Journal of Rawalpindi Medical College (JRMC); 2017;21(4): 386-389

Original Article

Fetomaternal Effects of Obesity in Postdate and Induced Pregnancies

NoureenYousaf [1], Kinza Alam [1], Aisha Yousaf [1], Tahir Ahmad Munir [1], Inaam Qadir J.Hashmi [2], Haider Ali [3]
1.Department of Gynae and Obs, Mohiuddin Islamic Medical College, Mirpur, Azad Jammu and Kashmir
2.Department of Pathology , Mohiuddin Islamic Medical College, Mirpur, Azad Jammu and Kashmir
3. Shalamar Medical College, Lahore

Abstract

Background : To study the fetomaternal effects of obesity in post date and induced pregnancies.

Methods: In this case control study 210 postdate patients were included. They were divided into obese and non-obese groups according to BMI. Patient's age, parity, and duration of gestation was recorded. Induction was done, mode of delivery, PPH, perinatal outcome i.e. macrosomia, birth outcome, and shoulder dystocia was noted.

Results;The mean age was 23.05±3.61 years. All patients were postdate and underwent induction. BMI showed an increase with increase in age.Fifty seven percent of obese compared to 32% of non-obese needed low segment caesarean section (LCSC). Shoulder dystocia occurred in 2% of obese and 1% in non-obese while PPH occurred in 23% and 9.6% in obese and non-obese females respectively. Macrocosmia was encountered in 25% of obese versus 5% non-obese while stillbirth was observed in 3% of obese group. Clavicle fracture 1% was noticed only in obese females.

Conclusion: Maternal obesity is associated with adverse maternal and fetal outcomes in pregnancy including operative deliveries, PPH with fetal macrosomia, birth anoxia, and stillbirth. So these women should be treated as high risk pregnancies.

Key Words:Obesity,Macrosomia, Caesarean delivery

Introduction

Obesity is a known risk factor for various adverse maternal and fetal outcomes, like hypertension, increased risk of operational delivery, postpartum hemorrhage (PPH), still birth, birth anoxia and macrosomia. Ratio of obese pregnant women is on the rise due to change in lifestyle, high caloric food intake and lack of exercise. According to WHO obesity is one of the most neglected and most blatantly visible public health problem involving both developed and the developing countries during the past few years.[1] Obesity is taken as a chronic and one of the most prevalent condition, contributing to many chronic diseases like, type 2 diabetes, hypertension, heart disease, diseases of gall bladder, joint problems, endometrial carcinoma and so on.[2,3]

WHO and National Institute of Health has defined obesity as BMI ≥ 30, overweight as BMI of 25–29.9, normal weight as BMI of 18.5–24.9, and underweight BMI as<18.5. Obesity on basis of BMI is further classified into Class I (30–34.9), Class II (35–39.9), and Class III (> 40). [4,5]

The BMI, *or* Quetelet index (QI) is an internationally used measure ofobesity described by the Belgian polymath AdolpheQuetelet during the course of developing "social physics" that compare person's weight in kilograms to height in meter square. [6] There is a significant rising impact of obesity related pregnancy complications. The pregnancy complications associated with maternal obesity can be divided into those that primarily affect the mother and those that primarily affect the fetus.[7]

Obesity related maternal complications include gestational diabetes, thromboembolic phenomena, induction of labour, postpartum haemorrhages and operative vaginal delivery with third or fourth degree perineal lacerations. There is twofold increased chances of caesarean section, 14-25% raised chances of preeclampsia with raised failure of regional blocks and difficult intubation in obese than in non-obese women. [8-10]

The maternal obesity associated with fetal complications include low apgar score, increased congenital abnormalities, shoulder dystocia, anoxia, and macrosomia.[11, 12]According to WHO obesity has a prevalence of 17.1 % in the developing world and even more developing and low income countries. [13] In Pakistan obesity in pregnant women is rising and has a prevalence of about 13.5% due to sedentary lifestyle, diet rich in fat and carbohydrates and peculiar eating

habits with lack of exercise, so increasing the significance of its impact on obesity-related pregnancy complications.[14]

Patient and Methods

In this case control comparative study, 105 non-obese control versus 105 obese cases in women of reproductive age of 15 to 45 years, were included . The patients were selected by Non-probability consecutive sampling technique, presented in the department of Gynaecology and Obstetrics,MIMC,Mirpurand Mughal foundation Trust Hospital Mirpur from Sep 2016 till Aug 2017.A proforma was filled after taking written consent from the patients/relatives representing the relevant details with respect to labour, maternal and fetal informations. After taking history and complete examination, BMI was calculated by dividing weight in kilogram to height in meter^2. The patients were divided in to 2 groups A and B according to their BMI, Group A consists of females having normal BMI -19.8–25kg/m^{2}while group B consisting of patients with BMI - 29–35kg/m2 as obese or overweight. The females selected were>40 weeks gestation, 0-4 parity, and booked before 20 weeks of gestation.While females with multiple gestation, previous 2 or more caesarean section, pre-existing diabetes, chronic hypertension, diagnosed scarred uterus, placenta previa or cardiac disease were excluded from the study. Induction was planned and was done with 1 tablet of prostaglandin E_2 given intravaginally. Mode of delivery i.e. vaginal, forceps delivery and caesarean section and postpartum hemorrhage due to perineal tear or uterine atony was recorded. The perinatal outcome i.e. alive or stillbirth, fetal anoxia, shoulder dystocia, fracture clavicle and macrosomia was noted. Neonates were examined for any need of further evaluation. Each patient was followed up from the time of presentation till discharge.Difference between two groups was calculated using chi square test. The 95% confidence interval were given and p-value of less than 0.05 was considered significant.

Results

A significant difference (p-0.000) was noticed when age, BMI and parity were compared (Table 1). Comparative diastolic blood pressure was non-significant (p- 0.196) between both groups, however systolic blood pressure showed significant difference (p-0.000) between group A and B (131.12±5.32 and 121.50±5.45). Regarding parity the difference was non–significant (p- 0.552) when parity between primigravida and 2-4 para were compared in the study groups. The primigravida in group A (33.3%) were more than in group B (29.5%) while the para 2-4 were more in group B (70.5%) than in group A (66.7%) (Table 2). Within the group A lower segment caesarean section (57.1%) was greater than spontaneous vaginal delivery (28.6%) and instrumental delivery (14.3%), while in non-obese study group B, vaginal delivery was more (58.1%) than instrumental (9.5%) and caesarean section (32.9%). So the mode of delivery was mainly lower segment caesarean section in obese and spontaneous vaginal delivery in non-obese females. The incidence of postpartum haemorrhage showed a significant difference (p-0.012) between the study groups. The rate of uterine atony (17.1%) was more in obese females than non-obese (8.6%).Same trend was seen for genital tears and werefound to be more in obese (6.7%) than in non-obese females (1%). The rate of uterine atony was more than the genital tear in both groups. Out of 210 births only 04 (1.9%) were stillbirth. A non-significant difference (p-0.313) was seen when alive birth and stillbirth were compared between the study groups. The rate of stillbirth was slightly higher in obese females (2.9%)than in non-obese females (1%), while the rate of alive birth was slightly higher in non-obese females (99%) than in obese females (97.1%). A same trend of non-significant difference was also noticed when birth anoxia (p-0.174), shoulder dystocia (p-0.561) and clavicle fracture (p-0.316) were compared between the group A and group B. The rate of birth anoxia (3.8% versus1%), shoulder dystocia (1.9% versus 1%) and clavicle fracture (1% versus 0%) was more in group A compared to females of group B. However, a significant difference (p- 0.000) was seen when rate of macrosomia(>8.8 pound) in group A females (24.8%) was compared with females of group B (4.8%) (Table 3).

Table -1 Demographic data of Group A and B

Variables	Group A	Group B	95% CI	p value
Age	26.21±2.70	20.80±1.97	4.774 – 6.064	0.000
Systolic pressure	131.12±5.32	121.50±5.45	8.152 – 11.085	0.000
Diastolic pressure	86.32±5.18	85.39±5.24	-0.485 – 2.352	0.196
BMI	31.85±1.81	21.91±2.99	9.268 – 10.615	0.000
Parity	2.44±0.865	1.77±0.973	0.425 – 0.926	0.000

Group A – Females having BMI -19.8–25kg/m^2;Group B - Females having BMI - 29–35kg/m2;CI – Confidence Interval

Table 2:Maternal effect of obesity

Variables	Total No(%)	Group A No (%)	Group B No (%)	95 % Cl	p-value
Parity					
Prmigravida	66 (31.4)	35 (33.3)	31(29.5)	0.756-1.685	0.5
Parity 2-4	114 (68.6)	70 (66.7)	74(70.5)	0.787-1.136	
Mode of delivery					
SVD	91 (43.3)	30(28.6)	61(58.10		0.000
Instrument	25 (11.9)	15(14.3)	10(9.5)		
LSCS	94(44.80	60(57.1	34(32.2)		
PPH					
Tear	8 (3.8)	7(6.7)	1(1)		0.012
Uterine Atony	27 (12.9)	18(17.1)	9 (8.6)		
Normal	175 (83.3)	80(75.2)	95 (90.5)		

Group A – Females having BMI -19.8–25kg/m²;Group B - Females having BMI - 29–35kg/m2;CI – Confidence Interval; SVD – Spontaneous Vaginal Delivery;LCSC – Low segment caesarean section ;PPH – Post-partum Hemorrhage

Table 3:Fetal effects of obesity

Variables	Total No(%)	Group A No(%)	Group B No (%)	95% Cl	P –value
Birth					
Alive birth	206 (98.1)	102 (97.1)	104 (99)	0.944-1.019	0.313
Still birth	04(1.9)	03 (2.9)	01 (1)	0.317-28.376	
Birth Anoxia					
Yes	05(2.4)	04(3.8)	01(1)	0.455-35.193	0.174
No	205 (97.60	101(96.2)	104 (99)	0.931-1.013	
Shoulder Dystocia					
Yes	03(1.4)	02 (1.9)	01 (1)	0.184-21.722	0.561
No	207 (98.6)	103 (98.1)	104 (99)		
Clavicle fracture					
Yes	01(0.5)	01(1)	0(0)	0.972-1.009	0.316
Macrosomia					
Yes	31(14.8)	26(24.8)	05(4.8)	20.76 - 13.023	0.000
No	31(14.8)	79(75.2)	100(95.2)	0.702-0.889	

Group A – Females having BMI -19.8–25kg/m²;Group B - Females having BMI - 29–35kg/m2;CI – Confidence Interval

Discussion

Our results showed significant difference ($p<0.05$) in mean age between the study groups. There was an increase in mean age, with increase in BMI. These findings are in consistent with Al-Malik et al who showed increasing obesity with increasing age. [15] Our results showed a significant difference (p-0.000) regarding parity between the study groups, and a positive association between increasing parity and rising BMI was noticed. The results are in consistent with Wending et al and Hajiahmadi et al who showed positive associated between parity and obesity. [16,17] An association between systolic pressure and raised BMI was seen in our study. Most of the pregnant females with hypertension (HTN)were obese, but majority of obese female did not have HTN. These results are in agreement with studies who showed relationship of obesity with hypertension and its complications.[18]

In our study about 57% of the obese mothers delivered by lower segment caesarean sectionwhile 14 % underwent instrumental delivery. These results are in agreement with Barauet al and Humera et al who showed definite association of maternal increased BMI and C. section in terms of deliveries. [19,20] The instrumental or C. sections may be due to weaker uterine contractions in obesity.

A consistent susceptibility to PPH in obese females were seen in our study. This may be due to uterine atony or genital tears. The ineffectual uterine contraction may be associated with the fact that placental implantation covering a very large area with a higher gestational age. Kabiruet al observed 27.3% incidence of 3rd to 4th.degree tears in obese cases that correlates with our study.[21]

Three mothers delivered stillborn baby, two out of these were born to obese mothers. Suzan et al and Shan et al have demonstrated the perinatal deaths to be significantly higher among obese mothers**.** [22, 23] Hyperlipedmia is considered to be causative factor for stillbirth as it reduces prostacyclin production. Other factor may be placental insufficiency as well as increased insulin levels in the obese pregnant women. The incidence of shoulder dystocia in obese females was 2%in our study which correlates well with Zhang et al [24]who through meta-analysis suggested that maternal pre-pregnancy obesity is associated with an increased risk of shoulder dystocia.

Considering macrosomiaat time of birth, obese mothers showed statistically significant difference compared to non-obese (p=0.000) females in our study. Many studies have shown an association between birth of macrosomic babies and maternal obesity. [25,26]

In some macrosomic babies intensive care support was needed. Birth anoxia was seen in our study upto 3.8% related to obese than in non-obese mothers, these results are inconsistent with Sven et al[27] who also showed birth asphyxia with neonatal complications in offspring. Our study showed definitive maternal and fetal adverse outcomes in mothers with a pre-pregnancy raised BMI. As maternal obesity is associated with so many risk and morbidities so it is absolutely imperative for the medical practitioners and the health authorities to counsel women to achieve to avoid excess weight before, during and after pregnancy for healthier life.

Conclusion

1.Fetomaternal outcome was better in normal weight females following induction of labour in post-date pregnancies.

2.Mothers with BMI >30 had higher prevalence of complications to both the fetus and the mother.

3.The weight loss before conception and controlled weight gain during pregnancy can be helpful to minimize maternal and perinatal morbidity and mortality.

References

1. James WP. WHO recognition of the global obesity epidemic.Int J Obes 2008;32:120-6.
2. Seremak-MA, Drews K, Nowocień G, Kaluba-SA. Obesity in pregnant women as a problem in obstetrics.Ginekol Pol. 2007;78:234-38.
3. Rouse DJ, DuBard M. The effect of the increasing prevalence of maternal obesity on perinatal morbidity. Am J Obstet Gynecol 2011;85:845-49.
4. World Health Organization Obesity; preventing and managing the global epidemic. Report of the WHO consultation on obesity.Geneva: World Health Organization; 1997
5. National Institutes of Health Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report Bethesda, MD: National Institutes of Health, US Department of Health and Human Services; 1998.
6. Garabed E,Quetelet A.The average man and indices of obesity. Nephrol Dial Transplant 2008;23:47–51.
7. Weiss JL, Malone FD, Emig D, Ball RH, Nyberg DA, Comstock CH. Obesity, obstetric complications and cesarean delivery rate: a population based screening study. Am J Obstet Gynecol. 2004;190:1091–97.
8. Jarvie E, Hauguel-de-Mouzon S, Nelson SM, Sattar N.Lipotoxicity in obese pregnancy and its potential role in adverse pregnancy outcome and obesity in the offspring.ClinSci 2010;119:123-29
9. Vahratian A, Siega-Riz AM, Savitz OA, Zhang I. Maternal pre-pregnancy overweight and obesity and the risk of caesarean delivery in nulliparous women. Ann Epidemoil. 2005;45:15467-74.
10. Sheiner E, Levy A, Menes TS, Silverberg D, Katz M. Maternal obesity as an independent risk factor for caesarean delivery. Paediatr Perinat Epidemiol 2004;18:1-20
11. Khurram M, Paracha SJ, Khar HT, Hassan Z. Obesity related complications in 100 obese subjects and their age matched controls. J Pak Med Assoc 2006;56:50-53.
12. Stepan IF, Scheithauer S, Dornhofer N, Kramer T,Faber R. Obesity as an obstetric risk factor: does it matter in a perinatal center? Obesity 2006;14:770-73.
13. Study highlights growing threat of non-communicable diseases to women's survival in pregnancy and childbirth. The Bulletin of the World Health Organization. May 2016
14. NananDJ. The obesity pandemic implications for Pakistan.J Pak Med 2002;52:342-26.
15. Al-Malki JS, Al-Jaser MH, Warsy AS. Overweight and obesity in Saudi females of childbearingage. Int. J. Obes. Relat.Metab.Disord2003;27:134-49
16. Wending L,Wang Y, Shen L, Song L..Association between parity and obesity patterns in a middle-aged and older Chinese population: a cross-sectional analysis in the Tongji-Dongfeng cohort study. NutrMetab.2016;13:72-75.
17. Hajiahmadi M, Shafi H, Delavar M.A Impact of Parity on Obesity,A Cross-Sectional Study in Iranian Women. Med PrincPract 2015;24:70-74
18. HaanY, van Seventer, Diemer FS, van Montfrans, Oehlers GP. The association between obesity and parity in Surinamese women. Hypertension 2016;34.:262-68
19. Barua G, Robillard P, Hulsey T, Decdecker F, Laffite A. Linear association between maternal pre-pregnancy body mass index and risk of Caesarean section in term deliveries. BJOG2006;113: 1173-77
20. Humaira C, Abeera, Naila A and Shaihda Jay. Effects of obesity on pregnancy and its outcome.PAFMJ 2009;59(4):1121-23.
21. KabiruW,Raynor BD. Obstetric outcomes associated with increase in BM category during pregnancy. AM J Obstet Gynecol 2004; 191:928- 32
22. Suzan LC,Yair J.B, Jonathan Mayo, Emily Wei, Jeffrey B.G, David K.S, et al. Pre-pregnancy obesity and risks of stillbirth.PLoS One.2015;10:0138549.
23. Shaw GM, Wise PH, Mayo J, Carmichael SL. Low birth weight and prenatal care in Columbia. A cross-sectional study.Paediatr Perinat Epidemiol. 2014;28:302-11.
24. Zhang C, Wu Y, Li S, Zhang D. Maternal pre-pregnancy obesity and the risk of shoulder dystocia: a meta-analysis. BJOG. 2017;10:1471-84.
25. Gaudet L, Wen SW, Walker M. The combined effect of maternal obesity and fetal macrosomia on pregnancy outcomes.J Obstet Gynaecol Can. 2014;36:776-84
26. Laura Gaudet, Zachary MF, Shi WW, Mark W. Maternal Obesity and Occurrence of Fetal Macrosomia: A Systematic Review and Meta-Analysis BioMed 2014;http://dx.doi.org/10.1155/2014/640291
27. Cnattingius S, Lindam A, Persson M. Risks of asphyxia-related neonatal complications in offspring of mothers with type 1 or type 2 diabetes: the impact of maternal overweight and obesity. Diabetologia.2017;60:1244–51