

Maternal Obesity and Pregnancy Outcome in Almgarif Hospital -Ajdabiya/ Libya

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Abstract:

Background: Obese women have increased risk of complications during pregnancy, at the time of labor and delivery .The rate of successful vaginal delivery decreases progressively as maternal BMI increase, it associated with greater cesarean delivery for both prim gravid and multigravid, increased risk of intra-operative complications including increased infectious morbidity and thromboembolic problems. In addition to greater fetal adverse effects.

Aims: This study was conducted to assess the effect of maternal obesity on pregnancy intrapartum , postpartum and neonatal outcome.

Patients and methods: This study was cross sectional study conducted on two hundred obese pregnant women who had BMI more than 30 kg/m² were randomly selected for the study. Age, occupation, gravidity, parity, abortion, gestational age, mode of pregnancy, maternal outcome (intrapartum and postpartum) , induction of labour, mode of delivery (vaginal or cesarean section) and neonatal outcome were collected.

Results: Fetal complications included low birth weight in 13.5%, big sized baby in 26%, bad Apgar scores in 28%, asphyxia in 24%, brachial plexus injury in 7%, NTD and stillbirth in about 5%. Grade III obesity showed significant association with gestational DM ($X^2= 10.1$, P. value = 0.0006), DVT occurred more frequently with grade II and III obesity ($X^2= 6.11$, P. value =0.04), and significant association between grade II and III obesity with big sized baby ($X^2= 18.75$, P. value =0.001).

Conclusion: This study showed that maternal obesity carry multiple maternal and fetal complications, the most strongly associated with antenatal complications like urinary tract infection , gestational diabetes mellitus , pregnancy induced hypertension operative delivery, post operative complications such as wound infection and deep venous thrombosis also show strong associated with weaning and postpartum depression , Along with fetal post date, poor Apgar scores and birth asphyxia and neural tubal defect.

Key words: pre pregnancy obese healthy woman , maternal complications, fetal complications.

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Introduction:

Obesity is worldwide major problem due to change in life style and there is no clear cut definition of obesity , Over weight and obesity is defined as abnormal or excessive fat accumulation that may impair health . The world health organization (WHO) defines Overweight

" as Body mass index (BMI) equal to or more than 25 to 29.9 kg/m² and "obesity" as (BMI) equal to or more than 30 kg/m². (BMI) is usually calculated according to the following formula : (Quetlet 's index) $BMI = \text{weight (kg)} / \text{height (m)}^2$ (1).

According to the American College of Obstetricians and Gynecologist (ACOG) , pregnancy complications associated with excess weight gain put the mother at risk of gestational diabetes , pre-eclampsia / eclampsia , cesarean delivery, prolonged labor , their offspring at risk of macrosomia , stillbirths , preterm births, fetal distress, poor Apgar scores and congenital anomalies . Trends pointed to the need for guidelines to address optimal weight gain for all woman during pregnancy. At the booking , the obstetrician should be calculated BMI for all pregnant woman ideally using pre-pregnancy weight . If pre-pregnancy weight unknown and BMI being calculated in first trimester ,it is recommended that 1 kg should be subtract before performing calculation (2), The prevalence of pre-pregnancy obesity increased by 69% over a 10 year period, from 13% in 1993-1994 to 22 % in 2002 -2003 (3) .

Obstetrician should be known all the maternal and neonatal risk associated with obesity woman should be advised about life style modification and diet (4).

Patients and methods:

The study was carried out in Al-mgrif hospital Ajdabiya / Libya. Two hundred obese mothers (BMI more than 30 kg/m²) who were randomly selected for the study.

Inclusion criteria: All pregnant lady who has pre pregnancy body mass index more than 30 kg/m².

Exclusion criteria: Pregnant lady who has any chronic illness before , pre pregnancy body mass index less than 30 kg/m² and who did not know pre pregnancy weight .

Study Tools: Data was collected in a preformed work sheet including the patient's phone number, age, occupation. gravidity, parity, abortion, gestational age, mode of pregnancy (spontaneous or induced), maternal outcome (intrapartum and postpartum), induction of labour, mode of delivery (vaginal or cesarean section) neonatal outcome.

Statistical analysis:

Data was entered and analyzed using SPSS for windows (version 21). The results were expressed as tables and figures as indicated for descriptive outputs. Inferential results were extracted using Chi square test and cross tabulation considering level of significance (P value) of <0.05 for judging statistical relevance.

Results:

The result of current study revealed that the mean age of the patients was 34.34years±6.135years with age ranged from 18 to 46 years. More than half of patients were between 29 and 39 years 118(59%), and 45(22.5%) were aged more than 39 years and only 37(18.5%) were 18 to 28 years of age (table 1).

Regarding address of the patients of this study more than 75% of them were from Ajdabia 153 (76.5%) compared to only 47(23.5%) were resident outside the city of Ajdabia with respect to occupation of patients 130(65%) of them were none workers while about 70(35%) were working in different jobs (table 1).

Table 1: Socio-demographic characteristics of the sample.

| Characteristics | Subgroups | Number | % |
|-----------------|---|--------|------|
| Age in years | 18-28 years | 37 | 18.5 |
| | 29-39 years | 118 | 59.0 |
| | More than 39 years | 45 | 22.5 |
| | Total | 200 | 100 |
| | Mean =34.34years (± 6.135) Minimum= 18years, Maximum= 46years | | |
| Address | Ajdabia | 153 | 76.5 |
| | Outside Ajdabia | 47 | 23.5 |
| | Total | 200 | 100 |
| Working status | Worker | 70 | 35 |
| | None worker | 130 | 65 |

The grades of obesity of the patients in the current study was classified into three grades according to WHO grading of obesity depending on calculation of BMI and was found that majority of the patients 90(45%) were classified as grade III and 83(41.5%) grade II followed by 27(13.5%) were of grade I. Mean BMI in this sample of patients was 39.49 ± 4.856 with range of 30-58 (figure 1).

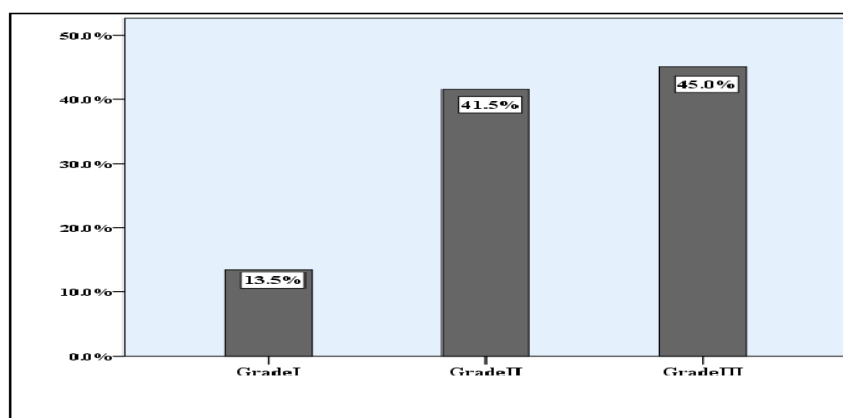


Figure 1: Distribution of patients according to Grades of Obesity.

In this study about 184(92%) of patients were multigravidas compared to only 16 (8%) were primigravidas most of the patients in this study were multiparous 173(86.5%) and only 27(13.5%) were nulliparous this study reported that majority of patients had history of abortions 119(59.5%) where only 81(40.5%) had history of abortion with range of 0-7 abortions (table 2).

Table 2: Gravidity, parity and abortion data of the sample

| Characteristic | Subgroups | Frequency | % |
|---------------------|--------------|-----------|------|
| Gravidity | Primigravida | 16 | 8 |
| | Multigravida | 184 | 92 |
| | Total | 200 | 100 |
| Parity | Nullipara | 27 | 13.5 |
| | Multipara | 173 | 86.5 |
| | Total | 200 | 100 |
| History of abortion | Yes | 119 | 59.5 |
| | No | 81 | 40.5 |
| | | | |

More than 60% of patients were term at delivery 121(60.5%), 58(29%) were post-term and only 21(10.5%) were preterm. Mode of pregnancy: More than 72% of patients in the current study get pregnant spontaneously 145(72.5) and 55(27.5%) of them their pregnancy was induced. Mode of delivery of the patients: About 128(64%) of patients in this study delivered by Cesarean section and 72(36%) delivered vaginally. Induction of labour of the patients: Regarding labor of patients in the study was induced only 43(21.5%) and spontaneous 157(78.5%) of them (Table 3).

Table 3: Gestational age at delivery, mode of pregnancy, delivery and induction of labour :

| Characteristics | Subgroups | Number | % |
|-------------------|-------------|--------|------|
| Gestational age | Term | 121 | 60.5 |
| | Preterm | 21 | 10.5 |
| | Post-term | 58 | 29 |
| | Total | 200 | 100 |
| Mode of pregnancy | Spontaneous | 145 | 72.5 |
| | Induced | 55 | 27.5 |
| | Total | 200 | 100 |
| Mode of delivery | Vaginal | 72 | 36 |
| | Cesarean | 128 | 64 |

| | | | |
|--------------------|-------|-----|------|
| | Total | 200 | 100 |
| Induction of labor | Yes | 43 | 21.5 |
| | No | 157 | 78.5 |
| | Total | 200 | 100 |

Maternal complications were as the following, hyperemesis occurred in 54% of the sample, 65.5% suffered from urinary tract infection (UTI), pregnancy induced hypertension occurred in 21% of the sample, gestational diabetes developed in 36%, antepartum hemorrhage complicated pregnancy of only 5% of the sample, induction of labour needed in 21.5% and 36% delivered by operative mode (C/S)(figure 2)

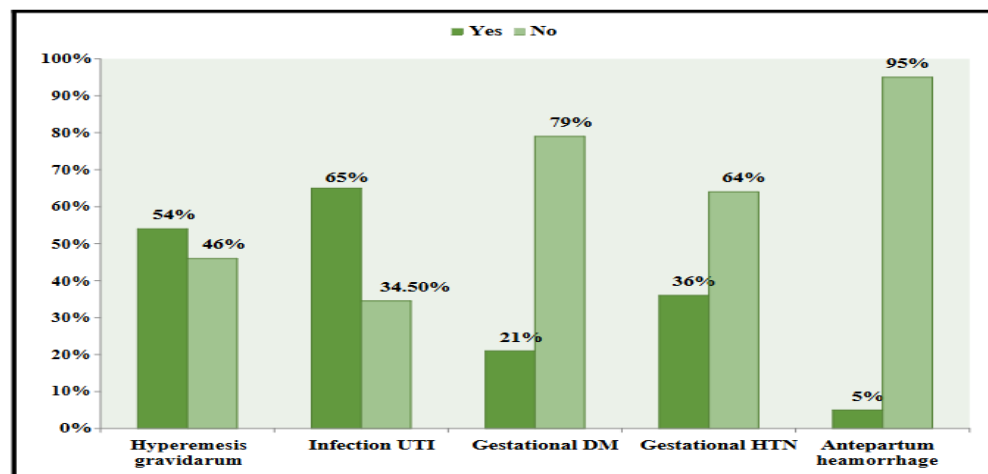


Figure 2: Antepartum maternal complication.

Post partum complications occurred to the sample of this study included wound infection in 33% of them, PPH in 51% , deep vein thrombosis (DVT) in 13%, post partum depression in 51.5%, moreover about 59.5% did not start breast feeding after delivery (figure 3).

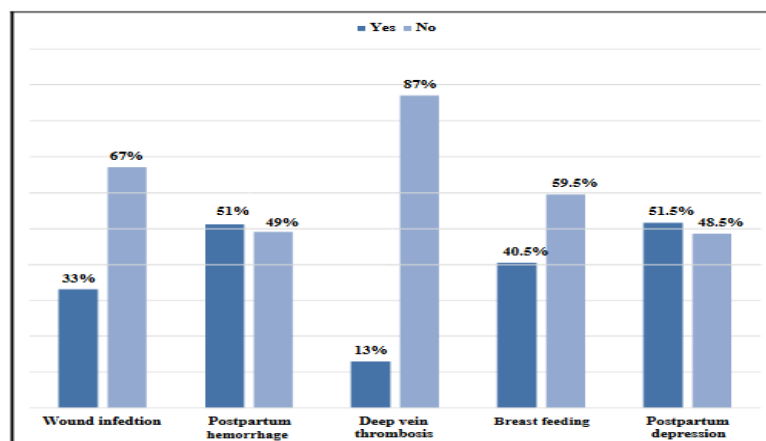


Figure 3: Post-partum complications.

In this study, neonatal complications showed that majority of babies (60.5%) had normal birth weight while (26%) had high birth weight (macrosoic) and only (13.5%) had low birth weight (Table 4).

Table 4: Birth weight distribution of neonates:

| Birth weight | Number | % |
|-------------------|--------|------|
| Normal BW | 121 | 60.5 |
| Low BW | 27 | 13.5 |
| High BW/Macrosoic | 52 | 26 |
| Total | 200 | 100 |

About 144(72%) of babies in this study had a good Apgar score compared to 56(28%) who had bad score (Table 5).

Other neonatal complications detected in this sample include birth weight abnormality of either low in 13.5% or high (macrosomia) in 26% of the sample, Apgar score were poor in 28%, neural tube defect (NTD) in 14.5%, birth asphexia in 24%, brachial plexus injury in 7%, and 4.5 for each of still birth in and shoulder dystocia separately

Table 5: Apgar scoring of neonates at 5 mint:

| Apgar scoring | Number | % |
|---------------|--------|-----|
| Good score | 144 | 72 |
| Bad score | 56 | 28 |
| Total | 200 | 100 |

Mean Apgar score =7.06 SD=2.469 Min=0Max=10

In this study, some pregnancy outcome was strongly associated with grades of obesity like gestational DM, where about 66.7% of patient who had DM was observed in grade III obesity with significant statistical association p-value =0.0006 (Figure 4).

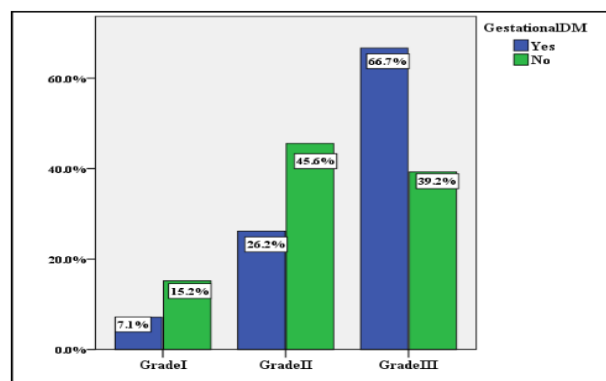


Figure 4: Maternal obesity and gestational DM.

In this study, DVT was strongly associated with grades of obesity ,where about 61.5% of patient who had DVT was having grade III obesity with significant statistical association p-value =0.04. Other pregnancy outcomes was not significantly associated with maternal obesity like gestational HTN, APH, PPH, HE, UTI, Wound infection, Breast feeding and postpartum depression (Table 6).

Table 6: Maternal obesity and Deep vein thrombosis DVT.

| DVT | Grades of Obesity | | | Total |
|-----|-------------------|------------|------------|------------|
| | Grade I | Grade II | Grade III | |
| Yes | 5 (19.2%) | 5 (19.2%) | 16 (61.5%) | 26 (100%) |
| No | 22 (12.6%) | 78 (44.8%) | 74 (42.5%) | 174 (100%) |

$$X^2=6.11 \quad p\text{-value}=0.04$$

Neonatal outcome in the current study reported that mother with grade II and Grade III obesity was strongly associated with high birth weight babies (macrosomic baby), where about 69.2% of high birth weight (macrosomic babies were highly significant associated with grade III obesity with p-value =0.001 (Figure 5).

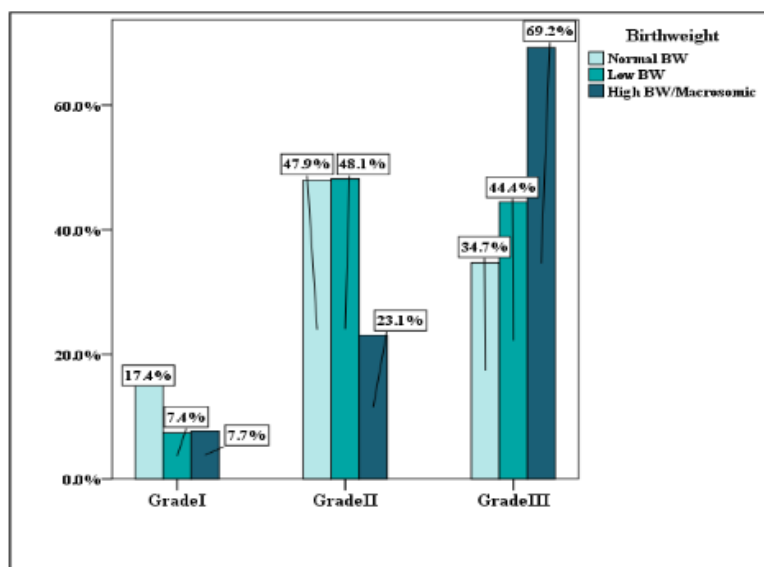


Figure 5: Birth weight and grades of obesity.

Apgar score of the neonates in this study showed that bad score babies related to grade III patients where 58.6% of bad score babies were found in grade III with significant statistical association P-value =0.04 (Figure 6).

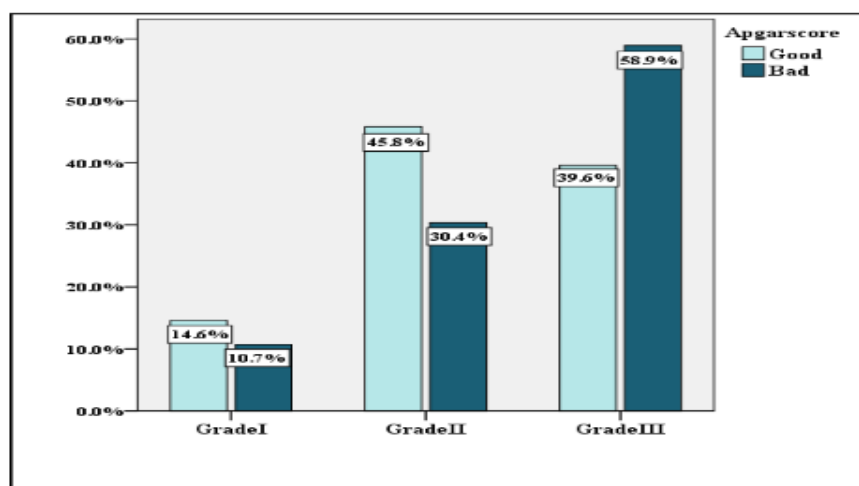


Figure 6: Apgar score at 5 min and grades of obesity.

Neonatal birth asphyxia also was one of the outcome in the current study which was strongly associated with maternal obesity where about 60.4% of asphyxiated babies were belong to grade III obese mothers with p-value =0.047 which consider a statistically significant (Table 7).

Table 7: Birth Asphyxia and grades of obesity.

| Birth Asphyxia | Grades of Obesity | | | Total |
|----------------|-------------------|------------|------------|------------|
| | Grade I | Grade II | Grade III | |
| Yes | 5 (10.4%) | 14 (29.2%) | 29 (60.4%) | 48(100%) |
| No | 22 (14.5%) | 69 (45.4%) | 61 (40.1%) | 152 (100%) |

Discussion:

Women obesity in pregnancy is considered as obstetric risk factor that may lead to adverse pregnancy outcome, this study utilized data of about 200 pregnant women with obesity, the majority of them were classified as grade III obesity, followed by grade II then the least were of grade I. This result support the fact of increased obesity in pregnant women. The prevalence of overweight and obesity among women was found to be growing globally from 29.8% in year 1980 to 38.0% in year 2013.(5) According to the Turkish Epidemiology Survey of Diabetes, Hypertension, Obesity and Endocrine Disease (TURDEP-II) study performed by Satman et al., the prevalence of obesity in Turkish women is 44.2% and 27.3% in men. (6)

Post term and prolonged pregnancy is associated with increased perinatal morbidity and mortality and higher probability of development of maternal complications such as pre- eclampsia, postpartum haemorrhage and caesarean delivery. (7)

Antenatal complications reported by other studies were consistent with this study, it was suggested that as the BMI increased the incidence of pre-eclampsia increased from 27% in those with BMI

30-35 kg/m² to 69.2% in those with BMI 35-39.9 kg/m² and 83.3% in those with BMI >40 kg/m². The overall incidence of pre-eclampsia in obese women is 42.8%. (8)

Although in this study UTI was predominant pathology which affected about two thirds of the sample, previous studies concluded that no statistically significant relationships between obesity or overweight and repeated urinary tract infections were observed. However other studies, have shown an increased incidence of urinary tract infection in obese pregnant women.(9)

Post partum complications occurred to the sample of this study varied between wound infection in 33% of them, PPH in 51% , DVT) in 13%, post partum depression in 51.5%, moreover about two thirds of the mothers did not start breast feeding after delivery. Previous studies showed that, women with high BMI and prolonged pregnancy are becoming an increasingly prevalent clinical problem. Management of prolonged pregnancies in obese women, however, is difficult because IOL is associated with a high risk of caesarean section and its attendant complications of infection, haemorrhage and thrombosis whereas conservative management is associated with an increased risk of perinatal mortality. The rate of induction of labor is reported to be doubled for obese pregnant women, compared to non-obese women. Delay in the first stage of labor is significantly more common, with the risk ranging from 1.5 times to 3 times more likely. Obese women also have a significantly increased risk of caesarean section of between 2-fold to more than 3-fold (10). Progress of labor in vaginal deliveries, obese women appeared to have a significantly longer median first stage of labor compared with normal weight women($p<0.05$) but no difference in median length of second stage of labor was reported with higher BMI, besides that overweight and obese women had a higher rate of second-degree perineal tear than those with normal BMI. However, no significant difference in incidence of third-degree tearing or incidence of retained placenta or postpartum hemorrhage with higher BMI. Therefore caesarean section was found to be increased by 50% in overweight women and more than doubled in obese women compared with normoweight women, this is was the result of a meta-analysis of 11 cohort studies in pregnant. (11)

Maternal obesity is a risk to both mother and newborn, is associated with fetal adverse outcome, the studied sample revealed some neonatal complications detected include birth weight abnormality of either low in 13.5% or high (macrosomia) in 26% of the sample, Apgar score were poor in 28%, neural tube defect (NTD) in 14.5%, birth asphexia in 24%, brachial plexus injury in 7%, and 4.5 for each of still birth in and shoulder dystocia separately. In agreement with multiple previous studies, for instance previously conducted study confirmed an increased incidence of low Apgar score with increasing BMI categories ($P=0.003$). There was also a trend towards increased incidence of shoulder dystocia with increasing BMI for primiparous women but just failed to reach significance ($P=0.05$); however, this was not shown to be significant and no trend was observed for multiparous women. Another study has demonstrated that many adverse outcomes of pregnancy are associated with maternal obesity such as an increase in the previously reported complications of pregnancy in obese women such as gestational diabetes, induction of

labour and wound infection. The risk of preeclampsia is positively associated with a raised BMI. (12)

Foetal macrosomia is more common in the obese none diabetic mother compared to the normal weight or lean mother with gestational diabetes. This might be referred to that increased glucose concentrations in the diabetic mother led to fetal hyperglycemia and hyperinsulinaemia causing increased fetal growth. Obesity is associated with maternal insulin resistance and fetal hyperinsulinaemia even in the absence of maternal diabetes. Insulin resistant individuals have higher fasting plasma triglyceride levels and greater leucine turnover. Amino acids are insulin secretagogues and an increased flux on amino acids could stimulate foetal hyperinsulinaemia. Triglycerides are energy rich and placental lipases can cleave triglyceride and transfer free fatty acids to the foetus. The combination of an increased energy flux to the foetus and foetal hyperinsulinaemia may explain the increased frequency of large for gestational age infants seen in the obese non-diabetic women in this study. (13)

Neonates of obese women were mostly large for gestational age, macrosomic and they had high incidences of birth injuries, shoulder dystocia, premature deliveries, late fetal deaths and congenital malformations particularly spina bifida, cleft lip, cleft palate and heart defect. (14)

Labour in the general obstetric population was 22.1%, while during 2013-2014 it had risen to 25% (15). Moreover, there are literature reports that the rates of induced labor are increasing worldwide. It is thought that induced labor is less efficient than a spontaneous onset labor and therefore women who are induced are twice as likely to have a caesarean-section delivery or an assisted delivery. Therefore mode of delivery in obese mothers is a dilemma, cesarean section carries many maternal complications and normal delivery carries mainly fetal complications and some maternal complications such as tears and bleeding.(16).

The increasing maternal BMI was also associated with an increased emergency CS delivery rate, which was 1.30 and 1.83 times greater for overweight and obese women compared to normal BMI women. The pathophysiological reason that has been postulated to be behind the increased caesarean-section delivery rates is that the increased BMI, due to the adipose tissue being hormonally active, may predispose women to a reduced response to induced labour because of altered metabolic status when overweight or obese. (17).

Maternal weight gain during pregnancy that classified as maternal obesity is an important predictor for women health in here later life, as they are more prone to obesity later in life, which is commonly associated with the development of chronic hypertension, dyslipidaemia and T2DM. Therefore, from a public health perspective, obesity represents an important modifiable risk factor for adverse pregnancy outcome. (8)

Conclusion:

Maternal obesity is a significant risk factor for averse fetal and maternal outcome. Interventions directed towards weight loss and prevention of excessive weight gain must begin in the pre-conception period. Obstetrical care providers must counsel their obese patients regarding the risks

and complications conferred by obesity and the importance of weight loss. The present study showed a high risk of a wide range of important maternal and neonate pathologies in women who were obese during pregnancy. All of the sample have BMI greater than 29.9 Kg/m² and were classified into grade I (13.5%), II (41.5%) or III (45%) obesity according to WHO classification. Operative delivery reported in 64%, induction was needed in 21.5%, and 29% were post term. Maternal complications were as following; 54% hyperemesis, 65.5% UTI, pregnancy induced hypertension in 21%, gestational DM in 36%, APH in 5%, postpartum complications included PPH in 51%, depression in 59.5%, wound infection in 33%, DVT in 13%. Fetal complications included low birth weight in 13.5%, big sized baby in 26%, bad Apgar scores in 28%, asphyxia in 24%, brachial plexus injury in 7%, NTD and stillbirth in about 5%. Grade III obesity showed significant association with gestational DM ($X^2= 10.1$, P. value = 0.0006), DVT occurred more frequently with grade II and III obesity ($X^2= 6.11$, P. value =0.04), and significant association between grade II and III obesity with big sized baby ($X^2= 18.75$, P.value =0.001). To sum up, this study showed that maternal obesity carry multiple maternal and fetal complications, the most prominent were gestational DM, pregnancy induced hypertensionm operative delivery, post operative complications such as wound infection and DVT. Along with fetal post date, poor Apgar scores and birth asphyxia.

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