

Study the effect of increased maternal BMI on foetal outcome: A prospective observational study

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ABSTRACT

Aim: To study the effect of increased maternal BMI on fetal outcome. **Materials and Methods:** The present descriptive cross-sectional study entitled was conducted in the Department of Obstetrics and Gynecology. The study includes 100 subjects who have taken antenatal care at the hospital. Descriptive statistics included computation of percentages, means and standard deviations were calculated using SPSS version 20. **Results:** Mean age was 27.21 years, mean BMI (kg/m²) was 27.49 and mean weight gain was 7.14 kgs. Most common neonatal complication was Low Birth Weight (7%) followed by Meconium Aspiration Syndrome (6%), Sepsis (6%). Neonatal death was observed among 5% subjects and still birth was reported among 4%. **Conclusion:** Present study confirmed that maternal obesity is associated with an increased risk of neonatal complications like Low Birth Weight, Meconium Aspiration Syndrome and Sepsis.

Keywords: BMI, LBW, obesity, outcome

Introduction

During the last 20–40 years, the prevalence of obesity has increased at a rate that gives cause for concern. Several chronic diseases, such as hypertension, cardiovascular disease and type-2 diabetes^[1] and also increased mortality are associated with obesity.^[2]

In India the epidemic of obesity is seen alongside continuing problem of under nutrition, creating a double burden.^[3] According to NFHS (2005-2006) surveys more than 30 million people of India are obese, which is approximately 6% of the obese people worldwide.^[4] Currently third in the chart next only to US and China; India is racing ahead to top the chart. There is also a steady rise in obesity among children in Asian population with it rising up to 25% in some developing countries.^[5]

In 2009, the Institute of Medicine (IOM) put forth new guidelines regarding how much weight women should gain during pregnancy.^[6] The impetus for the update was partly due to the increasing availability of data on the effect of gestational weight gain (GWG) on perinatal outcomes as well as the changing obstetric population over time since its last recommendation in 1990.^[7] The studies of feto-maternal adverse outcomes have been primarily based on retrospective studies, reviews, and large birth registries, have used weights rather than BMI, and have been limited in the outcomes evaluated. This study enables us to highlight a problem that is a modifiable risk factor (BMI) and its fetal outcome and to educate treating clinicians about the importance of preconceptional counselling regarding obesity and related issues.

Materials and Methods

The present descriptive cross-sectional study entitled “to study the effect of increased BMI on fetal outcome” was conducted in the Department of Obstetrics and Gynecology. The study includes 100 subjects who have taken antenatal care at the hospital.

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Ethical approval and informed consent

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained.

Inclusion criteria

1. Pregnant woman who give informed consent for study.
2. Pregnant woman with gestation <12 weeks.
3. Pregnant woman with comorbid conditions like thyroid disease, diabetes mellitus, PCOS.

Exclusion criteria

1. Pregnant woman presenting beyond 12 weeks of gestation.
2. Pregnant woman with previous LSCS.
3. Pregnant woman with multiple gestations.

Methodology

Pregnant woman were followed up in each antenatal visit as well as in ward in case of any complication before or after delivery. Detailed history was taken including complaints during present pregnancy, past history, menstrual history, obstetrical history. Detailed general physical examination and obstetrical examination was done. Neonatal status was followed up in the ward or NICU.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations were calculated. For all tests, confidence interval and *P* value were set at 95% and ≤ 0.05 respectively.

Results

Table 1 Mean age was 27.21 years, mean BMI (kg/m²) was 27.49 and mean weight gain (kgs) was 7.14.

Table 2 The most common neonatal complication was Low Birth Weight (7%) followed by Meconium Aspiration Syndrome (6%), Sepsis (6%), VLBW (4%), Hypoglycemia (3%), Respiratory Distress Syndrome (3%), Congenital Heart Defect (2%) and cleft palate (2%), respectively.

Table 3 Neonatal death was observed among 5% subjects and still birth was reported among 4%, respectively.

Discussion

Maternal body mass index (BMI) is one of the most important predictor of nutritional status of pregnant lady. Both nutritional intake and maternal weight are modifiable factors which

Table 1: Clinical profile of the study population

Variables	Mean	Std. Deviation
Age (Years)	27.21	4.18
BMI (kg/m ²)	27.49	2.14
Weight Gain (kgs)	7.14	2.03

Table 2: Distribution neonatal complications

Neonatal complications	n %
Low Birth Weight	7 (7%)
Meconium Aspiration Syndrome	6 (6%)
Sepsis	6 (6%)
VLBW	4 (4%)
Hypoglycemia	3 (3%)
Respiratory Distress Syndrome	3 (3%)
Congenital Heart Defect	2 (2%)
Cleft Palate	2 (2%)

Table 3: Fetal outcome

Outcome	n (%)
Survived	91 (91%)
Stillbirth	4 (4%)
Neonatal Death	5 (5%)

can influence pregnancy outcome.^[8] Either underweight or overweight both can have a significant impact on outcome of pregnancy. Worldwide there has been alarming increase in the incidence of obesity and overweight, particularly in the past two to three decades. In the latest report, the WHO has indicated that approximately 1.6 billion adults are overweight and around 400 million are obese. Obesity as thus becomes a major contributor for global burden of chronic diseases and disabilities.^[9]

In the present study mean age was 27.21 years, mean BMI (kg/m²) was 27.49 and mean weight gain was 7.14 kgs. Kumar HAS *et al.*^[10] in their study reported that maximum numbers of patients were in the age group of 21 to 30 years in all the BMI groups. Shuchi L *et al.*^[11] revealed that mean age was 25.92 in the BMI >30 group compared with 24.2 in the BMI <30 group. This could be due to the age-related weight gain in these patients.

In the present study, maternal obesity is associated with an increased risk of Low Birth Weight (7%) followed by Meconium Aspiration Syndrome (6%), Sepsis (6%), VLBW (4%), Hypoglycemia (3%), Respiratory Distress Syndrome (3%), Congenital Heart Defect (2%) and cleft palate (2%) respectively. In another study conducted by Kutchi I *et al.*^[12] he observed that the risks for complications like congenital malformations, meconium-stained amniotic fluid, birth asphyxia and perinatal mortality was higher among obese group. This depicts that increased neonatal complication with increased BMI. The cause of the increased risk of abnormalities is unclear. Potential mechanisms may include deficiencies in folic acid, chronic hypoxia, as well as metabolic changes including maternal hyperglycemia, increased insulin resistance and incremented

circulating levels of triglycerides and uric acid as described above. Another possible contributor to this apparent increase in congenital abnormalities may relate to the relative difficulties with antenatal detection. Ultrasound scanning of obese pregnant women may lead to suboptimal visualization of fetal anatomy, lower detection rates of structural abnormalities, and therefore an increased prevalence at birth.¹³

In the present study, neonatal deaths reported were 5% and still birth was reported among 4%. John J *et al.*¹⁴ in her investigation found that the incidence of still birth was 10%. In another study conducted by Deshmukh VL *et al.*¹⁵ observed significantly higher rate of stillbirths ($p < 0.05$) and early neonatal death ($p < 0.05$) were noted in overweight and obese women. A meta-analysis was conducted by Chu *et al.*¹⁶ the findings suggested that maternal obesity increased the risk of stillbirth, the explanation for the association is uncertain. It may be directly related to obesity, or could be due to associated co-morbidities such as GDM or hypertensive disorders. It can be said that the increased risk of preterm delivery in the obese may be iatrogenic, as increased prevalence of medical conditions in the mother or fetal macrosomia and intrauterine growth restrictions of the baby may warrant early interception by attending physicians. Increased low birth weight, stillbirth, and spontaneous preterm delivery might also be due to dysregulation of pro-inflammatory cytokines as well as increased risk of infection in obese and overweight individuals as they will lead to reduced placental surface area and also their vasculature with consequent uteroplacental insufficiency.¹⁷

Conclusion

Present study confirmed that maternal obesity is associated with an increased risk of neonatal complications like Low Birth Weight, Meconium Aspiration Syndrome and Sepsis. Maternal obesity is now becoming one of the most common risk factors in pregnancy, leading to complications that impact on the health of both the woman and her offspring. Therefore, there is a need for:

1. Preconception counseling including awareness regarding exercise and healthy, nutritious diet should be done.
2. Consideration of pregnant women with high BMI as high-risk pregnancy.
3. Before conceiving and in first antenatal visit screening for hypertension and DM must be performed

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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