prevalence of obesity would come down to 7.0%. This would probably explain the difference in proportion of GDM in overweight and obese, which in our study was not statistically significant. This was in contradiction to previous studies which indicated an increased incidence of GDM in obese patients.

The limitation of this study was that sample size can be expanded to include a larger population to arrive at a statistically significant conclusion. Being a retrospective study, only a few parameters could be evaluated. The study design could be modelled into a prospective study involving more study parameters to assess the impact of growing obesity among pregnant women. The difference in the association among the various study parameters between the obese and overweight prompt us to questioned the need for altering the BMI cut off. Further studies were needed to assess the impact of the change in BMI standards and its implications in pregnancy related complications.

CONCLUSION

Prevalence of obesity is increasing and is associated with many complications. A comprehensive and clinically efficient approach is required to tackle obesity and the interventions should start in the pre-conceptional period.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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