A prospective observational research to investigate the effect of increasing maternal BMI on foetal outcome

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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, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India. The study includes 120 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 28.21 years, mean BMI (kg/m2) was 28.49 and mean weight gain (Kgs.) was 8.01. Most common neonatal complication was Low Birth Weight (6.7%) followed by Meconium Aspiration Syndrome (5.8%), Sepsis (5.0%), VLBW (4.2%), Hypoglycemia (1.7%), Respiratory Distress Syndrome (2.5%), Congenital Heart Defect (0.8%) and cleft palate (1.7%) respectively. Neonatal death was observed among 6.7% subjects and still birth was reported among 10%.

Conclusion: The current study found a link between maternal obesity and newborn problems such as low birth weight, meconium aspiration syndrome, and sepsis.

Keywords: BMI, LBW, Outcome, Obesity

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 and also increased mortality are associated with obesity. In India the epidemic of obesity is seen alongside continuing problem of under nutrition, creating a double burden. According to NFHS (2005-06) surveys more than 30 million people of India are obese, which is approximately 6% of the obese people worldwide. Currently third in the chart next only to US & 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.

In 2009, the Institute of Medicine (IOM) put forth new guidelines regarding how much weight women should gain during pregnancy. 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.
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. Hence the present study was undertaken to study the effect of increased BMI on fetal outcome.

**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, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India. for 1 year. Study includes 120 subjects who have taken antenatal care at the hospital.

**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>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>28.21</td>
<td>3.08</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>28.49</td>
<td>1.34</td>
</tr>
<tr>
<td>Weight Gain (Kgs)</td>
<td>8.01</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Table 1: clinical profile of the study population
Table 1: mean age was 28.21 years, mean BMI (kg/m²) was 28.49 and mean weight gain (Kgs.) was 8.01.

Table 2: distribution neonatal complications

<table>
<thead>
<tr>
<th>Neonatal complications</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Birth Weight</td>
<td>8</td>
<td>6.7%</td>
</tr>
<tr>
<td>Meconium Aspiration Syndrome</td>
<td>7</td>
<td>5.8%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>6</td>
<td>5.0%</td>
</tr>
<tr>
<td>VLBW</td>
<td>5</td>
<td>4.2%</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>2</td>
<td>1.7%</td>
</tr>
<tr>
<td>Respiratory Distress Syndrome</td>
<td>3</td>
<td>2.5%</td>
</tr>
<tr>
<td>Congenital Heart Defect</td>
<td>1</td>
<td>0.8%</td>
</tr>
<tr>
<td>Cleft Palate</td>
<td>2</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Table 2: The most common neonatal complication was Low Birth Weight (6.7%) followed by Meconium Aspiration Syndrome (5.8%), Sepsis (5.0%), VLBW (4.2%), Hypoglycemia (1.7%), Respiratory Distress Syndrome (2.5%), Congenital Heart Defect (0.8%) and cleft palate (1.7%) respectively.

Table 3: Fetal outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>101 (84.2%)</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>12 (10.0%)</td>
</tr>
<tr>
<td>Neonatal Death</td>
<td>8 (6.7%)</td>
</tr>
</tbody>
</table>

Table 3: Neonatal death was observed among 6.7% subjects and still birth was reported among 10.0% respectively.

Discussion

The maternal body mass index (BMI) is one of the most significant indicators of a pregnant woman's nutritional state. Nutritional consumption and maternal weight are both controllable factors that can affect the outcome of a pregnancy. Both being underweight and being overweight can have a substantial influence on the pregnancy's outcome. Obesity and overweight have been more common over the world, especially in the last two to three decades. According to the WHO's most recent data, around 1.6 billion persons are overweight, with roughly 400 million being obese. As a result, obesity is a significant contribution to the worldwide burden of chronic illnesses and impairments.

The mean age was 28.21 years, mean BMI (kg/m²) was 28.49 and mean weight gain (Kgs.) was 8.01. In their study, Kumar HAS et al. found that the age group of 21 to 30 years had the highest number of patients across all BMI levels. According to Shuchi L et al., the BMI>30 group had a mean age of 25.92, whereas the BMI30 group had a mean age of 24.2. This might be owing to these individuals' age-related weight increase.

In the present study, maternal obesity is associated with an increased risk of Low Birth Weight (6.7%) followed by Meconium Aspiration Syndrome (5.8%), Sepsis (5.0%), VLBW (4.2%), Hypoglycemia (1.7%), Respiratory Distress Syndrome (2.5%), Congenital Heart Defect (0.8%) and cleft palate (1.7%) respectively. 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.\textsuperscript{xiii}

In the present study, neonatal deaths reported were 6.7% and still birth was reported among 10%. John J et al.\textsuperscript{xiii} in her investigation found that the incidence of still birth was 10%. A meta-analysis was conducted by Chu et al.\textsuperscript{xiv} 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 consequentuteroplacental insufficiency.\textsuperscript{xv}

Conclusion
The current study found a link between maternal obesity and newborn problems such Low Birth Weight, Meconium Aspiration Syndrome, and Sepsis. Obesity in the mother is currently one of the most prevalent risk factors in pregnancy, leading to issues that affect the woman’s and her child’s health.

References

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