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PRE-PREGNANCY OBESITY AND ITS OUTCOME

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ABSTRACT

Background- Obesity affects women more than men specially during pregnancy. The purpose of this study was to review the possible effects of obesity on pregnancy outcomes.

Methodology- This was a facility based prospective study conducted on 120 pregnant women. Anthropometric measurement such as body weight (kg), height (cm) were measured and body mass index (BMI) was calculated. Participants were then categorized as normal, overweight and obese based upon Asian Pacific WHO criteria. All the females were then followed up till term to assess the outcome of pregnancy. Outcome variables were maternal disease like pre-eclampsia, pregnancy induced hypertension, gestational diabetes mellitus and caesarean section.

Results: The present study documented a statistically significant association of BMI with comorbidities and cesarean section ($p<0.01$) whereas no such association was observed between BMI and neonatal birth weight ($p>0.05$).

Conclusion: Obesity has a significant impact on maternal morbidity as well as mode of delivery. Obesity being a preventable health problem must be addressed prior to pregnancy to avoid associated complications among mother as well as neonates and improve pregnancy outcome.

KEYWORDS : Obesity, BMI (basal metabolic index), central obesity, perinatal outcome, fetal outcome, overweight, sedentary lifestyle, prospective study, genetic susceptibility.

INTRODUCTION:

The prevalence of obesity as well overweight has increased tremendously in India eventually making it the third most obese nation in the world.[1] World Health Organization and the National Institute of Health define normal as a body mass index (BMI) of 18.5-24.9 kg/m^2, overweight as 25-29.9 kg/m^2, and obesity as 30 kg/m^2 or greater.[2,3] However, for Asian Indian population, the cut-offs for overweight (≥23.0kg/m^2) and obesity (≥25.0kg/m^2) are lower than WHO criteria due to risk factors and morbidities.[4] Obesity is a risk factor for many chronic disease such as cardiovascular disease, hypertension, diabetes, orthopedic disorders and certain cancers.[5]

Literature suggest higher prevalence of overweight and obesity in females of reproductive age group.[6,7,8] Also the prevalence of obesity among pregnant females is rising contributing to obesity-related pregnancy complications.[9] Maternal obesity during pregnancy is associated with high risk of miscarriage, gestational diabetes, pregnancy induced hypertension, cesarean delivery whereas fetal complications include high risk of congenital malformation, macrosomia, childhood obesity and infections.[10,11]

The Global Safe Motherhood Initiative launched in the year of 1987was designed to step up antenatal care and counselling throughout the world. As the world celebrated the 30thcentenary since the inception of program in 1987, a 44% reduction in the maternal mortality was achieved by the end of the year 2015 and the need for new sustainable goals has been set for the year 2030.[12] Nutritional factors and weight gain during pregnancy are two amenable factors influencing maternal and perinatal outcomes. Individualized counselling regarding the weight gain and dietary charting would help in optimized pregnancy weight gain. Pre-pregnancy physical activity and improved dietary goals help in regulating pregnancy weight gain whereas breast feeding assists in normalizing the mother's weight in addition to optimization of child's health in the puerperium.[13] Thus, appropriate optimized antenatal maternal nutrition combined with regular clinical follow up is critical in reducing the operative risks of delivery of these babies for whom both intrauterine environment and the birth process can be life threatening.

The impact of pre-pregnancy BMI on maternal and perinatal outcomes, as well as subsequent disease risk in the offspring, has attracted widespread attention. Thus, the present study was conducted with the aim to compare the pregnancy outcomes of different women based on their pre-pregnancy BMIs.

METHODS:

This study was conducted as a facility based prospective study on 120 pregnant women reporting to MGM hospital of maternal and child health care, Kalamboli over a period of 6 months i.e. from 1st Dec'2019 to 30th May 2020. The inclusion criteria was pregnant women with singleton pregnancies registering during first trimester of gestation and willing to participate in the study. However, females registering during second and third trimester, with history of medical disorders like renal, diabetes mellitus type II and adrenal disorders and not willing to participate were excluded from the study. A written consent was obtained from all the females. Demographic variables such as age, socioeconomic status recorded and entered in pretested questionnaire. Anthropometric measurement such as body weight (kg), height (cm) were measured and body mass index (BMI) was calculated by dividing weight (kg) from height in meter squared (m^2). Participants were then categorized as normal, overweight and obese based upon Asian Pacific WHO criteria i.e. normal as 18.5-22.9 kg/m^2, overweight as a BMI of 23–24.9 kg/m^2 and obesity as a BMI≥25 kg/m^2.[14]

Apart from this, history, clinical examination and routine investigations were conducted for all the females. All the females were then followed up till term to assess the outcome of pregnancy. Outcome variables were maternal disease like pre-eclampsia, pregnancy induced hypertension, gestational diabetes mellitus and caesarean section.

Statistical analysis- Data was compiled using MsExcel and analysed using statistical software SPSS version 20.0. Frequency and percentage were computed for variables like maternal age, parity and gestational age. Chi-square test was applied to compare the proportion of maternal and fetal outcomes in both the groups. P–value of < 0.05 was considered significant.

RESULTS:

Out of 120 females, 12 (10%) females had normal BMI whereas 43 (35.8%), 39 (32.5%), 20 (16.7%) and 6 (5%) females were overweight, obese category I (25-29.9 kg/m^2), obese II (30-34.9 kg/m^2) and obese III (≥35 kg/m^2) respectively.

Table 1- Distribution According To Baseline Variables

Baseline variables		Frequency	Percentage
Age (years)	18-25	41	34.2
	26-30	69	57.5
	>30	10	8.3
Gravida	1	59	49.2
	2	44	36.7
	3	17	14.2
BMI	Normal	12	10.0
	Overweight	43	35.8
	Obese I	39	32.5
	Obese II	20	16.7
	Obese III	6	5.0

The mean age of pregnant females in present study was 26.5±3.19 years and majority of females belonged to 26 to 30 years of age (57.5%) followed by 34.2% females belonging to18 to 25 years of age. About 49.2% females were primigravida.

Majority of females delivered via cesarean section (71.7%) and vaginal delivery was conducted in only 28.3% females.

Table 2- Association Of Comorbidities With BMI

Comorbidities	BMI					Total
	Normal	Over weight	Obese I	Obese II	Obese III	
None	8 (66.7)	16(37.2)	11(28.2)	5 (25)	0 (0)	40(33.3)
APH	0 (0)	0 (0)	0 (0)	1 (5)	0 (0)	1 (0.8)
Eclampsia	0 (0)	1 (2.3)	0 (0)	0 (0)	0 (0)	1 (0.8)
GDM	0 (0)	9 (20.9)	7 (17.9)	8 (40)	3 (50)	27(22.5)
Hypothyroidism	2 (16.7)	7 (16.3)	5 (12.8)	2 (10)	0 (0)	16(13.3)
PIH	2 (16.7)	6 (14)	14(35.9)	2 (10)	1 (16.7)	25(20.8)
PIH with GDM	0 (0)	0 (0)	1 (2.6)	1 (5)	0 (0)	2 (1.7)
Preeclampsia	0 (0)	4 (9.3)	0 (0)	1 (5)	0 (0)	5 (4.2)
Previous LSCS	0 (0)	0 (0)	1 (2.6)	0 (0)	0 (0)	1 (0.8)
Short stature	0 (0)	0 (0)	0 (0)	0 (0)	2 (33.3)	2 (1.7)
χ^2=79.5; p=0.001						

Majority of females with normal BMI had no associated comorbid conditions during the course of pregnancy whereas 50% females with obesity II developed gestational diabetes and 16.7% developed PIH. The observed association between BMI and comorbidities in present study was statistically highly significant (p<0.01).

Table 3- Association Of Mode Of Delivery With BMI

Delivery	BMI					Total
	Normal	Over weight	Obese I	Obese II	Obese III	
NVD	9 (75)	11(25.6)	11(28.2)	3 (15)	0 (0)	34(28.3)
LSCS	3 (25)	32(74.4)	28(71.8)	17 (85)	6 (100)	86(71.7)
χ^2=17.15; p=0.002						

It was observed that out of 12 patients with Normal BMI, vaginal delivery was conducted in 75% whereas as the BMI increased, majority of deliveries were conducted via cesarean section and the observed association was statistically highly significant (p<0.01).

Table 4- Association Of Neonatal Birth Weight With BMI

Birthweight	BMI					Total
	Normal	Over weight	Obese I	Obese II	Obese III	
1.0-1.5	0 (0)	1 (2.3)	0 (0)	0 (0)	0 (0)	1 (0.8)
1.5-2.5	4 (33.3)	7 (16.3)	3 (7.7)	2 (10)	0 (0)	16(13.3)
2.5-4	8 (66.7)	34(79.1)	33(84.6)	14 (70)	4 (66.7)	93(77.5)
>4	0 (0)	1 (2.3)	4 (7.7)	4 (20)	2 (33.3)	10 (8.3)
χ^2=18.9; p=0.09						

About 33.3%, 20%, 7.7% and 2.3% patients with obesity III, Obesity II, obesity I and overweight respectively delivered neonate with birth weight >4 kg, however observed association was not statistically significant (p>0.05).

DISCUSSIONS

Obesity has reached epidemic proportions and obesity in pregnancy has an adverse impact on outcome of pregnancy. The present study was conducted to assess the impact of higher BMI on maternal outcome in terms of various complications such as GDM, hypertensive disease of pregnancy, mode of delivery as well as on fetal outcome in terms of birth weight.

The BMI cutoff value for obesity has been set at lower level as compared to Western countries as the health risks associated with obesity occur at a lower BMI in Asian Indian population. Thus, the Western Pacific Regional Office of WHO in collaboration with International Association for the Study of Obesity, and the International Obesity Task Force together released new guidelines for defining obesity in Asian population in 2000.[15] In present study, only 10% females had normal BMI whereas about 35.8% and 54.2% females were overweight and obese respectively. Similar findings were documented by Narayani et al in which 21.2% females were overweight and 41.7% females were obese using revised criteria.[16]

Maternal obesity has been linked to multiple complications which may have adverse effects on both the mother and neonate. The most common maternal comorbidities documented in present study was gestational diabetes in 22.5% followed by PIH in 20.8% females. Incidence of maternal morbidities were higher in obese females as compared to normal and overweight females, however, pre-eclampsia and eclampsia were higher in overweight females (p<0.01). These findings were similar to study by Singh P et al in which occurrence of gestational hypertension was higher in obese and morbidly obese females (p< 0.01) whereas GDM was documented in 9.5% obese and 33.3% morbidly obese females (p<0.001).[17] Bhattacharya et al also documented increased incidence of gestational hypertension and GDM among obese females as compared to normal females similar to present study.[18] Vellanki VS et al also documented higher incidence of gestational diabetes mellitus, pre-eclampsia and preterm labour in obese pregnant women as compared to normal females.[19]

In present study, LSCS was the most common mode of delivery observed in 71.7% females. Out of 12 cases with normal BMI, normal delivery was conducted in 75% females whereas in 100% females with obesity grade III, delivery was conducted via cesarean section. Thus most common mode of delivery in obese female was LSCS. Similar results were observed in the study by Singh P et al in which 66.6% morbidly obese and 33.3% obese females underwent LSCS.[17] Similarly, Bhattacharya et al also documented LSCS in 42.7% morbidly obese and 30.8% obese females and the difference was statistically significant (p<0.05).[18] Vellanki VS et al documented that induction of labor and instrumental delivery was significantly higher in obese females as compared to normal females and also 12 of non obese and 32 of obese women had cesarean section which was statistically significant.[19]

Macrosomia was documented in 10 (8.3%) neonates in present study whereas low birth weight and very low birth weight was documented in 13.3% and 0.8% neonates respectively. Though majority of macrosomia neonates were born to obese females, but the observed association was statistically not significant. In contrast, Singh P et al observed statistically significant association between BMI and neonatal birth weight. Large for gestational age (LGA) neonates were predominantly observed in obese (19.04%) and morbidly obese (28.57%) females.[17] Verma et al also documented a statistically significant association of obesity with macrosomia ($0p < 0.05$).[20]

CONCLUSION:

From the findings of present study, we conclude that obesity has a significant impact on maternal morbidity as well as mode of delivery. Obesity in present study was significantly associated with pregnancy induced hypertension, gestational diabetes and cesarean delivery contributing to maternal morbidity. Obesity being a preventable health problem must be addressed prior to pregnancy to avoid associated complications among mother as well as neonates and improve pregnancy outcome. Therefore, all pregnant and non-pregnant women of child bearing age must be educated about the feto-maternal complications arising due to both the extremes of BMI. Therefore pre-conceptional weight loss in higher BMI category women and adequate pregnancy weight gain according to the BMI can be helpful in achieving the goal we all strive for, "A healthy mother and a healthy baby".

REFERENCES

1. World Health Organization. (2014). Obesity and overweight 2014 (Internet updated January 2015). Retrieved from: http://www.who.int/ mediacentre/ factsheets/ fs311/ en lastly assessed on 30-04-16.
2. Who O. Preventing and managing the global epidemic. Report of a WHO consultation on obesity. Geneva: WHO. 1997 Jun 3:17-40.
3. National Institutes of Health. Clinical guidelines for the identification, evaluation, and treatment of overweight and obesity in adults-the evidence report. Obes Res. 1998;6(2):51S-209S.
4. Joshi SR. Metabolic syndrome-emerging clusters of the Indian phenotype. Journal-Association of Physicians of India. 2003 May 1;51:445-6.
5. Norman RJ, Clark AM. Obesity and reproductive disorders: a review. Reproduction, Fertility and Development. 1998;10(1):55-63.
6. Orr-Walker B, Evans MC, Reid IR, Cundy T. Increased abdominal fat in young women of Indian origin. Asia Pacific journal of clinical nutrition. 2005 Mar 1;14(1).
7. Bhardwaj S, Misra A, Misra R, Goel K, Bhatt SP, Rastogi K, Vikram NK, Gulati S. High prevalence of abdominal, intra-abdominal and subcutaneous adiposity and clustering of risk factors among urban Asian Indians in North India. PloS one. 2011 Sep 20;6(9):e24362.
8. Pradeepa R, Anjana RM, Joshi SR, Bhansali A, Deepa M, Joshi PP, Dhandania VK, Madhu SV, Rao PV, Geetha L, Subashini R. Prevalence of generalized & abdominal obesity in urban & rural India-the ICMR-INDIAB Study (Phase-I)[ICMR-INDIAB-3]. The Indian journal of medical research. 2015 Aug;142(2):139.
9. Lu GC, Rouse DJ, DuBard M, Cliver S, Kimberlin D, Hauth JC. The effect of the increasing prevalence of maternal obesity on perinatal morbidity. American journal of obstetrics and gynecology. 2001 Oct 1;185(4):845-9.
10. Lashen H, Fear K, Sturdee DW. Obesity is associated with increased risk of first trimester and recurrent miscarriage: matched case–control study. Human reproduction. 2004 Jul 1;19(7):1644-6.
11. Sibai BM, Ewell M, Levine RJ, Klebanoff MA, Esterlitz J, Catalano PM, Goldenberg RL, Joffe G. Risk factors associated with preeclampsia in healthy nulliparous women. American journal of obstetrics and gynecology. 1997 Nov 1;177(5):1003-10.
12. Lucas AO, Stoll BJ, Bale JR, editors. Improving birth outcomes: meeting the challenge in the developing world. National Academies Press; 2003 Nov 28.
13. Rasmussen KM, Catalano PM, Yaktine AL. New guidelines for weight gain during pregnancy: what obstetrician/gynecologists should know. Current opinion in obstetrics & gynecology. 2009 Dec;21(6):521.
14. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, Joshi SR. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. Japi. 2009 Feb;57(2):163-70.
15. Obesity. World Health Organization. Available at http://www.wpro.who.int/ nutrition/documents/docs/Redefiningobesity.pdf. Last accessed on 30th June 2020.
16. Narayani BH, Shalini B. First trimester maternal BMI and pregnancy outcome. International Journal of Clinical Obstetrics and Gynaecology 2018; 2(4): 72-5.
17. Singh P, Wadhwani R. Maternal and perinatal outcome in pregnancy with high BMI. Int J Reprod Contracept Obstet Gynecol 2017;6:2812-6.
18. Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of body mass index on pregnancy outcomes in nulliparous women delivering singleton babies. BMC public Health. 2007 Dec 1;7(1):168.
19. Vellanki VS, Kocherlakota VL, Kaul R. High body mass index in pregnancy, its effects on maternal and fetal outcome. Journal of Clinical Gynecology and Obstetrics. 2012 Feb 8;1(1):15-8.
20. Verma A, Shrimali L. Maternal body mass index and pregnancy outcome. Journal of clinical and diagnostic research: JCDR. 2012 Nov;6(9):1531.