Original Article

The Effect of Maternal Obesity on Mode of Delivery and Duration of Labour

Ghazala Sadiq[1], Riffat Mohsin[2]

[1]Consultant Gynaecologist, Quaid e Azam International Hospital Islamabad/Al Sadiq Saad Shaheed Hospital, Peshawar Road, Rawalpindi, [2]Senior Registrar, Quaid e Azam International Hospital Islamabad

Address of Correspondence: *Dr. Ghazala Sadiq*
[1]Consultant Gynaecologist, Quaid e Azam International Hospital Islamabad
E-mail: ghadiq@gmail.com

Abstract

Objective: To assess the impact of maternal obesity on the mode of delivery by comparing it with women of normal BMI.
Study design: Retrospective, observational cohort study.
Place & duration: Department of Obstetrics & Gynaecology, Quaid e Azam International Hospital from May 2017 to July 2017.
Methodology: Retrospective observational cohort study including 120 term patients at 37 complete weeks to 40 complete weeks; having a single fetus with cephalic presentation. Early pregnancy weight up to 20 weeks of gestation was taken to calculate BMI. Normal weight was considered <25kg/m2, Obese were with BMI > 30kg/m2. Mode of delivery and length of both stages of labour were determined and compared in both groups.
Results: In Group A 36.37% (n=22) and in Group B 43.33% (n=26) were between 37-38 weeks of gestation. In Group A 63.33% (n=38) and in Group B 56.67% (n=34) were between 39-40 weeks. Mean length of first stage of labour in Group-A (non-obese) was 8.21+6.56 hours versus 8.50+4.56 hours in Group-B (obese), the p-value was 0.274. In the second stage of labour these findings were 49.00+36.34 minutes in Group-A and 62.00+43.14 minutes in Group-B in the second stage of labour, the p-value was 0.050 which is statistically significant. whereas mode of delivery is concerned in Group A SVD took place in n=86 i.e. 71.7% and LSCS in n=32 i.e. 28.3%. In Group B SVD was in n=55 i.e. 45.9% and LSCS N=65 which comes out to be 54.7%.
Conclusion: The conclusion drawn from the study is that with maternal obesity risk of c section is significantly increased and in those where normal delivery takes place length of first stage and more significantly the second stage are increased.
Keywords: Maternal obesity, Labour, C-section.

Cite this article as: Sadiq G, Mohsin R. The Effect of Maternal Obesity on Mode of Delivery and Duration of Labour. J. Soc. Obstet. Gynaecol. Pak. 2018; Vol 8(1):41-45

Introduction

Obesity is defined as an adult with Body Mass Index (BMI) greater than ≥30 kg/m^2). It has reached epidemic proportions globally and is now a major health concern in pregnancy, in both high and low-income countries.[1] In Australia 28.3 %;[2] in Canada 10%[3] and in the United States 35.8% women are obese, recent data implies that more than half of women during the pregnancy period are

Authorship Contribution: [1]Conception and design, Collection and assembly of data, Analysis and interpretation of the data, Final approval and guarantor of the article, [2]Drafting of the article, Critical revision of the article for important intellectual content, Statistical expertise

.

Funding Source: none
Conflict of Interest: none

Received: Nov 11, 2017
Accepted: Mar 24, 2018

overweight/obese.[4] The sharp rise in prevalence of obesity is multifactorial, and amongst others, the result of changes in dietary habits, sedentary lifestyles, and urbanisation.[5] The health implications of obesity are severe; there is a clear and well-documented association between obesity and cardiovascular disease, diabetes, and some cancers (e.g. endometrial).

Due to the large rise in numbers of obese mothers, researchers and physicians have now begun to classify maternal obesity based on specific criteria. Women with a body mass index (BMI) ranging from 25-30 are classified as overweight whereas those who have BMI between 30-39.9 are classified as obese. According to WHO Global Database on Body Mass Index: The International Classification of adult according to BMI overweight: BMI 25–29.9 kg/m^2, obesity I: BMI 30–34.9 kg/m^2, obesity II: BMI 35–39.9 kg/m^2, obesity III°: BMI ≥ 40 kg/m^2. Women meeting the criteria of having a body mass index (BMI) ranging from 40-49.9 are classified as morbidly obese. Women with a body mass index (BMI) > 50 are classified as super obese

Pregnancy with obesity is considered as high risk because as compared with mothers having normal BMI, overweight or obese mothers have increased maternal and perinatal morbidity.[6] Antenatally maternal risks include gestational diabetes, pregnancy-induced hypertension, pre-eclampsia.[6] Pregnancy has been associated with hypercholesterolaemia which is further increased in obese patients. Obesity is associated with poor labour outcomes, with obese women less likely to go into labour spontaneously, more likely to have prolonged pregnancies and have their labour induced, and less likely to achieve a normal delivery, Obesity may be associated with dysfunctional uterine activity secondary to metabolic factors.[7]; less Ca 2+ flux of myometrium[8] greater oxytocin utilization[9]; prostaglandin E2 insensitivity and disturbed reactive oxidative species homeostasis[10] are commoner and contribute to increased rate of caesarean delivery. Other intrapartum risks include failed regional anaesthesia /analgesia. There is an increase in the length of labour in VBAC or vaginal delivery and duration of surgery if caesarean section is the mode of delivery. Infective morbidity is related to mode of delivery wound infections and endometritis are great concerns. Postpartum risks include and. Postnatally, obese women great risk of having postpartum haemorrhage and thromboembolism they are less likely to breastfeed successfully, have a longer postnatal stay in hospital, and are at risk of postnatal infections.

Fetal risks include neural tube defects, an increased risk of stillbirth, large for gestational age, macrosomia, admission to the neonatal intensive care unit [11]due to birth trauma and birth asphyxia and neonatal hypoglycemia.[12]

The risk of major congenital malformations during the first year of life increases with a mother's weight, from 5% higher in women who are overweight to 37% higher in women with the most severe obesity.[13] Evidence from epidemiologic studies indicates that maternal obesity is a risk factor for neurodevelopmental disorders in children.[14] A case-control study of autism spectrum disorders (ASDs) in California recently demonstrated that mothers who were obese before pregnancy had a 67% increase in the risk of having children with ASDs.[15] Furthermore, breastfeeding initiation rates are lower and there is a greater risk of early breastfeeding cessation in women with obesity compared with healthy weight women. These adverse outcomes may result in longer duration of hospital stay, with concomitant resource implications.[16]

Methodology

This retrospective observational cohort study was carried out at Quaid e Azam International Hospital for a period of three months from May 2017 to July 2017. Ethical approval was granted by the ethical committee of Quaid e Azam International Hospital. It included all patients n=568 having a single fetus with cephalic presentation who delivered vaginally or by cesarean section between 37 and 40 complete weeks of gestation. Women who did not have either height or weight or both recorded were excluded from the analysis n=143. Those who booked after 20 weeks of gestation n=95 were not included for the accuracy of the analysis. Patients with other obstetric causes of operative delivery n=90 were also not included in our study.

Pre-pregnancy or early pregnancy weight up to 20 weeks of gestation was taken to calculate body mass index (BMI). Patient were considered obese

with fulfilling the criteria n=120 BMI ≥ 30kg/m^2 and labeled as Group-B. Second group n=120 were non-obese patients following the criteria BMI ≤30 were considered in Group-A. Detailed demographic information was extracted from the records including medical and surgical history, obstetrics and gynecology history, prenatal history, antepartum records, and labor and delivery. Pregnancies were dated by a woman's last menstrual period or by ultrasonography if the last menstrual period was unknown. A partogram was maintained during labour. Data was entered and analyzed in SPSS version 21.0. Frequency and percentage was calculated for qualitative variables like maternal age (years) and gestational age (weeks). Mean and the standard deviation was calculated for quantitative variables like duration of 1st and 2nd stage of labour. Independent sample t-test was used to compare the duration of labour (1st and 2nd) among non-obese and obese patient. P≤0.05 was taken as the level of significance.

Results

A total number of 568 patients were delivered in the study period, n=120 21.12 % had BMI ≥ 30 and were included in the study. Among these n=74 i.e. 61.7% in Group A and n=75 i.e. 62.49% in Group B were between 31- 40 years of age and with higher parity. Table I showed that that Group A 73.3% (n=88) and in Group B 70.8% (n=85) were between 37-38 weeks of gestation. In Group A 26.6% (n=32) and in Group B 30.0% (n=36) were between 39-40 weeks.

Table I: Descriptive statistics of variables

	Group-A (non-obese)	Group B (obese)
Age (years)	n (%)	n (%)
20-25	23 (19.2)	19 (15.83)
26-30	20 (16.7)	20 (16.66)
31-35	63 (52.5)	32 (26.66)
36-40	11 (9.2)	43 (35.83)
41-45	3 (2.5)	6 (5.02)
Period of Gestation (weeks)		
37	36 (30.0)	32 (26.6)
38	52 (43.3)	53 (44.2)
39	15 (12.5)	19 (15.9)
40	17 (14.2)	16 (13.3)

Obese women had slow progress and longer duration of both first and second stages of labour. Mean length of the first stage of labour in Group-A (non-obese) was 8.21±6.56 hours versus 8.50±4.56 hours in Group-B (obese), which was statistically not significant (p-value 0.274). In the second stage of labour these findings were 49.00±36.34 minutes in Group-A and 62.00±43.14 minutes in Group-B in the second stage of labour, p-value was 0.050 which is statistically significant, as shown in Table II

Table II: Comparison of Duration of 1st and 2nd stage of Labour

	Group-A (non-obese)	Group-B (obese)	P-value
Duration (hours) 1st stage of labour	8.21+6.56	8.50+4.56	0.274
Duration (min) 2nd stage of labour	49.00+36.23	62.00+43.14	0.050

P<0.05 was taken as level of significance

Whereas mode of delivery is concerned in Group A vaginal delivery took place in n=86 i.e. 71.7% were SVD and LSCS cases were n=32 i.e. 28.3%. In Group B vaginal delivery was in n=55 i.e. 45.9% and LSCS n=65 which comes out to be 54.1%, as shown in Figure 1.

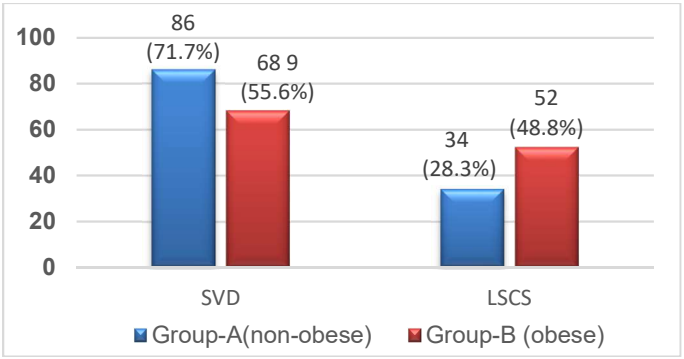

Figure 1. Comparison of Mode of Delivery among both the Groups

Discussion

In this study, the prevalence of obesity is 21.12% i.e. n= 120 which is in line with both national and international data. According to Statistics Canada, it is 23.1% in Canada and 29.7% in USA. The National Health Survey of Pakistan declared the prevalence of obese female in general population to be 26%.[17]

In our study progress of labour was slow and thus the duration of labour, stage 1and stage 2 both were

significantly prolonged. The findings are in accordance with Swedish[18] and American study [19] whereas a few studies a have contradictory results.[20] This study found a 21.5 % increase in C-sections in women with a BMI > 30 kg/m^2 which is comparable to German study 20.5%.[21] Obese women who were able to deliver spontaneously suffered from more perineal lacerations which is in line with previous investigations.[22]

Rates of vaginal delivery maybe low in obese groups, due to the reluctance of physicians to perform them in obese mothers as a result of increased risk of shoulder dystocia[23] Interestingly, the obstetric emergency of shoulder dystocia was not increased in obese women in this study, which is in contrast to previous findings. The lowered number may be due to the high rate of elective C-sections of selected cases at risk.

Maternal obesity is linked to adverse outcomes for mothers and babies this may result in longer duration of hospital stay, and intensive care with concomitant resource implications. This is a burden on health services of a third world country like Pakistan already combating with high maternal and perinatal mortality and morbidity. It is crucial to reduce this unnecessary burden caused by maternal obesity. Women with obesity need support to lose weight before they conceive and to minimize their weight gain in pregnancy. As special care and increased utilization of healthcare services is required Obesity Maternal Clinics are a good option. Pre-pregnancy counseling and a reduction of just 10 Pounds weight can cause a reduction in the incidence of gestational diabetes in these women. Antenatal guidance should be given to gain minimum weight during pregnancy. In postpartum period obese women can be encouraged to lose weight rather than retaining it.

This study is limited by its retrospective design. This led to incomplete data almost 25.1% n=143 of women with singleton gestations in the database did not have BMI recorded, most of which were missing data on weight. This high rate of missing data for BMI has been noted by other researchers Women self-reported height and weight, usually at the first prenatal visit. Some researchers note self-reporting may under-report true weight and BMI.[24] Keeping this in view such patients were not included which could indicate a risk of selection bias. Moreover, it is a unicentric study making data limited.

Conclusion

Body mass index had a significant effect on total duration of active labour. Obese women had slow progress and longer duration of both first and second stages of labour. Risk of caesarean delivery increased with increasing BMI. Both of the parameters increase with rising BMI. Maternal obesity needs to be taken care of.

References

1. Persson M, Cnattingius S, Villamor E, Söderling J, Pasternak B, Stephansson O, Neovius M. Risk of major congenital malformations in relation to maternal overweight and obesity severity: cohort study of 1.2 million singletons. BMJ. 2017;357:j2563.
2. Elizabeth A. Sullivan, Jan E. Dickinson, Geraldine A Vaughan, Michael J. Peek, David Ellwood et al. Maternal super-obesity and perinatal outcomes in Australia: a national population-based cohort study BMC Pregnancy Childbirth. 2015; 15: 322.
3. Tjepkema M. Adult obesity in Canada: measured height and weight Nutrition Findings from Canadian Community Health Survey. 2008.
4. Shoar Z, Zivot AT, Nasiri S, Mandhani N, Kelly BA. Maternal Obesity, Maternal Gestational Diabetes Mellitus, and Maternal and Neonatal Outcomes. J Obes Weight Loss Ther.2016; 6:292. doi:10.4172/2165-7904.1000292
5. Nuttall FQ. Body mass index: obesity, BMI, and health: a critical review. Nutrition today. 2015 ;50(3):117.
6. Crane JM, Murphy P, Burrage L, Hutchens D. Maternal and perinatal outcomes of extreme obesity in pregnancy. Journal of Obstetrics and Gynaecology Canada. 2013 ;35(7):606-11.
7. Rahman MM, Abe SK, Kanda M, Narita S, Rahman MS, Bilano V, Ota E, et al. Maternal body mass index and risk of birth and maternal health outcomes in low-and middle-income countries: a systematic review and meta-analysis. Obesity reviews. 2015;16(9):758-70.
8. Vinayagam D, Chandraharan E. The adverse impact of maternal obesity on intrapartum and perinatal outcomes. ISRN obstetrics and gynecology. 2012 Article ID 939762, 5 pages doi:10.5402/2012/939762
9. Zhang J, Bricker L, Wray S. Poor uterine contractility in obese women. BJOG. 2007;114:343–348.
10. Carlson N S, Hernandez T L, Hurt K J. Parturition dysfunction in obesity: time to target the pathobiology. Reprod Biol Endocrinol. 2015;13:135
11. Liu, P., Xu, L., Wang, Y., Zhang, Y., Du, Y., Sun, Y., and Wang, Z.Association between perinatal outcomes and maternal pre-pregnancy body mass index. Obesity Reviews.2016; 17: 1091–1102.
12. Sebastián Manzanares G, Ángel Santalla H, Irene Vico Z, López Criado MS, Alicia Pineda L, José Luis Gallo V. Abnormal maternal body mass index and obstetric and

neonatal outcome. The Journal of Maternal-Fetal & Neonatal Medicine. 2012 ;25(3):308-12.
13. Kmietowicz Z. Risk of major birth defects rises with severity of mother's overweight. BMJ: British Medical Journal (Online). 2017;357.
14. Surén P, Gunnes N, Roth C, Bresnahan M, Hornig M, Hirtz D, Lie KK, Lipkin WI, Magnus P, Reichborn-Kjennerud T, Schjølberg S. Parental obesity and risk of autism spectrum disorder. Pediatrics. 2014 ;133(5):e1128-38.
15. Krakowiak P, Walker CK, Bremer AA, Baker AS, Ozonoff S, Hansen RL, Hertz-Picciotto I. Maternal metabolic conditions and risk for autism and other neurodevelopmental disorders. Pediatrics. 2012 ;129(5):e1121-8.
16. Marchi J, Berg M, Dencker A, Olander EK, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. Obesity Reviews. 2015 ;16(8):621-38.
17. Yousuf F, Naru T, Sheikh S. Effect of body mass index on outcome of labour induction. Journal of the Pakistan Medical Association: JPMA. 2016;66(5):598.
18. Carlhäll S, Källén K, Blomberg M. Maternal body mass index and duration of labor. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2013;171(1):49-53.
19. Shayna M. Norman, Methodius G. Tuuli, , Anthony O. Odibo, Aaron B. Caughey, etal The Effects of Obesity on the First Stage of Labor: Obstet Gynecol. 2012; 120(1): 130–135.
20. Ellekjaer KL, Bergholt T, Løkkegaard E. Maternal obesity and its effect on labour duration in nulliparous women: a retrospective observational cohort study. BMC pregnancy and childbirth. 2017 ;17(1):222.
21. Neumann K, Indorf I, Härtel C, Cirkel C, Rody A, Beyer DA. C-Section Prevalence Among Obese Mothers and Neonatal Hypoglycemia: a Cohort Analysis of the Department of Gynecology and Obstetrics of the University of Lübeck. Geburtshilfe und Frauenheilkunde. 2017 ;77(05):487-94.
22. Wehmeyer, Jessica Carol, "What is the Relationship Between Maternal BMI > 30 and Method of Delivery?" (2013). e Eleanor Mann School of Nursing Undergraduate Honors eses. 32.
23. Eugene Declercq, Marian MacDorman, Michelle Osterman, Candice Belanoff, ScD, and Ronald Iverson; Prepregnancy Obesity and Primary Cesareans among Otherwise Low-Risk Mothers in 38 U.S. States in 2012:Birth. 2015; 42(4): 309–318.
24. Ellekjaer KL, Bergholt T, Løkkegaard E. Maternal obesity and its effect on labour duration in nulliparous women: a retrospective observational cohort study. BMC pregnancy and childbirth. 2017 ;17(1):222.