International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Analysis on the Impact of Obesity in Pregnancy and Neonatal Outcomes

Dr. K. R. Chellammal[1], Dr. Asha E.[2]

[1]Professor and Head of Department, Bharath Medical College & Hospital, Bhaarath Institute of Higher Education and Research (BIHER), Selaiyur, Chennai.

[2]Assistant Professor, Bharath Medical College & Hospital, Bhaarath Institute of Higher Education and Research (BIHER), Selaiyur, Chennai (Corresponding Author)

Abstract: ***Background: Being obese is defined as having an unusually high amount of fat in adipose tissue, which can have negative health effects. A high fat diet, genetic predispositions, and little to no physical activity are the main factors that contribute to obesity. Obesity puts mother and fetus at risk for issues like hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), postpartum infections, dysfunctional labor, premature labor, cesarean sections, and deep vein thrombosis, according to numerous research conducted in India. Methods: There were 98 patients in all who were part of this investigation. This report represents a retrospective analysis. This investigation was conducted at the tertiary care level hospital, Bharath Medical College and Hospital. Our research delineates the prenatal, intrapartum, and neonatal outcomes associated with obesity. Results: In terms of obstetric features, the findings showed that 32% of the cases were primi gravida and 68% were multigravida.30% of deliveries in the past were made via SVD, while 70% were made through LSCS. Of the women, 49% belonged to class I obesity (BMI 30 - 34), 32% to class II obesity (BMI 35 - 39.9%), and >40% had a BMI of 4. Just 11% of cases had diabetes mellitus, 28% had hypertension, and 21% had macrosomia, according to the risk factors. Conclusion: Given that obesity is a serious public health issue that negatively impacts the results of mother pregnancy, the study highlights an important risk factor for expectant mothers. Numerous relationships between obesity and particular co - factors, such as diabetes, hypertension, and macrosomia characteristics, were observed in this study.***

Keywords: Maternal obesity, Pregnancy outcome, Perinatal outcome, Congenital outcome, GDM

1. Introduction

In recent years, obesity has raised to be estimated a global health problem. It is the fifth major cause of mortality globally. Obesity is a state of uncommon and extreme fat mass in adipose tissue, leading to detrimental health issues. The important criteria that lead to obesity are less or no physical activity, high dietary fat intake, genetic determinants. Obesity is also correlated to geriatric group which is clear considering metabolic process and less physical activity. Other factors contributing are high educational level, marital status, alcohol use and high socioeconomic status. Overweight have become the important nutritional complication globally, as it enforces notable stress on health care system. Obesity affects 2.1 billion globally. If the current scenario extends, by 2030 this may reach approximately half of the world's adult population.

Obesity is measured using several means, body mass index (BMI), waist circumference (WC), waist - hip ratio, skinfold, and body fat measurements in percentage. BMI is the regularly used diagnostic tool in the present grading of obesity. The World Health Organization (WHO) divided BMI values into six class to define different body weights, from underweight to obesity. These class are underweight (less than 18.5), average weight (18.5–24.9), overweight (25.0–29.9), obesity class I (30.0–34.9), obesity class II (35.0–39.9), and obesity class III (40.0 or greater). The non - communicable diseases (NCD), such as hypertension (HTN), type 2 diabetes mellitus (T2DM), dyslipidemia, and cardiovascular disease (CVD), rise greatly with obesity. Obstructive sleep apnea and osteoarthritis are also related to obesity [1, 2, 3].

Numerous studies in India have emphasised the fact that obesity poses mother and foetus at complications such as hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), postpartum infections, dysfunctional labour, preterm labour, caesarean sections, and deep vein thrombosis. New born of obese women were large for gestational age, macrosomic and had increased incidences of birth injuries, prematurity, shoulder dystocia, congenital malformations and late foetal deaths. Among women in Tamilnadu, obesity increased from 30.9% in 2015–16 to 40.4 % in 2021 - 2022 (Statistical Bulletin 2022, India).

The universal incidence of obesity as a health hazard is found to be more common in females than males (WHO). Excessive pre pregnancy weight, weight gain during pregnancy may have fatal conditions on both mother and the neonate. The motive of the present research is to decipher the ratio of varying obstacles that are related with obesity in pregnancy and the role of gestational weight gain on the various intra partum & postpartum problems in mother & the infant.

Maternal obesity increases perinatal mortality, it also extends the risk of perinatal death, preterm birth, macrosomia, congenital anomaly, childhood obesity, and stillbirth. Also, maternal obesity is related to a higher risk of cesarean deliveries and a higher incidence of aesthetic and postoperative requisites. Another significant issue is preeclampsia, a distinct syndrome distinguished by new onset of hypertension with proteinuria that occurs after 20 weeks' gestation. The estimated cause or preeclampsia of all pregnancies is 2 to 8% wherein the exact genesis is not known.

The impact of obesity on pregnant women extends to the method of delivery. Prior studies reported in obese women delivered by caesarean section, there was no relationship between obesity or overweight and episiotomy. Obesity may be defensive in the risk of third - and fourth - degree tears [4, 5, 6].

Significance of the study

According to Statistical Bulletin on Overweight/ Obese Women in the Southern States of India published in 2022, Tamilnadu stand the highest with an overall percentage of 40.4%. The incidence of obesity in pregnant women is increasing and is integrated with pregnancy - related complications and their consequences. Additionally, obesity change the chance of conception and also will alter the fertility outcomes. Moreover, it affects the chance of conception and might decrease the response to fertility treatment. There is limited study from this part of the country. Hence, the present report was proposed to evaluate the influence of obesity on pregnancy and neonatal outcomes among women [7].

2. Methods

Sample size and design

The total number of deliveries in the 1 year, during the period from 1 Jan 2023 to 31 December 2023, was 1000 delivery. The total number of patients included in this study were 98. The present report is a retrospective study. This study was carried out in Bharath Medical College and Hospital, tertiary care level hospital. Our study describes the obese pregnancy in antenatal period, intrapartum and the neonate outcome at delivery. Presently, in the labour and delivery ward we are equipped with ten beds (6 beds for active labour, three beds for induction, and one bed in operation room).

Participants

Primi gravida and multigravida pregnant women were recruited in our study aged 18 to 44. The BMI for the selected patients were 30 or more. We excluded all multiple pregnancies and pre - pregnant diabetes mellitus, chronic hypertension prior pregnancy, history of cardiac issues, or the current pregnancy with abnormal foetus lie like a breech or transverse lie. Elective caesarean sections were excluded with different cause apart from obesity.

Data Collection

In a retrospective manner the details from the delivery department and the data in labour records were collected. Based on the obesity classes the pregnancy outcome was compared. Referring to the antenatal term, intrapartum period, and the neonatal outcome were listed. Other factors like sociodemographic and health - related features were added and grouped with the maternal and neonatal issues.

1) The first class is sociodemographic and health - related features which include eight subcategories: BMI, maternal age, primi gravida, multigravida, method of the prior delivery, smoking habits in present delivery, pre - existing thyroid issues, and repeated miscarriages.
2) The second group is the maternal outcomes which divided into: The antenatal intricacies include four subcategories: Pregnancy - induced hypertension, macrosomia, gestational diabetes and urinary tract infection [8, 9, 10].

Ethical Considerations

Ethical regulations are to be rigorously adopted throughout the study. The Institutional Review Board (IRB) 's approval for the research study was sorted. Confidentiality, privacy, and anonymity will be maintained.

Statistical Analysis:

The data analysed using the Statistical Package of Social Sciences (SPSS, IBM, Armonk, NY, USA) version 23. Appropriate statistical tests were used to report the observations of this study and to accomplish the objectives.

3. Results

Table 1: The Socio demographic characteristics of study's participants

Variable	Categories	N	%
Age	18 - 20	4	4
	21 - 25	26	26
	26 - 30	46	46
	31 - 36	24	24
Primi Gravida	Yes	32	32
Multi	Yes	68	68
Previous delivery	SVD	30	30
	LSCS	70	70
Healthy	26 - 30	15	15
Obesity	Class I (30 - 34.9)	49	49
	Class II (35 - 39.9)	32	32
	Class III (>=40)	4	4
Current smoking or other habits	Nil		
Pre - existing thyroid disease	Nil		
Recurrent miscarriages	Nil		
DM	Yes	11	11
HTN	Yes	28	28
Macrosomia	Yes	21	21

Table 1 presents respondents' essential characteristics; the majority are 46% of women aged between 26 - 30 years, 26% for the age group between 21 to 25 years, 24% for the age group 31 - 36, 4% for age group 18 - 20. Regarding the obstetric characteristics, results revealed that primi gravida was 32%, while the majority were multigravida 68%. The mode of previous delivery 30% were delivered through SVD and 70% by LSCS.49% of women were in class I obese (BMI 30–34), 32% of them in obesity class II (BMI 35 - 39.9%) and >40% was 4. Regarding the risk factors, only 11% were diabetes mellitus cases, 28% were hypertensive, and 21% had macrosomia.

Table 2: Based on Obesity the factors involved in the study

	Categories	Class I (N=49)	Class II (N=32)	Class III (N=4)	P - Value
Age	18 - 20 21 - 25 26 - 30 31 - 36	1 (2.04%) 12 (24.49%) 25 (51.02%) 11 (22.45%)	3 (9.38%) 13 (40.63%) 10 (31.25%) 6 (18.75%)	0 (0%) 0 (0%) 3 (75%) 1 (25%)	0.199
Mode of Delivery	LSCS NVD	32 (65.31%) 17 (34.69%)	23 (71.88%) 9 (28.13%)	4 (100%) 0 (0%)	0.404
DM	Yes	5 (10.20%)	4 (12.50%)	0 (0%)	0.832
HTN	Yes	17 (34.69%)	6 (18.75%)	1 (25%)	0.285
Macrosomia	Yes	9 (18.37%)	7 (21.88%)	2 (50%)	0.295
Gestational Age	Preterm Term	2 (4.08%) 47 (95.92%)	2 (6.25%) 30 (93.75%)	0 (0%) 4 (100%)	0.709

Table 2 shows the p value of each obese category and the co - factors. Based on the age; in 18 - 20 age group 1 (2.04%) was in Obese class I, 3 (9.38%) in Class II and 0 (0%) in class III, 21 - 25 age group, 12 (24.49%) were in Class I, 13 (40.63%) in Class II and 0 (0%) in Class III. Among the age group 26 - 30, 25 (51.02%) were Class I, 10 (31.25%) Class II and 3 (75%) in class III. In the age 31 - 36 category, 11 (22.45%) were in Class I category, 6 (18.75%) in Class II and 1 (25%) in Class III. Significant associated was observed based on the mode delivery, LSCS was 32 (65.31%) were in the Class I category, 23 (71.88%) in class II and 4 (100%) in class III. Vaginal delivery was 17 (34.69%) in class I, 9 (28.13%) in class II and 0 (0%) in class III. Based upon diabetes mellitus, 5 (10.2%) were in class I, 4 (12.5%) in class II, 0 (0%) in class III. Among the hypertensive cases, 17 were class I obese, 6 (18.75%) were class II and only one (25%) was class III. Association between macrosomia and obese was significant, 9 (18.37%) in class I, 7 (21.88%) class II and 2 (50%) in class III. Based upon gestational age, 15 were pre - term neonates, 82 were full term babies and 3 were post - date delivery. According to the birth weight the gestational age was noted, 82 of them was appropriate for the gestational age, 3 were small and 15 were large. Perineal tear was observed in 5 cases.15 babies were admitted in neonatal ICU among the study group.10 among the cases had urinary tract infections.

4. Discussion

The rising prevalence of obesity has a significant impact on obstetrics practice. Maternal complication association due to obesity includes recurrent miscarriage, pregnancy induced hypertension, gestational diabetes, prolonged labour. On the other hand, perinatal complications include congenital disabilities like congenital anomalies, macrosomia, stillbirth, preterm birth, and the need for admission to the neonatal intensive care unit [11, 12, 13].

Our study aimed to assess the impact of obesity on pregnancy and neonatal outcomes in this part of the country. This study's first objective was to describe the pregnancy and the neonatal outcomes for obese pregnant women. The present study revealed a significant association between obesity and pregnancy - induced hypertension and age [14].

Regarding the association between obesity and hypertension, our result shows a statistically significant association between obesity and hypertension. In Obese class I group, 34.69% were hypertensive. The study revealed a positive association between obesity and increased risk of pregnancy induced hypertension. Likewise, Zayed, E. S and his co - workers demonstrated in the retrospective cohort study that women with pre pregnancy obesity are more likely to develop hypertension, which reported a statistically significant association between obesity and hypertension with other complications. According to Young, O. M, in a review that aimed to summarize the findings of published systematic reviews regarding the possible risks for pregnant women with obesity and their infants. The review demonstrates an association between obesity and gestational hypertension, identified as a risk factor in 54 studies. A cohort study was done by Marchi, J. and other researchers, where data was collected from three large urban academic centers; the result revealed a positive association between obesity and hypertension [15, 16, 17].

The findings reported by Salihu, H. M in a prospective cohort study, the result shows that higher gestational weight gain was associated with a higher risk of pregnancy - induced hypertension. In our study too, the full term neonates were born to obese class I women, wherein hypertensive were also higher in this age group.

This study's second objective was to compare the pregnancy and the neonatal outcomes of obese pregnant women in different obesity classes. Regarding hypertensive issues our study's findings were in accordance with other findings reported by Young, O. M which stated that preterm hypertension is a bit high in women with class III obesity compared to normal - weight women. Since in our study the study population is lesser, the positive percentage is 25%. When the more number of subjects are involved the detection levels would also improve [18, 19, 20].

Obese women have an increased risk of gestational diabetes and giving birth to macrocosmic children regardless of their glycaemic status. To limit the pregnancy complications of obesity, it is common obstetric practice to restrict weight gain in obese women with diet/physical exercise [21].

The study sheds light on a significant risk factor among pregnant women as obesity is a severe public health problem and harms maternal pregnancy outcomes. This study reflected several associations between obesity and specific co - factors as diabetes, hypertension and macrosomia variables.

Acknowledgment
The authors would like to thank Dr. P. Padmapriya, Research Scientist, and Dr. S. Gothai Nachiyar S, Bio Statistician for their Research Methodologies frame work and Statistical application support, Bharath Medical College and Hospital.

References

[1] Al Ghamdi, T.; Al Thaydi, A. H.; Chamsi, A. T.; Al Mardawi, E. Incidence and Risk Factors for Development of Third and Fourth Degree Perineal Tears: A Four Year Experience in a Single Saudi Center. J. Women's Heal. Care 2018, 7, 1–4.
[2] Ali, H. S.; Lakhani, N. Effect of obesity and its outcome among pregnant women. Pak. J. Med. Sci.2011, 27, 1126–1128.
[3] AlSaif S, Mumtaz S, Wray S. A short review of adipokines, smooth muscle and uterine contractility. Life Sci.2015; 125: 2–8. https: //doi. org/10.1016/j. lfs.2015.02.001.
[4] American College of Obstetricians and Gynecologists. ACOG practice bulletin no.105: bariatric surgery and pregnancy. Obstet Gynecol.2009; 113 (6): 1405.
[5] Blomberg, M. Maternal Body Mass Index and Risk of Obstetric Anal Sphincter Injury. BioMed Res. Int.2014, 2014, 1–8.
[6] Braga, G. C.; Clementino, S. T. P.; Da Luz, P. F. N.; Scavuzzi, A.; Neto, C. N.; Amorim, M. M. R. Risk factors for episiotomy: A case - control study. Revista da Associação Médica Brasileira 2014, 60, 465–472.
[7] Durnea, C. M.; Jaffery, A. E.; Gauthaman, N.; Doumouchtsis, S. K. Effect of body mass index on the incidence of perineal trauma. Int. J. Gynecol. Obstet.2017, 141, 166–170.
[8] Gaillard, R.; AP Steegers, E.; Hofman, A.; Jaddoe, V. W. Associations of maternal obesity with blood pressure and the risks of gestational hypertensive disorders. The Generation R Study. J. Hypertens.2011, 29, 937–944.
[9] Garretto, D.; Lin, B. B.; Syn, H. L.; Judge, N.; Beckerman, K.; Atallah, F.; Friedman, A.; Brodman, M.; Bernstein, P. S. Obesity May Be Protective against Severe Perineal Lacerations. J. Obes.2016, 2016, 1–5.
[10] Harreiter J, Schindler K, Bancher - Todesca D, et al. Management of pregnant women after bariatric surgery. J Obes 2018.
[11] Josefsson A, Bladh M, Wirehn AB, et al. Risk for congenital malformations in offspring of women who have undergone bariatric surgery. A national cohort. BJOG Int J Obstet Gynaecol.2013; 120 (12): 1477–82.
[12] Joseph, N.; Sneha, V.; Nelliyanil, M.; Rai, S.; Supriya, K.; Bhat, K. Awareness of consequences of obesity on reproductive health problems among women in an urban area in South India. IJRCOG 2015, 4, 1109–1116.
[13] Kahr, M. K.; Antony, K. M.; DelBeccaro, M.; Hu, M.; Aagaard, K. M.; Suter, M. A. Increasing maternal obesity is associated with alterations in both maternal and neonatal thyroid hormone levels. Clin. Endocrinol.2016, 84, 551–557.
[14] Kamel, H. A. H.; Ibrahim, A. S. M.; Abdo, M. M. Maternal Obesity and Its Effect in Late Pregnancy and Labour. Egypt. J. Hosp. Med.2018, 71, 2982–2988.
[15] Marchi, J.; Berg, M. V. D.; Dencker, A.; Olander, E. K.; Begley, C. Risks associated with obesity in pregnancy, for the mother and baby: A systematic review of reviews. Obes. Rev.2015, 16, 621–638.
[16] Onubi, O. J.; Marais, D.; Aucott, L.; Okonofua, F.; Poobalan, A. S. Maternal obesity in Africa: A systematic review and meta - analysis. J. Public Health 2016, 38, e218–e231.
[17] Pop, V. J.; Biondi, B.; Wijnen, H. A.; Kuppens, S. M.; Vader, H. H. Maternal thyroid parameters, body mass index and subsequent weight gain during pregnancy in healthy euthyroid women. Clin. Endocrinol.2013, 79, 577–583.
[18] Sinha, K.; Pandey, S.; Das, C. R. Impact of Maternal Obesity on Pregnancy Outcome. J. Nepalgunj Med Coll.2018, 14, 18–22.
[19] Vittal, D. S.; Rani, V. U. Maternal obesity and its outcome in the fetus. IJAM 2016, 3, 125–129.
[20] Saravanakumar K, Rao SG, Cooper GM. The challenges of obesity and obstetric anaesthesia. Curr Opin Obstet Gynecol 2006; 18: 631–5.
[21] Kanagalingam MG, Forouhi NG, Greer IA, Sattar N. Changes in booking body mass index over a decade: retrospective analysis from a Glasgow Maternity Hospital. BJOG 2005; 112: 1431–3