

Maternal Obesity and Risk of Caesarean Delivery in Erbil City

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Abstract

Background and objectives: Worldwide the numbers and rate of Obesity is increasing in adults and especially in women during reproductive ages. In addition, the Obesity has a great effect on the type of Delivery, especially a great number of them will become Cesarean. Cesarean delivery (C-section) is a surgical procedure used to deliver a baby through incisions in the abdomen and uterus. "Obesity is defined as increase in body weight due to excessive fat accumulation. It is the most common nutritional disorder in the affluent industrialized and developed world". The BMI is calculated as weight in kilograms divided by the square of the height in meters (kg/m²). Calculated BMI values are available in various chart and according to BMI as follows: normal is 18.5 to 24.9 kg/m², overweight is 25 to 29.9 kg/m², and obese is ≥ 30 kg/m². Obesity is additionally divided into: class 1 is 30 to 34.9 kg/m², class 2 is 35 to 39.9 kg/m², and class 3 is ≥ 40 kg/m². Class 3 obesity is often referred to as unhealthy. This study aimed is to assess the maternal obesity and the risk of cesarean delivery: Assess socio-demographic characteristics of pregnant women, Explain the effect of Obesity on the Type of Delivery and Find out association factors between the socio-demographics, type of delivery and the obesity. **Methods:** A descriptive cross-sectional study design carried out by the researchers on pregnant women's in Maternity Teaching Hospital; A convenient sampling technique was used to gathering information from a sample of 97 pregnant women's in Hospital involves all ages. The study conducted during 1st of January until 31st of March 2022. The researchers used a modified questionnaire for data collection. **Results:** The result showed that most cesarean cases were among age of 26-35 that was 60.8%. Nearly have equal result regarding residency. The majority of women 85.6% were housewife. The lowest number 8.3% have more than 16 years of marriage history, while most of them 39.6% had less than 6 years. Regarding medical data of mothers, most of them 45.4% had 3-4 gravida, and 59.8% had 2-4 para, and 89.7% had less than one abortion. The clear things regarding type of delivery result showed that majority of women 72.2% were elective cesarean. Most of mother regarding Body mass index were above 30 BMI. In conclusion the results have found that there is a great association between obesity and risk of been cesarean. **Conclusions:** This study showed a great association between BMI and increased risk of cesarean delivery. Cesarean is more amongst obese groups than the non-obese. This case control study has proven that maternal obesity is a significant risk factor for Caesarean section, Obesity rate has rapidly increased in the general population in house wife, the cesarean section rate in the Multi (with Cesarean) women was much higher than the Multi (without cesarean).

Keywords: Pregnant, Obesity, Caesarean delivery, BMI, Maternity

1. Introduction

Background: Obesity in adults and mainly in women is increasing worldwide during the reproductive ages (1). Also, the obesity has a huge effect on delivery type as high number of them have to have (cesarean section) cesarean delivery; which is a special surgical procedure almost used for baby delivery through abdominal and uterine incisions (2).

Obesity can be defined as body weight increasing as a result of excessive accumulation of fat. It is the furthest public nutritional disorder in the wealthy developed and industrialized countries (3).

Although weight gaining and obesity are recognized as risk factors for several health conditions, including vascular and cardiac illnesses (4,5). Overweight and obese women as well have enlarged risk of problems during gestation and delivery (6,7). Earlier researches indicated that weight-gained and obese ladies had bigger risk of fetal and maternal complications for example hypertension, gestational diabetes mellitus,

preeclampsia, genital tract infection, fetal distress, postpartum hemorrhage, macrosomia and intrauterine death which are identified to enlarge the risk for cesarean delivery (8,9).

Body Mass Index (BMI) is a scale used for calculation of weight in kilograms divided by the square of person's height in meters [kg/m²] the scale of BMI available in many charts and its values are as followings:

Normal weight: 18.5 – 24.9 kg/m², overweight: 25 – 29.9 kg/m², and obese person: ≥ 30 kg/m². Obesity also divided into 3 stages: class 1 obesity: 30 – 34.9 kg/m², class 2 obesity: 35 – 39.9 kg/m², and class 3 obesity: ≥ 40 kg/m². And the last one identified as unhealthy (10, 11).

In several countries, around 50% of their populations are identified as either obese or overweight (12,13) and has been attributed to lifestyle, cultural and environmental factors change (14). Moreover, a study done in Baghdad indicated the prevalence of reproductive age women's obesity were increased

from 23.6 to 25% (15,16).

As far overweight and obesity are familiar risk factors for several health difficulties, including cardiovascular health problems (14,17), overweight or obese women also have elevated risk of pregnancy and delivery complications (18,19). Older researches revealed that women who are overweight and obesity had enlarged risk of maternal and fetal difficulties for instance gestational diabetic mellitus, hypertension, preeclampsia, fetal distress, postpartum hemorrhage, genital tract infection, and intrauterine death and macrosomia which are recognized to increase the risk for caesarean delivery (20-24).

Numerous researches indicated that there are association between maternal obesity and postoperative complications of caesarean delivery. However, these outcomes are not validated in the population of Kurdistan-Iraq. Therefore, we conducted this prospective research to find out whether if there is an association between the higher BMI and risk factors of caesarean delivery in Kurdistan-Iraq.

2. Subjects and Methods

A descriptive cross-sectional study design carried out by the researcher on pregnant women in Erbil Maternity Teaching Hospital; A convenient sampling technique was used to gather information from a sample of 97 pregnant women in Maternity Teaching Hospital involves all ages. Participation in this study was voluntary. Data collection performed after obtaining ethical consent from all participants through 1st of January until 31st of march 2022.

The questionnaire of the study started with a covering letter for students explaining the purpose of the study and ethical consent for the student's agreement to participate the survey in this research. The questionnaire consisted of three types of questions; the first part included socio-demographic characteristics of pregnant women

In this part, the questions included (age, educational level, address, occupation, age of marriage, and medical data history). Part II: History of pregnancy in women

In this part that included (para, gravida, abortion, type of delivery, classification of pregnancy, and history of abortion). and Part III: Measurement and finding of BMI

The body weight of pregnant women and height were used for finding out the body mass index. To find the body mass index and detecting obesity. The questionnaire sheets were distributed to the pregnant women. After answering the questions, the questionnaire sheets collected from the participants and then analyzed as per the study objectives.

3. Results

Description of the sample

The result showed that most cesarean cases were among age of 26-35 that was 60.8%. Nearly have equal

result regarding residency. The majority of women 85.6% were housewife. The lowest number 8.3% have more than 16 years of marriage history, while most of them 39.6% had less than 6 years. Regarding medical data of mothers, most of them 45.4% had 3-4 gravida, and 59.8% had 2-4 para, and 89.7% had less than one abortion. The clear things regarding type of delivery result showed that majority of women 72.2% were elective cesarean. Most of mother regarding Body mass index were above 30 BMI. In conclusion the results have found that there is a great association between obesity and risk of been cesarean.

4. Discussion

The aim of this study was to explore the trends of maternal overweight, obesity, and caesarean birth and to determine whether maternal overweight and obesity are risk factors for caesarean birth in Erbil. Studies have linked overweight and obesity to a wide range of unfavorable pregnancy outcomes including maternal and neonatal morbidity and mortalities. [8, 9, 25].

Our findings indicated that maternal obesity is associated with an increased risk of caesarean birth across all the cohort years. After adjustment for potential confounders, compared to women with normal BMI, overweight women were significantly more likely to have caesarean births in 2015/16 and 2004–2015. Similarly, there was an observed increase in the prevalence of caesarean births in 2004–2015.

As with previous findings, (11,26,27), we found an increased risk of cesarean birth in overweight and obese women. Although there is limited knowledge about the increased rate of cesarean birth in overweight and obese women, it has been suggested that pregnancy complications such as gestational diabetes, hypertension, increase in maternal pelvic soft tissue, fetal macrosomia, prolonged time of delivery and intrapartum complications might be related to obesity which are known risk factors for caesarian birth (26,28). A previous study on maternal obesity and labour complications found that obese women who required induction of labour were associated with increased rates of caesarean birth (29). Due to the large body volume of obese women, more time may be needed for oxytocin to reach the optimal tissue level. During delivery, fetoplacental circulation may be compromised by excess intra-abdominal adipose causing mechanical obstruction of labour and fetal distress prompting the need for caesarean birth (29). Previous studies in Africa showed that obese women are 87% more likely to have caesarean birth than those who are not (11,30). Similarly, elsewhere the risk of cesarean birth was reported to have increased by half in overweight women and two-folds for obese women compared to those with normal BMI (26,31). Additionally, maternal obesity is associated with chronic conditions and macrosomic births which may result in cephalopelvic disproportion and prompting the need for caesarean birth (32,33). The increased risk for caesarian birth in the Northern Region of Malawi might reflect the small population and the distribution of

facilities (34), thus, suggesting that women in the Northern region might have better access to CS services than women in other regions. Several limitations to this study require considerations when interpreting the findings. First, the use of a cross-sectional study design did not allow us to establish temporal relationships. Second, our data are prone to interviewer bias due to social desirability effects. Third, although MDHS data collection instrument was validated to ascertain correct responses from participants, the possibility of recall bias on maternal age, ANC visits, and children’s age may still have occurred, and accordingly, the effects of those covariates might have been either underestimated or overestimated in the study. Fourth, we were unable to adjust all confounding factors such as lifestyle, underlying medical conditions (commodities) and environmental factors because these variables were not included in the MDHS dataset. Finally, the measure of maternal BMI during the survey might have been different from BMI before birth. Generally, women tend to have a high BMI during pregnancy (35) and decrease after birth. Therefore, the strength of association may then possibly be biased towards the null. Further studies using BMI collected during pregnancy may be required to validate our findings. Despite these

potential limitations, our study has notable strengths. These data came from a well validated population-based surveillance registry representative of the referent population which enables our results to be generalized to women of reproductive age in Malawi. In addition, our results may help trigger obesity prevention intervention programs specifically and effectively for this population.

5. Conclusion

This study showed a great association between BMI and increased risk of cesarean delivery. Caesarean is more amongst obese groups than the non-obese. This case control study has proven that maternal obesity is a significant risk factor for Caesarean section, Obesity rate has rapidly increased in the general population in house wife ,the cesarean section rate in the Multi (with Cesarean) women was much higher than the Multi (without cesarean), Table 1. Showed that in a total of 97 women were included in this study. The highest CS rate in these women whose age are between (26-35). More than half of them (60%) and that rate also comes up and shows up in house wife in a higher rate of(%85) .

Table 1. Socio demographic Characteristics of study participant

Socio-demographic data		Frequency	%
Age group	18-25	20	20.6%
	26.00 – 35	59	60.8%
	>36	18	18.6%
Address	Urban	54	55.7%
	Rural	43	44.3%
Level education	Non-formal education	24	24.7%
	Primary	29	29.9%
	Secondary or Higher	44	45.4%
Occupation	Housewife	83	85.6%
	Employed	14	14.4%
Age of marriage group	1-5	29	30.2%
	6.00 - 10.00	38	39.6%
	11.00 - 15.00	21	21.9%
	16.00+	8	8.3%

Table 2. Studying the relationship between mode of delivery in the current pregnancy most of the women who become CS were in condition of elective in ratio

of(%72) and also most of the women were included that previously they were CS , (Multi (with Cesarean) by a ratio of(%75)

Table 2. Medical Data of Pregnant women

Medical Data of Pregnant women		Frequency	Column N %
Gravida	<= 2.00	29	29.9%
	3.00 - 4.00	44	45.4%
	5.00+	24	24.7%
Para	<= 1.00	32	33.0%
	2.00 - 4.00	58	59.8%
	5.00+	7	7.2%
Abortion	<= 1.00	87	89.7%
	2.00 - 3.00	7	7.2%
	4.00+	3	3.1%
Type delivery	Elective	70	72.2%
	Emergency	27	27.8%
History of abortion	Yes	26	26.8%
	No	71	73.2%
Classification pregnancy	Primi gravida	7	7.2%
	Multi (without cesarean)	17	17.5%
	Multi (with Cesarean)	73	75.3%

This image showed that most women 84.5% who did cesarean were obese. And few of them 13.4% were

overweight. While only 2.1% of them were in normal weights.

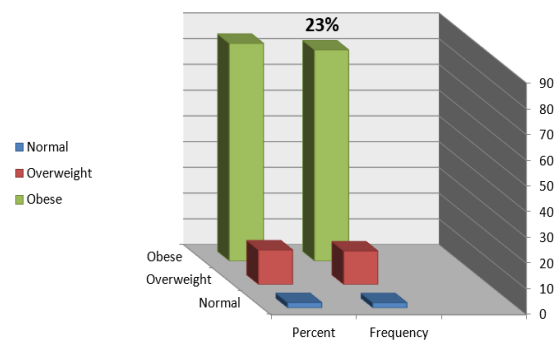


Image: 3 level of BMI of women

References

- 1-AL-KUBAISY, W., AL-RUBAEY, M., AL-NAGGAR, R. A., KARIM, B. & NOOR, N. A. M. 2014. Maternal obesity and its relation with the cesarean section: A hospital based cross sectional study in Iraq. *BMC pregnancy and childbirth*, 14, 1-5.
- 2-STAFF. 31 May 2017. All about C-Section [Online]. Available: <https://www.momandme.nestle-mena.com/en/all-about-c-section?> [Accessed 12 March 2021].
- 3-SHABAB, U. & TAHIR, S. 2010. Effect of obesity on cesarean section rate. *Journal of Surgery Pakistan (International)*, 15, 92.
- 4 .Chan RS, Woo J. Prevention of overweight and obesity: how effective is the current public health approach. *Int J Environ Res Public Health*. 2010;7:765–83.
5. Bhurosy T, Jeewon R. Overweight and obesity epidemic in developing countries: a problem with diet, physical activity, or socioeconomic status? *Sci World J*. 2014. <https://doi.org/10.1155/2014/964236>.
6. Williams CB, Mackenzie KC, Gahagan S. The effect of maternal obesity on the offspring. *Clin Obstet Gynecol*. 2014;57:508.
7. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382:427–51.
8. Cresswell JA, Campbell OM, De Silva MJ, Slaymaker E, Filippi V. Maternal obesity and caesarean delivery in sub-Saharan Africa. *Tropical Med Int Health*. 2016;21:879–85.
9. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287 213 pregnancies in London. *Int J Obes*. 2001;25:1175
10. CUNNINGHAM, F., LEVENO, K., BLOOM, S., SPONG, C. Y. & DASHE, J. 2014. *Williams obstetrics*, 24e, McGraw-hill.
11. WHO. Obesity: Preventing and Managing The Global Epidemic. [Internet]. 2000. Available from: https://whqlibdoc.who.int/trs/WHO_TRS_894.pdf. Accessed 7 May 2018.
12. Kamadjeu RM, Edwards R, Atanga JS, Kiawi EC, Unwin N, Mbanya J-C. Anthropometry measures and prevalence of obesity in the urban adult population of Cameroon: an update from the Cameroon burden of diabetes baseline survey. *BMC Public Health*. 2006;6:228.
13. Sodjinou R, Agueh V, Fayomi B, Delisle H. Obesity and cardio-metabolic risk factors in urban adults of Benin: relationship with socio-economic status, urbanisation, and lifestyle patterns. *BMC Public Health*. 2008;8:84.
14. Bhurosy T, Jeewon R. Overweight and obesity epidemic in developing countries: a problem with diet, physical activity, or socioeconomic status? *Sci World J*. 2014. <https://doi.org/10.1155/2014/964236>
15. Al-Twail NG, Abdulla NM, Abdul Ameer AJ: Prevalence of and factors associated with overweight and obesity among a group of Iraqi women. *Eastern Mediterranean Health Journal* 2007, 13(2):14. 50-55.
16. Swidan A: Nutritional status assessment of female 10-60 years, Household survey. Baghdad, General Federation of Iraqi women; 1997.
17. Chan RS, Woo J. Prevention of overweight and obesity: how effective is the current public health approach. *Int J Environ Res Public Health*. 2010;7:765–83.
18. Williams CB, Mackenzie KC, Gahagan S. The effect of maternal obesity on the offspring. *Clin Obstet Gynecol*. 2014;57:508.
19. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382:427–51.
20. Cresswell JA, Campbell OM, De Silva MJ, Slaymaker E, Filippi V. Maternal obesity and caesarean delivery in sub-Saharan Africa. *Tropical Med Int Health*. 2016;21:879–85.
21. Ovesen P, Rasmussen S, Kesmodel U. Effect of prepregnancy maternal overweight and obesity on pregnancy outcome. *Obstet Gynecol*. 2011;118:305–12.
22. Sydsjö G, Sydsjö A, Brynhildsen J, Josefsson A. Trends in caesarean section and instrumental deliveries in relation to body mass index: a clinical survey during 1978-2001. *Reprod Health*. 2010;7:18.
23. Cedergren MI. Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstet Gynecol*. 2004;103:219–24.
24. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287 213 pregnancies in London. *Int J Obese*. 2001; 25:1175.
25. Leddy MA, Power ML, Schulkin J. The impact of maternal obesity on maternal and fetal health. *Rev Obstet Gynecol*. 2008;1:170.
26. Ovesen P, Rasmussen S, Kesmodel U. Effect of prepregnancy maternal overweight and obesity on pregnancy outcome. *Obstet Gynecol*. 2011;118:305–12
- 27 .Tsvieli O, Sergienko R, Sheiner E. Risk factors and perinatal outcome of pregnancies complicated with cephalopelvic disproportion: a populationbased study. *Arch Gynecol Obstet*. 2012;285:931–6.
28. .Brown K, Apuzzio J, Weiss G. Maternal obesity

- and associated reproductive consequences. *Women's Health*. 2010;6:197–203
29. Al-Kubaisy W, Al-Rubaey M, Al-Naggar RA, Karim B, Noor NAM. Maternal obesity and its relation with the cesarean section: a hospital based cross sectional study in Iraq. *BMC Pregnancy Childbirth*. 2014;14:235.
30. Onubi OJ, Marais D, Aucott L, Okonofua F, Poobalan AS. Maternal obesity in Africa: a systematic review and meta-analysis. *J Public Health*. 2016;38:e218–31.
31. Poobalan AS, Aucott LS, Gurung T, Smith WCS, Bhattacharya S. Obesity as an independent risk factor for elective and emergency caesarean delivery in nulliparous women—systematic review and meta-analysis of cohort studies. *Obes Rev*. 2009;10:28–35.
32. Arrowsmith S, Wray S, Quenby S. Maternal obesity and labour complications following induction of labour in prolonged pregnancy. *BJOG Int J Obstet Gynaecol*. 2011;118:578–88
33. 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.
34. Ministry of Health - MoH/Malawi, ICF International. Malawi Service Provision Assessment 2013–14. Malawi: MoH/Malawi and ICF International; 2014.
35. Olson CM, Strawderman MS, Dennison BA. Maternal weight gain during pregnancy and child weight at age 3 years. *Matern Child Health J*. 2009;13:839