

A Review of the Effects of Obesity on Pregnancy and Childbirth

¹Z. Karimian and ²N. Bahrami

¹Department of Reproductive Health, Shahroud University of Medical Sciences, Shahroud, IR Iran

²Department of Midwifery, Dezful University of Medical Sciences, Dezful, IR Iran

Key words: Obesity, pregnancy, labor, preterm, plexus trauma

Abstract: Overweight in united state and other developed countries has become one of the health major problems. prevalence of obesity in women is worrying because numerous effect obesity on their pregnancy, so that, weight of pregnant women is important factor in their pregnancy and labor. Obese women that become pregnant are susceptible of to sever complication of pregnancy. Obesity lead to more complication in pre-pregnancy stage, pregnancy, labor and postpartum stage and also for fetus and infant. in obese women increase risk of hypertensive disorder, preterm delivery, gestational diabetes, cesarean delivery, macrosomia, premature, intrauterine growth restriction, post term, thromboembolism, labor induction and dystocia. Infant of obese mother are also in risk of numerous abnormalities, head trauma, brachial plexus trauma and clavicles fractures. Given the major economic and medical consequences of pregnancy in overweight women, all attempts should be made to prevent obesity in women of childbearing age and to encourage weight loss before pregnancy. These women should be screened for hypertension and carbohydrate intolerance.

Corresponding Author:

Z. Karimian

Department of Reproductive Health, Shahroud University of Medical Sciences, Shahroud, IR Iran

Page No.: 89-93

Volume: 15, Issue 4, 2020

ISSN: 1815-8846

Research Journal of Biological Sciences

Copy Right: Medwell Publications

INTRODUCTION

Excessive weight has become one of the major problems of health in entire world^[1]. Unfortunately, the incidence of obesity has increased during the last 100 years. That this increase reflects the increasing community of wealthy and poor mobility in daily life with a high-calorie consumption of foods^[2]. Increasing prevalence of obesity in young women is worrying because that have multiple effects on pregnancy So that, the weight of pregnant women is extremely important factor in pregnancy and labor^[3]. Obesity has unfavorable effects on the health of women at every stage of their lives, So that, in young women has impact on mental

health and their social and reproductive health in later stages of the life^[4]. Obesity has also a significant effect on their life expectancy, so that, more women die from causes related to obesity^[5]. Obesity also increases fetal bad outcomes including increased risk of neural tube defects, heart defects and hospitalized in intensive care unit^[6].

Complications of obesity in women, their children's lives and their future generations will also affect. There is some evidence that suggest that nutrition in utero and early life stages increases the risk of obesity and chronic disease in both sexes^[4].

In addition, to diseases associated with obesity has significant effect on hospital costs and economic^[7]. In the

study of Galtier-Dereure *et al.*^[8] found that hospital costs and length of stay associated with maternal weight gain. In this review, we checked effects of obesity on pregnancy and childbirth and also the effects on the fetus and newborn.

OBESITY AND PREGNANCY

Systemic physiological changes that occur during pregnancy in obese pregnant women will be changed. Systems that are most affected include the respiratory system, cardiovascular and gastrointestinal that this issue can cause respiratory, digestive and cardiovascular problems^[9].

Obese women before becoming pregnant are at greater risk of infertility and amenorrhea^[10]. And they are less chances of spontaneous pregnancy^[11]. So that, pregnancy rate per cycle in obese women are weaker than underweight or normal weight women^[12]. And obese people respond less to treatment of infertility and in case of pregnancy are more likely to be abort^[13, 14]. Obese patients in assisted reproductive techniques have fewer chances of pregnancy and need to higher doses of gonadotropins^[15]. Steeg *et al.*^[11] have demonstrated that the probability of spontaneous pregnancy in infertile women decreases with increasing BMI. In another study shown that the obesity influence on outcomes of IVF and ICSI^[16]. In addition, obesity decreases the biological effects of contraceptive pill^[17].

The prevalence of hypertension in obese women 2.2-2.4 times higher than the control group, the incidence of preeclampsia 1.2-9.7 has been reported^[8]. That this increase of hypertensive disorders of pregnancy in obese, increases prolonged maternal mortality^[18].

Even found that increases weight from normal weight to obesity or overweight between pregnancies increases the risk of preeclampsia^[19]. In obese patients mechanism of preeclampsia is unknown but one hypothesis suggests that the pathophysiological changes and subclinical inflammation and insulin resistance in obese patients is responsible for the increase preeclampsia^[20].

Several studies have found that obesity is associated with the incidence of diabetes in pregnancy^[21-23]. Obesity increases the risk of diabetes, even in cases the moderate^[6].

In one study found that the weight change even during 5 years before pregnancy affects the incidence of gestational diabetes^[24]. In another study it was shown that insulin resistance during pregnancy increases the risk of gallstones^[25]. Some studies have shown that in obese nulliparous women increase the risk of elective preterm but reduced spontaneous preterm labor^[26]. In some studies, snoring and sleep apnea in obese mothers reported more than others^[10]. Is known that these

problems are worse in pregnancy and fetal growth retardation is associated with hypertensive disorders of pregnancy^[20].

Asthma and obesity are interrelated together also, about the relationship their several mechanisms of biological, immunological, inflammatory, hormonal and genetic suggested^[27]. In one study found that maternal obesity before pregnancy is associated with asthma in children^[28].

OBESITY AND DELIVERY

Some studies have shown that obesity has no effect on the duration of labor while other studies known that the longer labor in obese patients^[29]. In another study was found that the active phase of labor in overweight or obese nulliparous women were longer compared to normal weight women^[9].

Increased of body mass index is associated with an increased rate of cesarean section. In research was found that the risk of cesarean delivery in obese subjects 1.5-3 times the control group^[6].

In another study was found cesarean risk for overweight was 1.4 times, for obese 2.05 times and for severely obese control group was 8.2 times^[21,22]. Cesarean complications in obese women is higher such as prolong the surgery, wound infection, endometritis and wound infection after cesarean section^[20].

The high cesarean rate in obese women has been reported due to fetal distress, failure to progress in labor and cephalopelvic disproportion^[30]. Obesity Prenatal control, decreased approximately 10% of caesarean section in this group^[31].

Obese women with a previous cesarean section is less successful than in normal women for delivery^[32-34]. So that, risk of uterine rupture is higher in these patients^[35]. In one study it was found that the rate of premature rupture of membrane, disruption of placenta, using vacuum and laceration in obese women did not differ with normal population^[30]. But in another studies perineal laceration grade III and IV was increased^[36].

Dystocia rate increases also in obesity^[36]. In one study increased dystocia in obese Caucasian only but did not show any increase in other races^[37]. In some studies, the risk of preeclampsia was increased also obese women^[38].

Obesity is associated with venous thromboembolism in a delivery. So that, the thromboembolism in patients with moderate obesity 1 in 857 and 1 in 32 in cases of severe obesity^[39] and this is one of major causes of morbidity and mortality^[40].

In obese patients during anesthesia, there is the probability of failure of epidural anesthesia, requires to high doses of anesthetic, inadvertent dural puncture and

difficult intubation^[41]. Obese women during post Partum have symptoms of depression twice as likely as women to normal^[9].

OBESITY AND POSTPARTUM

There are relationship between maternal obesity and poor lactation in postpartum^[42]. Mechanism of difficulty in feeding in obese women is unclear but changes in the pituitary, hypothalamus and changes in fat metabolism are potential mechanisms^[20].

Increased levels of estrogen as a possible reason for the decline in breast-feeding obese women is considered^[9]. Perhaps complications of pregnancy and childbirth, to be effective in creating a negative relationship^[43]. New research shows that obese women have decreased prolactin response to sucking of infant^[44].

Obese mothers are more susceptible to wide postpartum haemorrhage^[20]. Because obese women have less contractile myometrium^[45]. Postpartum infection, urinary tract infection, Thrombophlebitis, endometritis in obese women increasing^[46]. Obese women during the postpartum have depressive symptoms twice than normal women^[9].

Obesity and effects on the fetus and newborn: The fetal malformations in fetuses of obese mothers increasing, abnormalities in maternal overweight was 35% and in obese mothers have been reported 37.5%. So that, neural tube defects, heart defects, abdominal wall defects, cleft palate and abnormalities of multiple fetuses in obese mothers increasing^[6].

Waller *et al.*^[47] also obtained positive relationship between maternal obesity and birth defects. Twice the risk of fetal and neonatal deaths have been reported in obese women^[9].

Obesity increases the fetal macrosomia that it leads to dystocia, birth injury, loss Apgar score and perinatal mortality^[6]. The relationship between obesity and pre-maturity is dispute. So that, in some studies reported higher levels pre-maturity in obese and in other studies, it is much less than normal weight individuals^[48]. Finally, maternal obesity is a risk factor for childhood obesity^[49].

CONCLUSION

Obesity can cause many complications during the pregnancy, childbirth and the postpartum period and also causing risks to the fetus and newborn^[6]. Due to the high cost of economic and social hernia complications, due to reported side effect and the economic and social costs, obese women during pregnancy should be considered as a high risk group and be aware of the potential risks^[6].

And be aware of the importance of a balanced diet for themselves and their children^[50]. The weight gain of obese women during pregnancy is controversial. But according to the Institute of Medicine, an increase of 8.6 kg in very obese pregnant women will improve neonatal outcomes^[6].

It has been determined training in achieving a desired weight before pregnancy, leads to will good pregnancy in obese women^[51]. Limit weight gain in pregnancy reduces the risk of preeclampsia, cesarean delivery and macrosomia^[52].

Due to the negative effects of obesity on breast feeding, breast feeding counseling and support is essential in the obese women^[9]. Due to the impact of obesity on infertility treatment, it is recommended that women before infertility treatment, to reach a normal weight^[53].

With a detailed consultation before pregnancy and proper prenatal administration and monitoring of weight gain and long-term follow-up of overweight people, complications can be minimized^[6].

In general, midwifery care provider should aware of the effects of obesity on perinatal outcome^[23]. In addition, children of obese women should take into consideration^[41].

Finally, due to the negative effects of obesity on male fertility and limited research in this area, recommended to be done in this case^[10].

REFERENCES

01. Speroff, L., R.H. Glasse and N.G. Kase, 1999. Clinical Gynecologic Endocrinology and Infertility. 6th Edn., Williams and Wilkins Co., Baltimore, USA., pp: 643-724.
02. Cunningham, F., K. Leveno, S. Bloom, C.Y. Spong and J. Dashe, 2014. Williams Obstetrics. 24th Edn., McGraw-Hill Education, New York, USA.,
03. Omanwa, K., M. Zimmer, J. Tlolka, E. Wytrychowska, J. Maciejewska and A. Drys, 2006. Is low pre-pregnancy body mass index a risk factor for preterm birth and low neonatal birth weight?. Ginekologia Polska, 77: 618-623.
04. Ryan, D., 2007. Obesity in women: A life cycle of medical risk. Int. J. Obesity, 31: S3-S7.
05. Hitchen, L., 2007. More mothers are dying from causes related to obesity. Biomed. J., Vol. 335, 10.1136/bmj.39420.350799.DB
06. Galtier-Dereure, F., C. Boegner and J. Bringer, 2000. Obesity and pregnancy: Complications and cost. Am. J. Clin. Nutr., 71: 1242S-1248S.
07. Sichieri, R., S.D. Nascimento and W. Coutinho, 2007. The burden of hospitalization due to overweight and obesity in Brazil. Cadernos Saude Publica, 23: 1721-1727.

08. Galtier-Dereure, F., F. Montpeyroux, P. Boulot, J. Bringer and C. Jaffiol, 1995. Weight excess before pregnancy: Complications and cost. *Int. J. Obesity Related Metab. Disord. J. Int. Assoc. Study Obesity*, 19: 443-448.
09. Morin, K.H. and L. Reilly, 2007. Caring for obese pregnant women. *J. Obstetric Gynecologic Neonatal Nurs.*, 36: 482-489.
10. Linne, Y., 2004. Effects of obesity on women's reproduction and complications during pregnancy. *Obesity Rev.*, 5: 137-143.
11. Steeg, J.W.V.D., P. Steures, M.J. Eijkemans, J.D.F. Habbema and P.G. Hompes *et al.*, 2008. Obesity affects spontaneous pregnancy chances in subfertile, ovulatory women. *Hum. Reprod.*, 23: 324-328.
12. Bellver, J., M.A. Melo, E. Bosch, V. Serra, J. Remohi and A. Pellicer, 2007. Obesity and poor reproductive outcome: The potential role of the endometrium. *Fertil. Sterility*, 88: 446-451.
13. Metwally, M., T.C. Li and W.L. Ledger, 2007a. The impact of obesity on female reproductive function. *Obesity Rev.*, 8: 515-523.
14. Pasquali, R., L. Patton and A. Gambineri, 2007. Obesity and infertility. *Curr. Opin. Endocrinol. Diabetes Obesity*, 14: 482-487.
15. Maheshwari, A., L. Stofberg and S. Bhattacharya, 2007. Effect of overweight and obesity on assisted reproductive technology-a systematic review. *Hum. Reprod. Update*, 13: 433-444.
16. Metwally, M., R. Cutting, A. Tipton, J. Skull, W.L. Ledger and T.C. Li, 2007b. Effect of increased body mass index on oocyte and embryo quality in IVF patients. *Reprod. Biomed. Online*, 15: 532-538.
17. Huber, L.R.B. and J.L. Toth, 2007. Obesity and oral contraceptive failure: Findings from the 2002 national survey of family growth. *Am. J. Epidemiol.*, 166: 1306-1311.
18. Samuels-Kalow, M.E., E.F. Funai, C. Buhimschi, E. Norwitz and M. Perrin *et al.*, 2007. Prepregnancy body mass index, hypertensive disorders of pregnancy and long-term maternal mortality. *Am. J. Obstetrics Gynecology*, 197: 490.e1-490.e6.
19. Getahun, D., C.V. Ananth, Y. Oyelese, M.R. Chavez, R.S. Kirby and J.C. Smulian, 2007. Primary preeclampsia in the second pregnancy: Effects of changes in prepregnancy body mass index between pregnancies. *Obstetrics Gynecology*, 110: 1319-1325.
20. Nuthalapaty, F.S. and D.J. Rouse, 2004. The impact of obesity on obstetrical practice and outcome. *Clin. Obstetrics Gynecology*, 47: 898-913.
21. Chu, S.Y., S.Y. Kim, C.H. Schmid, P.M. Dietz, W.M. Callaghan, J. Lau and K.M. Curtis, 2007a. Maternal obesity and risk of cesarean delivery: A meta-analysis. *Obesity Rev.*, 8: 385-394.
22. Chu, S.Y., W.M. Callaghan, S.Y. Kim, C.H. Schmid, J. Lau, L.J. England and P.M. Dietz, 2007b. Maternal obesity and risk of gestational diabetes mellitus. *Diabetes Care*, 30: 2070-2076.
23. Mighty, H.Y. and A.J. Fahey, 2007. Obesity and pregnancy complications. *Current Diabet Reprod.*, 7: 289-294.
24. Hedderston, M.M., M.A. Williams, V.L. Holt, N.S. Weiss and A. Ferrara, 2008. Body mass index and weight gain prior to pregnancy and risk of gestational diabetes mellitus. *Am. J. Obstetrics Gynecology*, 198: 409.e1-409.e7.
25. Ko, C.W., S.A. Beresford, S.J. Schulte and S.P. Lee, 2008. Insulin resistance and incident gallbladder disease in pregnancy. *Clin. Gastroenterol. Hepatol.*, 6: 76-81.
26. Smith, G.C., I. Shah, J.P. Pell, J.A. Crossley and R. Dobbie, 2007. Maternal obesity in early pregnancy and risk of spontaneous and elective preterm deliveries: A retrospective cohort study. *Am. J. Public Health*, 97: 157-162.
27. Castro-Rodriguez, J.A., 2007. Relationship between obesity and asthma. *Arch. Bronconeumologia (English Edition)*, 43: 171-175.
28. Reichman, N.E. and L. Nepomnyaschy, 2008. Maternal pre-pregnancy obesity and diagnosis of asthma in offspring at age 3 years. *Maternal Child Health J.*, 12: 725-733.
29. Bhattachayra, S., D.M. Campbell, W.A. Liston and S. Bhattachayra, 2007. Effect of body mass index on pregnancy outcomes in nulliparous women delivering singleton babies. *BMC Public Health*, 7: 168-168.
30. Rode, L., L. Nilas, K. Wojdemann and A. Tabor, 2005. Obesity-related complications in Danish single cephalic term pregnancies. *Obstetrics Gynecology*, 105: 537-542.
31. Atalah, E. and R. Castro, 2004. Maternal obesity and reproductive risk. *Rev. Med. Chile*, 132: 923-930.
32. Ducarme, G., A. Rodrigues, F. Aissaoui, C. Davitian, I. Pharisien and M. Uzan, 2007. Pregnancy in obese patients: Which risks is it necessary to fear?. *Gynecologie Obstetrique Fertilite*, 35: 19-24.
33. Goodall, P.T., J.T. Ahn, J.B. Chapa and J.U. Hibbard, 2005. Obesity as a risk factor for failed trial of labor in patients with previous cesarean delivery. *Am. J. Obstetrics Gynecology*, 192: 1423-1426.
34. Durnwald, C.P., H.M. Ehrenberg and B.M. Mercer, 2004. The impact of maternal obesity and weight gain on vaginal birth after cesarean section success. *Am. J. Obstetrics Gynecology*, 191: 954-957.
35. Hibbard, J.U., S. Gilbert, M.B. Landon, J.C. Hauth and K.J. Leveno *et al.*, 2006. Trial of labor or repeat cesarean delivery in women with morbid obesity and previous cesarean delivery. *Obstetrics Gynecology*, 108: 125-133.

36. Kiran, T.S.U., S. Hemmadi, J. Bethel and J. Evans, 2005. Outcome of pregnancy in a woman with an increased body mass index. *Br. J. Obstet. Gynecol.*, 112: 768-772.
37. Ramos, G.A. and A.B. Caughey, 2005. The interrelationship between ethnicity and obesity on obstetric outcomes. *Am. J. Obstetrics Gynecol.*, 193: 1089-1093.
38. Abi-Said, D., J.F. Annegers, D. Combs-Cantrell, R.F. Frankowski and L.J. Willmore, 1995. Case-control study of the risk factors for eclampsia. *Am. J. Epidemiol.*, 142: 437-441.
39. Robinson, H.E., C.M. O'Connell, K.S. Joseph and N.L. McLeod, 2005. Maternal outcomes in pregnancies complicated by obesity. *Obstetrics Gynecology*, 106: 1357-1364.
40. Walker, I.D., 2003. Venous and arterial thrombosis during pregnancy: Epidemiology. *Semin. Vasc. Med.*, 3: 25-32.
41. Seremak-Mrozikiewicz, A., K. Drews, G. Nowocien and A. Kaluba-Skotarczak, 2007. Obesity in pregnant women as a problem in obstetrics. *Ginekologia Polska*, 78: 234-238.
42. Lovelady, C.A., 2005. Is maternal obesity a cause of poor lactation performance?. *Nutr. Rev.*, 63: 352-355.
43. Rasmussen, K.M., 2007. Association of maternal obesity before conception with poor lactation performance. *Annu. Rev. Nutr.*, 27: 103-121.
44. Jevitt, C., I. Hernandez and M. Groer, 2007. Lactation complicated by overweight and obesity: Supporting the mother and newborn. *J. Midwifery Women's Health*, 52: 606-613.
45. Zhang, J., L. Bricker, S. Wray and S. Quenby, 2007. Poor uterine contractility in obese women. *BJOG Int. J. Obstetrics Gynaecology*, 114: 343-348.
46. Gurtler, F. and U. Gurtler, 1989. Pregnancy, labor and puerperium in obese females. *Zentralblatt Gynakologie*, 111: 988-994.
47. Waller, D.K., G.M. Shaw, S.A. Rasmussen, C.A. Hobbs and M.A. Canfield *et al.*, 2007. Prepregnancy obesity as a risk factor for structural birth defects. *Arch. Pediatr. Adolesc. Med.*, 161: 745-750.
48. Sukalich, S., M.J. Mingione and J.C. Glantz, 2006. Obstetric outcomes in overweight and obese adolescents. *Am. J. Obstetrics Gynecology*, 195: 851-855.
49. Durand, E.F., C. Logan and A. Carruth, 2007. Association of maternal obesity and childhood obesity: Implications for healthcare providers. *J. Community Health Nurs.*, 24: 167-176.
50. Hamon, C., S. Fanello, L. Catala and E. Parot, 2005. Maternal obesity: Effects on labor and delivery; Excluding other diseases that might modify obstetrical management. *J. Gynecologie Obstetrique Biol. Reprod.*, 34: 109-114.
51. Jain, N.J., C.E. Denk, L.K. Kruse and V. Dandolu, 2007. Maternal obesity: Can pregnancy weight gain modify risk of selected adverse pregnancy outcomes?. *Am. J. Perinatology*, 24: 291-298.
52. Kiel, D.W., E.A. Dodson, R. Artal, T.K. Boehmer and T.L. Leet, 2007. Gestational weight gain and pregnancy outcomes in obese women: How much is enough?. *Obstetrics Gynecology*, 110: 752-758.
53. Balen, A.H. and R.A. Anderson, 2007. Impact of obesity on female reproductive health: British fertility society, policy and practice guidelines. *Hum. Fertil.*, 10: 195-206.