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Study of Effect of Maternal BMI on Neonatal Outcome in Women Admitted to Labour Ward of New Civil Hospital

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Abstract: ***To Study the Effect of maternal BMI on Neonatal outcome. Material and method: Five hundred women who had singleton pregnancy who were admitted to the labour room of new civil hospital categorised into three categories on basis of their BMI and the labour and neonatal outcome were noted in all this groups. This observational study on" Maternal BMI and its influence on feto-maternal outcome" enrolled 500 eligible consenting women delivering in the labour room of new civil hospital, Surat during the study period after approval from HREC.***

Keywords: BMI (body mass index)

1. Introduction

The increasing rate of maternal obesity provides a major challenge to obstetric practice. Maternal obesity can result in negative outcomes for both women and foetuses. Obesity in pregnancy can also affect health later in life for both mother and child.

The worldwide prevalence of obesity has increased substantially over the past few decades; Economic, technological and lifestyle changes have created an abundance of cheap, high-caloric food coupled with decreased requirement of physical activity. Obesity is a significant public health concern and is likely to remain so for the foreseeable future.

Obesity, the silent epidemic worldwide has reached a stage where approximately 2.3 billion adults will be overweight and more than 700 million adults will be obese by 2015,as projected by WHO(1).National Family Health Surveys in India indicated an increase in obesity from 10.6% in 1998-1999 to 14.8% in 2005-06(2).

The currently recommended cut-offs of BMI by WHO are (1):
NORMAL : 18.5 – 24.9 kg/m^2
OVERWEIGHT: 25.0 – 29.9 kg/m^2
OBESITY : ≥30kg/m^2

2. Maternal Obesity and Neonatal Outcome

Maternal obesity is associated with abnormal foetal growth as well as peripartam morbidity and mortality. Women who are heavier are less likely to have a pregnancy complicated by a small for-gestational age infant or intrauterine growth restriction, but this protective effect appears to dissipate once the maternal BMI reaches the level of obesity (>30 kg/m2).(3) The major concern in obese pregnant women is foetal macrosomia (defined as an estimated foetal weight of greater than or equal to 4500 g), which appears to be increased 2- to 3-fold in obese parturient relationship between maternal obesity and foetal macrosomia.

There is increasing evidence to support an association between maternal obesity and congenital malformations, particularly neural tube defect and cardiac malformations. (4)

Other risks of obesity are preterm birth, increased chances of instrumental delivery and birth asphyxia. (5, 6, 7)

3. Objectives

To evaluate the impact of maternal body mass index on neonatal outcome.

- **Inclusion criteria:**
  Labouring women admitted to labour room of new civil hospital with full term singleton pregnancy with cephalic presentation and no contraindication to vaginal delivery.
- **Exclusion criteria:**
  Labouring women with multiple pregnancies, abnormal presentation, and previous caesarean section not eligible for VBAC, known case of DM and hypertension.

4. Results

The BMI distribution of our subjects as per the WHO Classification is presented below in Table-1a:

Table 1a

BMI	*Number of subjects(n=500)*	*%*
<24.9kg/m^2	276	55.2%
25-29.9kg/m^2	179	35.8%
>30kg/m^2	45	9%

Majority i.e. 55.2% of our subjects had BMI of less than 25 kg/m^2, 35.8% had normal BMI at full term/near term pregnancy; while 9% of subjects were obese i.e. had a BMI of over 30 . This is probably because our hospital caters to women of lower socio-economic status.

Table- 1b

	BMI<24.9 Kg/ m^2 (n=276)	BMI >30 Kg/ m^2 (n=45)
Age		
≤19(n=31)	25	6
20-25(n=240)	218	22
>25(n=50)	33	17
Parity		
Primi(n=151)	143	8
Multi(n=170)	133	37
Gestational age at delivery		
<37 weeks(n=86)	75	11
37-40 weeks(n=217)	197	20
>40 weeks(n=18)	4	14

- Obesity was noted in 15% of subjects under 19 years, 6.37% of 20-25 years and 14.78% of more than 25 years age groups.
- 94.7% primis/nullis had normal BMI and 17.77% were obese; on the other hand 78.23% multis had normal BMI and 82.22% were obese.

BMI in obese range was seen more frequently in the multiparous subjects (p-value <0.001 for primis).

Post-datism was noted in 31.1% subjects with obesity versus 1.4 % subjects with normal BMI and the difference was statistically significant. (p<0.001)

Neonatal outcome is presented below in Table-2.

Table 2: Neonatal outcome

Neonatal outcome			
		BMI<24.9Kg/m^2	BMI>30 Kg/ m^2
Baby weight(n=321)			
<2.5(n=32)		18	14
2.5-3.0(n=187)		176	11
3.0-3.5(n=89)		82	7
>3.5(n=13)		0	13
Status at birth (n=321)			
Live Birth(311)		272	39
Still Birth(10)		4	6
NICU admission(n=21)		6	15
Congenital anomaly		2	1
APGAR amongst live births (n=311)			
		(n=272)	(n=39)
1 min	Normal(n=282)	259	23
	Abnormal(n=29)	13	16
5 min	Normal(n=288)	270	18
	Abnormal(n=21)	2	19

- 14 of the 45 obese subjects (31.1%) had low birth weight babies weighing less than 2.5 kgs, while 18 of the 276(6.5%) non-obese subjects had low birth weight babies. **The difference in numbers of subjects having low birth weight babies in obese versus non-obese was statistically significant.(p value<0.001)**
- 13 of the 45 obese subjects (28.8%) had macrosomic babies weighing more than 3.5 kgs, while none of non-obese subjects had macrosomic babies. **The difference in numbers of subjects having macrosomic in obese versus non-obese was statistically significant.(p value<0.001)**
- 6 of the 45 obese subjects (13.3%) had stillborn babies, while 4 of the 276(1.4%) non-obese subjects had stillborn babies. **The difference in numbers of subjects having stillbirths in obese versus non-obese was statistically significant.(p value<0.003)**
- Obese subjects were more likely to have newborns with abnormal APGAR at 1minute and also at 5minutes as compared to non-obese subjects**. The difference in numbers of subjects having abnormal APGAR in their newborns in obese versus non-obese was statistically significant in both. (P-value <0.001)**
- 15 of the 39 obese subjects (38.46%) babies needed NICU admission, while 6 of the 272(2.2%) non-obese subjects babies needed NICU admission. **The difference in numbers of subjects having newborns needing NICU admission in obese versus non-obese was statistically significant.(p value<0.001)**
- 1 of the 39 obese subjects (2.5%) babies were anomalous, while 2 of the 272(0.73%) non-obese subjects babies had congenital anomaly.(p value-0.54)

5. Conclusion

Though obesity is not a very common problem amongst the pregnant women population in the middle and lower socio-economic status, its implications in terms of adverse neonatal outcome are significant. So measurement of maternal BMI at antenatal booking visit should receive priority at all levels of antenatal care to avoid adverse neonatal outcome.

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