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## A study to determine the correlation between maternal body mass index and obstetric operative intervention

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### Abstract

This is a prospective study consisting of 325 women delivered in Sasson general hospital Pune aimed to determine the correlation between maternal body mass index and obstetric operative intervention in the form of caesarean section deliveries and instrumental deliveries. Patients were registered before or at 18 weeks of gestation. They were followed in antenatal outpatient department every month upto 28 weeks of gestation, later every 2 weeks till 36 weeks of gestation and weekly there after till delivery. In this study we conclude that incidence of caesarian deliveries and instrumental deliveries is more as we move from gestational weight gain less than normal category to gestational weight gain more than normal category in relation with BMI.

**Keywords:** BMI, Obesity, obstetrical outcome, caesarean section, instrumental delivery.

### 1. Introduction

Obesity has become a worldwide epidemic. The latest reports of WHO<sup>[1]</sup> indicate that in 2005, approximately 1.6 billion adults were overweight and at least 400 million adults were obese. Overweight and obesity are defined as abnormal or excessive percent fat accumulation that may impair health. The prevalence of obesity has doubled among women from 16.5% to 33.2%<sup>[2]</sup>. As the prevalence of obesity is increasing, so is the number of women in reproductive age group who are overweight and obese. The average BMI is increasing among all age categories and women are entering pregnancy at higher weights. Women are also likely to retain gestational weight with each successive pregnancy<sup>[3]</sup>. The Institute of Medicine (IOM)<sup>[9]</sup> have given recommendations of weight gain according to prepregnancy BMI category as - low, normal, high, obese. As prepregnancy weight is difficult to obtain we considered weight of pregnant women of < 18 wks gestation as the initial body weight at the time of registration in our study. We wish to study the serial gestational weight gain as a method of antenatal surveillance to anticipate the pregnancy complications and neonatal outcome in general. We studied weight gain in population residing at and around Pune. Most of the previous studies were done in western population which can hardly be applied to our population.

### 2. Materials and Methods

These women were registered before or at 18 weeks of gestation, and attended antenatal outpatient department of our institute regularly as per schedule. At the time of registration the baseline information was taken especially with respect to age, parity, weight & height. BMI was calculated for each patient according to formula  $\text{weight}/(\text{height in meters})^2$ . Electronic digital weighing machine was used for measurement of weight with accuracy upto 200 grams. Weight recorded without shoes, chappals and other articles. Weight was measured by same group of doctors throughout the antenatal period and thus errors of machine and human errors were minimized.

Then the patients were classified according to body mass index into 4 groups

- a) Body mass index <19.8 kg/sqm- underweight
- b) Body mass index 19.8- 26 kg/sqm- normal weight
- c) Body mass index 26.1-29.0 kg/sqm-overweight
- d) Body mass index >29.0 kg/sqm- obese

Later at each visit the clinical data was recorded, weight measurements was carried out and USG & colour Doppler study was done as per requirement if indicated and results were recorded. Also any antenatal complication was noted & if present was treated. Thus each and every patient was followed up in antenatal outpatient department till delivery. In labour room patient was followed up for any intrapartum complications and the type of delivery. The data thus collected was analysed to correlate body mass index in pregnancy, gestational weight gain & fetomaternal outcome.

### 2.1 Inclusion Criteria

1. All pregnant women <18wks at first ANC visitor respective of age and parity who agreed to be compliant for ANC visits and delivery at our institute.
2. Pregnant women >18wks with well-maintained previous ANC records.

### 2.2 Exclusion Criteria

1. All pregnant women > 18weeks gestation with no previous records.
2. All pregnant women who are non-compliant
3. All pregnant women with recent illness, infections during pregnancy like HIV, hepatitis B, syphilis.
4. Twin pregnancy.
5. Preexisting Diabetes mellitus, Hypertension, Heart disease.

### 2.3 Statistical analysis

Statistical analysis is done with Z test as sample is large. P value is calculated. If P value is greater than 0.05 than the result is not statistically significant.

#### Observation and results

In our study total 400 women were enrolled and 75 patients were dropped as lost for follow up. So we have in total 325 patients with singleton pregnancy enrolled in the study at or before 18 weeks of gestation.

The weight taken at 18 weeks or before in pregnancy was considered as initial weight for calculating Body mass Index. BMI was calculated by formula weight in kg/ height in meter<sup>2</sup>. If records for pre-pregnancy weight was available than it was taken as the initial weight. According to the Institute of Medicine (IOM) guidelines these 325 patients were divided into 4 groups-

1. **GROUP A**– Group with low BMI< 19.8 kg/sqm
2. **GROUP B** –Group with normal BMI- 19.8- 26 kg/sqm
3. **GROUP C**- High BMI- 26.1 -29 kg/sqm
4. **GROUP D**-Obese- >29kg/sqm.

### 2.4 Forceps delivery in different BMI groups

BMI Groups	No. of Forceps	%
A - 100	1	11.2%
B - 146	2	22.2%
C - 38	2	22.2%
D - 41	4	44.4%
Total	9	100

From the above table it can be seen that maximum number of forceps delivery occur in the D group – 44.4% while least common are seen in the A group 11.2%. The overall incidence of Forcep application was 2.8%. The main indication of Forcep application being fetal distress in 2<sup>nd</sup> stage of labour.

### 2.5 Incidence of LSCS in different BMI groups

BMI Groups	No. of LSCS	%
A - 100	1	3.13
B - 146	10	31.25
C - 38	6	18.75
D - 41	15	46.87
TOTAL	32	100

From the above table it can be seen that maximum number of LSCS are seen in D group 46.87% and least in a group – 3.13%. LSCS rate in the study group was 9.8%.

### 2.6 Indications for LSCS in different BMI groups

Indication for LSCS	A	B	C	D	Total	%
CPD	0	4	4	5	13	40.7
Failure of induction	0	2	1	8	11	34.3
Fetal distress	1	1	1	1	4	12.5
Others	0	3	0	1	4	12.5
	1	10	6	15	32	100

From the above table it can be seen that most common indication of LSCS was Cephalopelvic disproportion accounting for 40.7%. Other uncommon indications in the study group were breech presentation, cord prolapse, previous 2 LSCS, deep transverse arrest.

### 3. Discussion

In a recent most study of 1,20,000 obese pregnant women, Kiel<sup>[4]</sup> and associates (2007) found that those who gained less than 15 pounds had lowest rates of preeclampsia, large for gestational age infants and cesarean delivery.

In other study of 1,00,000 women with normal prepregnancy BMI, DeVaderand colleagues (2007)<sup>[5]</sup> found that those who gained less than 25 pounds during pregnancy had lower risk for preeclampsia, failed induction, Cephalopelvic disproportion, caesarean sections, and Large for gestational age infants. In our study there is more association of operative intervention in form of LSCS and forceps delivery in high BMI and obese group. LSCS rate in the study group was 9.8%. Also 72.72% of failed induction cases and 46.87% of all cesarean sections occur in D group i.e. obese group. Most common indication of LSCS was cephalopelvic disproportion amounting to 40.7% of all LSCS.

In a study carried out by Dietz<sup>[6]</sup> *et al.* showed that incidence of cesarean delivery increased with increased prepregnancy BMI from 14.3% for low BMI to 42.6% for morbidly obese women. Similar results were reported by Vahratian<sup>[7]</sup> *et al.* Weiss<sup>[8]</sup> and colleagues reported the rate of cesarean among nulliparous women with normal BMI to be 20.7% and 33.8% for high BMI and 47.4% in obese patients. Similar results were reported by Holger<sup>[9]</sup> and colleagues. Brost<sup>[10]</sup> and maternal age and increased rate of cesarean delivery.

The overall incidence of Forcep application in our study group was 2.8%. Maximum number of forceps delivery occur in the D group – 44.4% while least common are seen in the A group 11.2%. The main indication of Forcep application being fetal distress in 2<sup>nd</sup> stage of labour. In a study carried by Yu CK<sup>[11]</sup> *et al.* also shows that increased incidence of vaginal operative delivery in obese group.

### 4. Conclusion

From our study we may conclude that incidence of caesarian deliveries and instrumental deliveries is more as we move

from gestational weight gain less than normal category to gestational weight gain more than normal category. More common in obese and high BMI group. In clinical practice gestational weight gain is commonly used to identify women considered to be at a risk of foetal compromise, if gestational weight gain is poor or if weight gain is excessive.

The variation in total gestational weight gain is so wide that this measurements alone are less likely to be clinically useful. Impact of gestational weight gain should be interpreted in relation to maternal prepregnancy BMI.

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