

IMPACT OF MATERNAL OBESITY ON NEONATAL HEALTH

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Abstract: Obesity is an emerging major public health problem throughout the World and its prevalence has largely increased over the last decade in both developed and developing countries. Maternal obesity is associated with many risks to the pregnancy, with increased risk of miscarriage and operative delivery and other risks to the mother include an increased risk of pre-eclampsia and thromboembolism. Obesity during pregnancy is one of the main factors related to birth outcome with birth weight highly correlated to maternal weight gain. In light of the above the present study was aimed at finding the correlation between maternal obesity and neonatal outcome. The study was conducted at Fernandez Hospital, Abids, Hyderabad, consisting of 100 pregnant women using a pre- tested semi structured questionnaire. The percentage of normal BMI subjects was observed to be 10% (N), Overweight 38% (O.wt), Obese 31% (O), Morbidly Obese 21% (M.O). The complications which were observed are Gestational Diabetes Mellitus (O-32%, M.O- 29%), Anaemia (O-23%, M.O-5%), Pregnancy Induced Hypertension (O-26%, M.O-29%), Hypothyroidism (O-10%, M.O-14%) were more prominent among obese and morbidly obese pregnant women. From the results it was clear that the average birth weight of the baby was higher in Obese (3.00kgs) and Morbidly Obese (3.25kgs) pregnant women and the number of neonatal complications like Macrosomia (O-32%, M.O-67%), Jaundice (O-48%, M.O-67%), hypoglycaemia (O-32%, M.O-43%) and congenital anomalies (O-29%, M.O-29%) were higher in obese and morbidly obese pregnant women. It can be concluded that higher the BMI more the number of complications among neonate.

Keywords: Maternal Obesity, BMI and Pregnancy outcomes

1.INTRODUCTION:

Obesity is a rapid growing global problem. The growing epidemic of obesity in our society has become a major public health issue, with serious social and psychological consequences in addition to the physical health implications. It is an emerging major public health problem throughout the World and its prevalence has largely increased over the last decade in both developed and developing countries.

The prevalence of obesity has been growing worldwide, including among pregnant women and women of reproductive age. In pregnancy, maternal obesity is associated with increased fetal growth and a higher frequency of pregnancy complications such as hypertensive disorders, gestational diabetes and an increased need of operative delivery. Maternal obesity has significant health implications, both for the mother herself as well as for the baby. Not only are mortality risks increased antenatally, labour outcomes are also poorer for women with overweight or obesity.

This rise in obesity prevalence can be explained in part by sedentary lifestyle, unhealthy eating habits and diets rich in fat and carbohydrates. In addition to significant health repercussions for the infant, the risk of stillbirth is 40% higher in obese women than in non-obese women. The care of overweight and obese mothers is more complex and often requires additional pre- and post-natal care. Obesity during pregnancy is one of the main factors related to birth outcome with birth weight highly correlated to maternal weight gain.

Maternal obesity is associated with many risks to the pregnancy, with increased risk of miscarriage and operative delivery and other risks to the mother include an increased risk of pre-eclampsia and thromboembolism.

TABLE 1: RECOMMENDATIONS OF WEIGHT GAIN DURING PREGNANCY

DESCRIPTION	RECOMMENDED TOTAL WEIGHT GAIN (LBS)
Underweight	28-40
Normal Weight	25-35
Overweight	15-25
Obese	15

Institute of Medicine IOM recommended for weight gain during pregnancy by pre-pregnancy weight status/1990.

Adequate weight gain is important for perinatal outcome, but high weight gain in pregnancy has been related to gestational complications, complications in delivery, and macrosomia and low weight gain to retarded fetal growth and preterm birth. Research has shown that obesity increases the risk of adverse outcomes, such as birth defects, especially neural tube defects, fetal death and neonatal death, maternal complication, delivery of large for gestational-age (LGA) infants. The offspring of overweight and obese women are more likely to require admission to neonatal intensive care and to have congenital abnormalities such as neural tube and cardiac defects. Birth related injuries and fetal death in utero are also higher in this group, and babies are more likely to be Macrosomic, placing them at risk of birth trauma and possible subsequent childhood (and, indeed, lifelong) Obesity.

Obesity and Pre-GDM are independently associated with an increased risk of large –for gestational age infants and this impact of abnormal body habitus on birth–weight increases with increasing BMI and is associated with significant obstetric morbidity. Being obese during pregnancy has a negative effect on their babies and can lead to an increased risk of birth defects. The dramatic increasing rate of obesity and the increasingly rate of preterm births have led to recent investigations of an association of maternal obesity with Pre Term Babies.

FETAL COMPLICATIONS ARISING DUE TO MATERNAL OBESITY

Maternal Obesity is associated with a variety of adverse health outcomes in the fetus too such as:

CONGENITAL MALFORMATIONS

There is conflicting evidence regarding the association between obesity and congenital malformations. Several studies found that women with a BMI greater than 31kg/m² had a significantly increased risk of delivering infants with neural tube defects (congenital deformities involving the coverings of the nervous system are called as Neural tube defects) and defects of the central nervous system, great vessels in the heart; ventral wall and other intestinal defects. The association between spina bifida (is a developmental birth defect involving the neural tube: incomplete closure of the embryonic neural tube results in an incomplete formed spinal cord)and obesity was also confirmed in a study which concluded that for every incremental unit increase (kg/m²)in BMI, the risk of neural tube defects increased by 7%. There is also an increase in other malformations such as Omphalocele, (in which the intestines or other abdominal organs protrude out through the navel.) cardiac anomalies and multiple defects among infants of overweight and obese group.

MACROSOMIA

Several studies have shown that maternal obesity and excessive weight gain during pregnancy is associated with macrosomic babies. Obesity and Pre-GDM are independently associated with an increased risk of large –for gestational age infants and this impact of abnormal body habitus on birth–weight increases with increasing BMI and is associated with significant obstetric morbidity.

ANTEPARTUM STILLBIRTH

The combination of rapid fetal growth induced by the endogenous hyperinsulinaemia in obese women and the functional limitations of the placenta to transfer sufficient oxygen to meet the requirements of the fetus may lead to hypoxia and death. Studies have suggested that obesity is associated with an increased risk of ante partum still birth. A three-fold increase in ante partum stillbirth was found in morbidly obese women compared with normal BMI. Maternal obesity was associated with more than double the risk of stillbirth and neonatal death compared with women of normal weight.

LONG TERM FOR THE FETUS

Infants who are at the highest end of the distribution for weight or BMI or who grow rapidly during infancy are at increased risk of subsequent obesity. Obese babies were nine times more likely than normal weight babies to grow into obese adults, and infants who grew rapidly were five times more likely to become obese.

II. AIM AND OBJECTIVES:

In light of the above the present study was aimed at finding the co-relation between maternal obesity and neonatal outcome.

The objectives are:

1. To find the deleterious effect of maternal obesity on neonates.
2. To study the mother's complications during pregnancy.
3. To study the congenital anomalies of the neonates.

III. METHODS AND MATERIALS:

The proposed study was to study the neonatal complications arising due to maternal obesity, a retrospective study was done consisting of 100 pregnant women. According to their pre- pregnancy BMI they were categorized into 4 categories.

BMI= weight in kgs / height in m² .

Normal BMI = 18-23 kgs / m²

Overweight BMI = 24- 28 kgs / m²

Obese BMI= 29-32 kgs / m²

Morbidly obese BMI = 33- 40 kgs / m²

A pilot study has been done initially followed by a survey of 100 samples using a semi structured questionnaire. The questionnaire included information on past history of pregnancy like no of living children, number of gravid, any complications during earlier pregnancy and baby with metabolic disorders. Information on mother's complication during present pregnancy, weight gain in every trimester and week of gestation were also collected. Neonatal assessment was studied by collecting data on head circumference, length of the body in cms and APGAR score at 5 minute. The status of the baby was studied whether the baby was born AGA/LGA or SGA. The data on baby with any complications, preterm born or any congenital anomalies found was also collected. Thus neonatal assessment and mothers complications during pregnancy were studied.

IV.RESULTS AND DISCUSSION

A retrospective study was done consisting of 100 pregnant women using a semi structured questionnaire. The questionnaire included information on past history of pregnancy, complications during earlier pregnancy and present pregnancy and neonatal complications were collected and consolidated and the results of the data are as follows:

Fig1: BMI and Pre Pregnancy Status

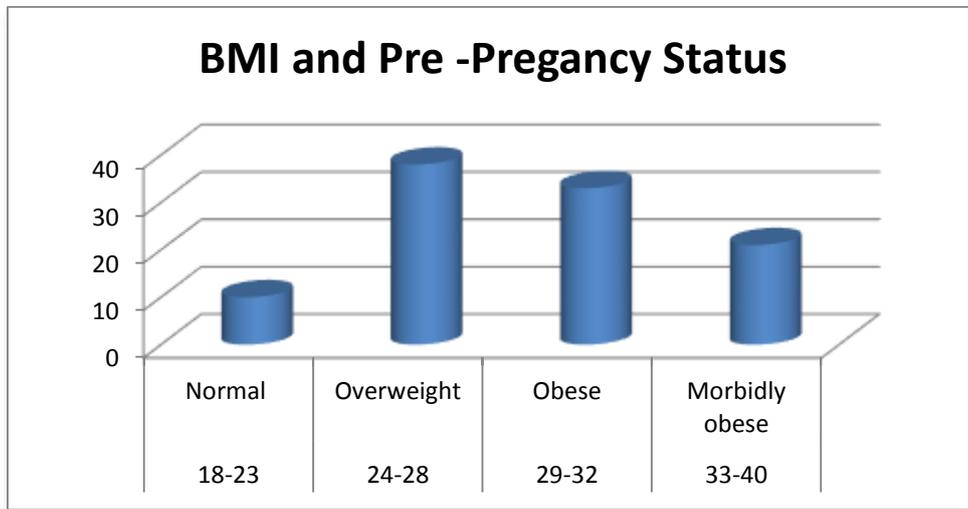


Fig 2: BMI and Average Weight Gain in every trimester

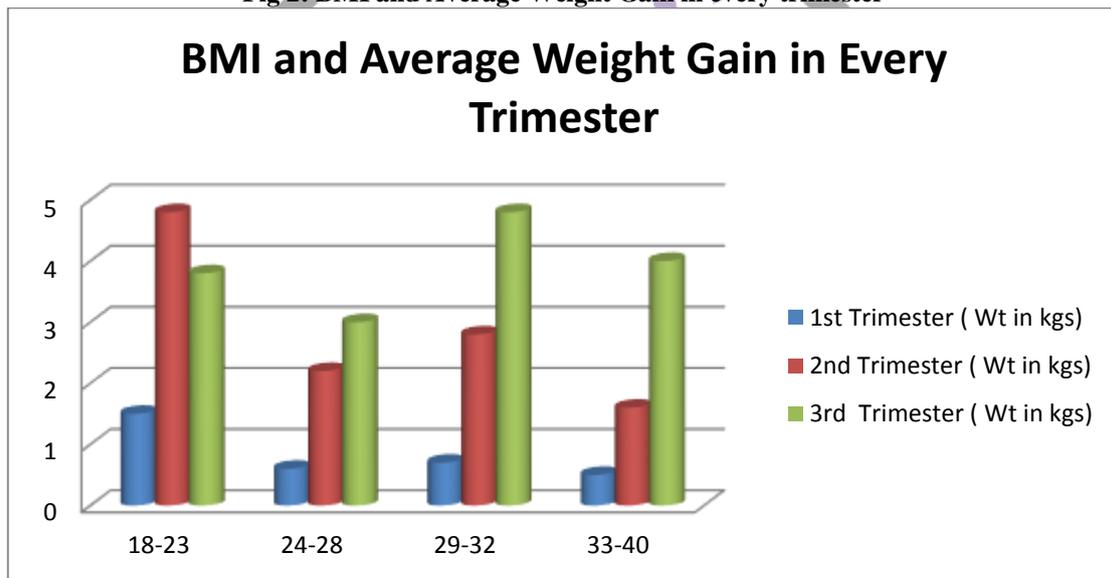


Table 2: BMI and Mother’s Complications during Pregnancy

BMI kgs / m ²	Anemia (%)	Pregnancy Induced Hypertension (%)	Gestational Diabetes (%)	Hypothyroidism (%)	Any other (%)
18-23	80	Nil	18	Nil	2
24-28	11	18	18	3	8
29-32	23	26	32	10	6
33-40	5	29	29	14	29

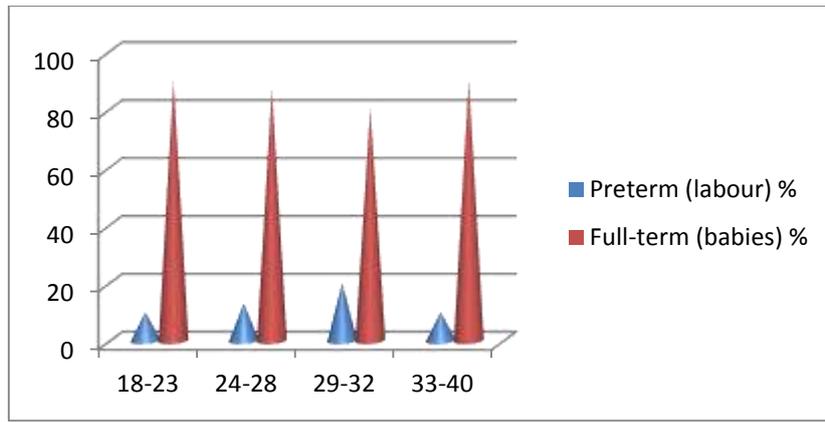


Fig 3: BMI and Week of Gestation

Fig 4: BMI and Cesarean Delivery

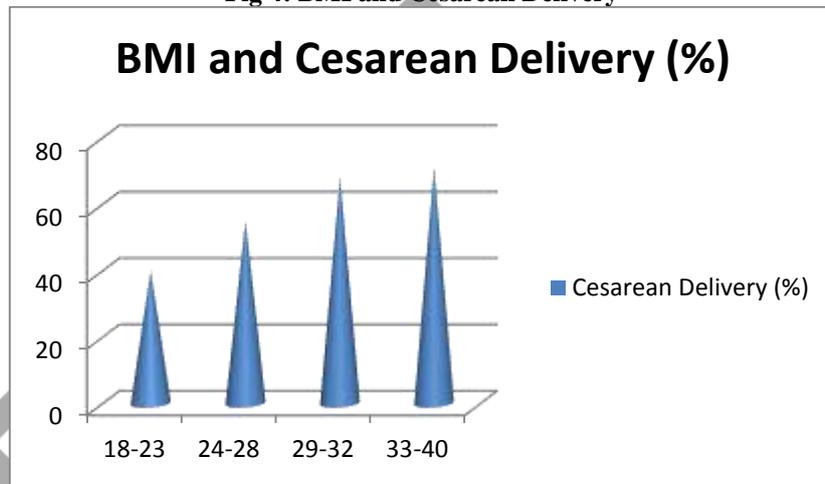


Fig 5: BMI and Average Birth Weight of the Baby

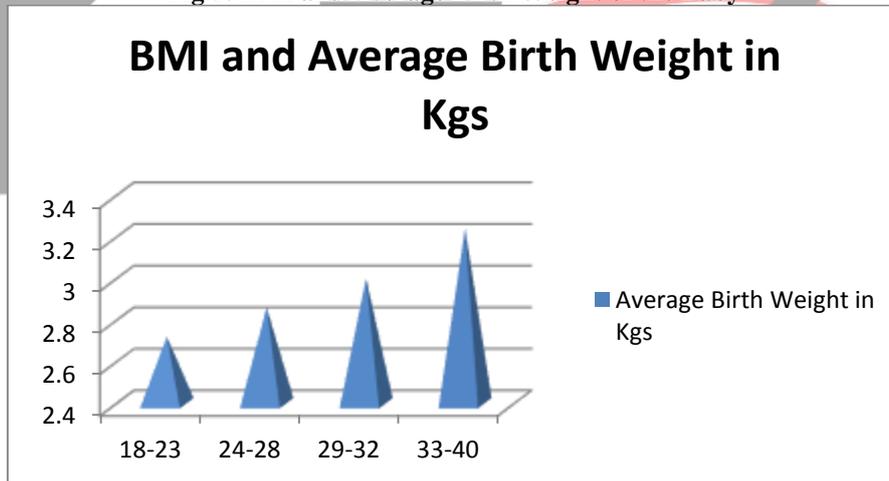


Table 3: BMI and Impression of the Baby

BMI kgs /m ²	AGA (%)	SGA (%)	LGA (%)
18-23	80	20	NIL
24-28	79	5	16
29-32	52	16	32
33-40	23	10	67

Fig 6: BMI and Baby suffering from Jaundice

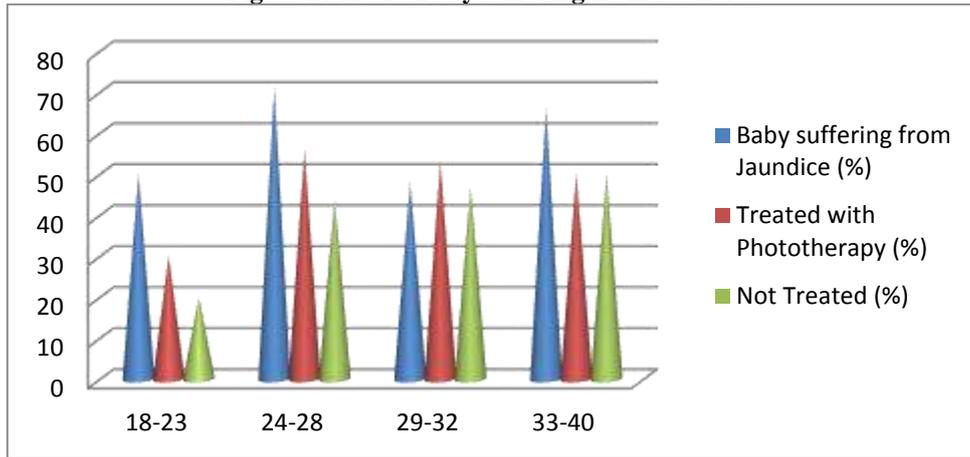


Table 4: BMI and Baby suffering from Hypoglycemia

BMI kgs /m ²	Hypoglycemia (%)	Intravenous fluid (%)	Oral feeds (%)
18-23	30	100	Nil
24-28	26	90	10
29-32	32	90	10
33-40	43	90	10

Fig 7: BMI and Baby suffering from Congenital Anomalies

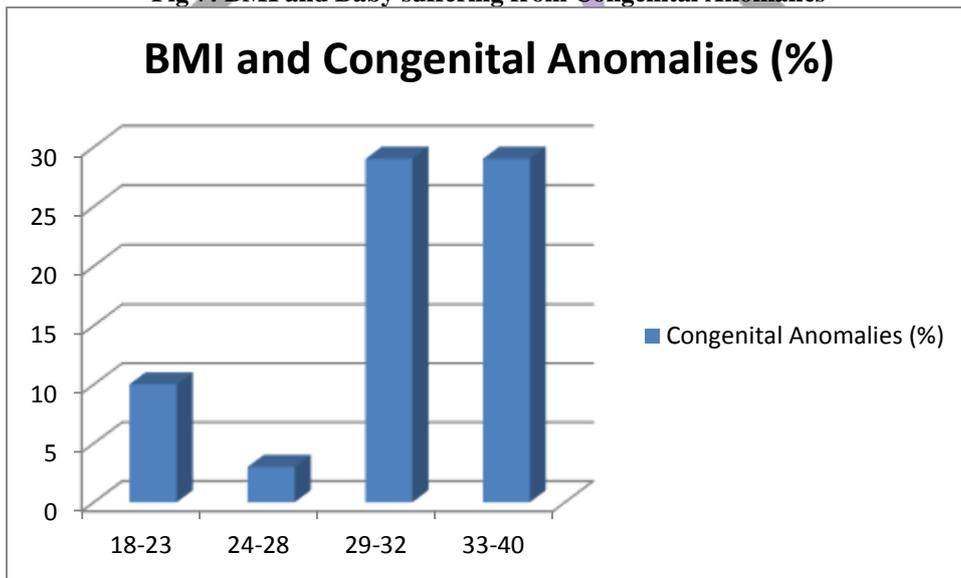


Table 5: BMI and Child's Diet in Hospital

BMI kgs /m ²	Breast Milk (%)	I.V Fluids (%)	Oral Feeds (%)
18-23	70	30	Nil
24-28	73	23	4
29-32	67	29	4
33-40	57	38	5

V.SUMMARY AND CONCLUSION

To assess the co-relation between the maternal obesity and neonatal complications a retrospective study was done. The data was collected and according to their BMI they were categorized into Normal (N) (10%), Overweight (O.wt) (38%), Obese (O) (31%) and Morbidly Obese (M.O) (21%). The complications which were observed are Gestational Diabetes Mellitus (O-32%), (M.O-29%), Anemia (O-23%, M.O-5%), Pregnancy Induced Hypertension (O-26%, M.O-29%), Hypothyroidism (O-10%, M.O-14%), were more prominent among obese and morbidly obese pregnant women.

Data was analyzed by comparing the neonatal complication by increasing maternal BMI. It was found that the average birth weight of the baby was higher in obese (3.00kgs) and morbidly obese (3.25kgs) pregnant women and the Apgar score of the neonate was found to be more than 5 at 5 minutes in obese and morbidly obese pregnant women. The length of the baby was found to be in the

range of 45-50 cms. The head circumference was found to be normal in overweight, obese and morbidly obese women. The number of neonatal complications like macrosomia (O-32%, M.O-67%), Jaundice (O-48%, M.O-67%), Hypoglycaemia (O-32%, M.O-43%) and congenital anomalies (O-29%, M.O-29%) were higher in obese and morbidly obese pregnant women. Thus more number of complications is seen in neonates of obese and morbidly obese women.

It can be concluded that higher the BMI more the number of complications among pregnant women and neonates. Obesity has implications both for the mother and the infant. In addition to health complications, it also leads to additional care and resources needed from service providers.

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