



MATERNAL LOW BMI – MATERNAL AND FETAL OUTCOME

Gynaecology

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ABSTRACT

Objectives: To compare antenatal complications, obstetric and neonatal outcome in underweight women and women with normal BMI.

Methodology: Prospective observational study. Subjects were selected from OPD and IPD for 6months in Government maternity hospital, Tirupati, using systematic random sampling. Their BMI at booking visit was noted. They were periodically followed results analysed.

Results: 106 women were underweight and 134 had normal BMI. Age distribution is similar. 81.1% of the underweight women were anemic. 23.6% of underweight women and 9.7% of women with normal BMI developed gestational hypertension/ preeclampsia. Preterm labor (28.3%) and IUGR (22.3%) was significantly higher in underweight women.

Conclusion: Underweight women have more incidence of anemia, blood transfusions, pregnancy induced hypertension, pre term labour and intrauterine growth retardation. The mean birth weight of baby is less in underweight women.

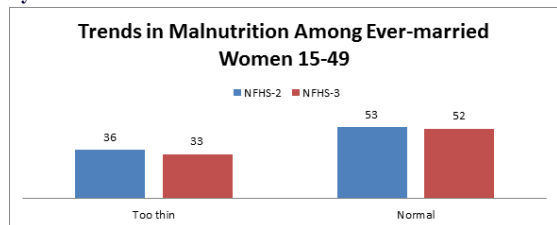
KEYWORDS

Body Mass Index, prematurity, anemia, intra uterine growth retardation

INTRODUCTION

The National Family Health Survey (NFHS) there was only a marginal decrease in the incidence of underweight from 36% in 1998-1999 to 33% in 2005-2006 in ever married women aged 15-49 years¹.

Graph :1 Trends in Malnutrition among ever married women 15-49 years



Lean women carry a risk of adverse outcomes. Correct pre-pregnancy BMI is required for optimum outcome.²

Anemia and low birth weight were significantly present among lean women³. Low weight and BMI at conception or delivery as well as poor weight gain during pregnancy are associated with low birth weight, prematurity and maternal delivery complications³. Being underweight is also a risk factor for fetal growth restriction⁴. Purpose of this study is to evaluate the pregnancy outcome in underweight women attending Govt. maternity hospital, Tirupati, an urban setting where both underweight and overweight population is encountered.

AIMS AND OBJECTIVES

Aim:

To study the maternal and fetal outcome of women with low body mass index in otherwise normal pregnancies.

Objectives:

To compare the following aspects in normal and underweight women

- Antenatal complications such as gestational hypertension/ preeclampsia and gestational diabetes.
- Obstetric outcome in terms of abortion, preterm labor and mode of delivery.
- Neonatal outcome in terms of perinatal deaths, birth weights and admissions in neonatal intensive care units.

MATERIALS AND METHODS

- **Study design:** Prospective observational study.
- **Study subjects:** Systematic random sampling technique will be

used to select study subjects among the women attending the OPD (Outpatient Department) and IPD (Inpatient Department)

- **Study method:** Subjects will be selected using systematic random sampling technique if they meet the inclusion criteria for first 6 months. They will be periodically followed and their antenatal complications, obstetric outcomes and neonatal outcomes will be noted and analyzed.
- **Study setting:** Government Maternity Hospital, Tirupati.

INCLUSION CRITERIA:

- Primigravida women aged 20-35yrs attending Government Maternity Hospital in first trimester.

EXCLUSION CRITERIA:

- Women with multiple pregnancies.
- Women with pre existing medical illness.
- Women who did not give the consent for the study.
- Women who are overweight or obese during the booking visit.

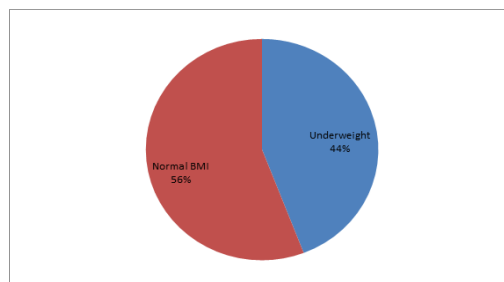
ETHICAL CONSIDERATIONS:

All patients were informed about the study and written consent was taken prior to their inclusion into the study. Patients were not subjected to additional financial burden for the purpose of study.

RESULTS

A total of 260 women were enrolled in the study 240 women were followed up to delivery or abortion. Among them 106 women belonged to underweight group, 134 belonged women with normal BMI.

Graph 2: Distribution of BMI.



The mean height in underweight and normal BMI group women is 158cm and 163cm. The mean weight in each group was 40.01kg in underweight group and 51.65kg in normal BMI group.

Table1 : Age distribution

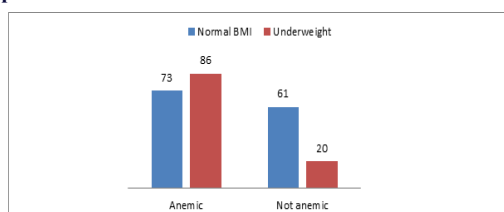
Age	BMI		Total
	Normal BMI (18.5 – 24.9 kg/m ²)	Underweight BMI (<18.5 kg/m ²)	
20 & 21 yrs	86	72	158
	54.4%	45.6%	100%
22 & 23 yrs	28	19	47
	59.6%	40.4%	100%
24 & 25 yrs	20	15	35
	57.1%	42.9%	100%

Most of the subjects were 20-21 years 158 (65.89%). None of them were above 25 years of age.

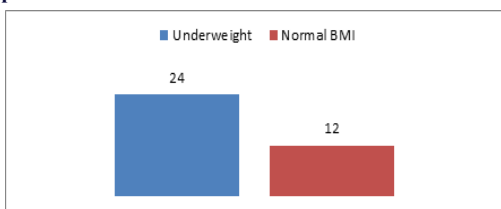
Table 2: Distribution of Socioeconomic class

Age	BMI		Total
	Normal BMI (18.5 – 24.9 kg/m ²)	Underweight BMI (<18.5 kg/m ²)	
Lower Middle class	82	67	149
	55.03%	44.97%	100%
Upper Lower class	28	19	47
	59.6%	40.4%	100%
Lower class	24	20	44
	54.5%	45.5%	100%

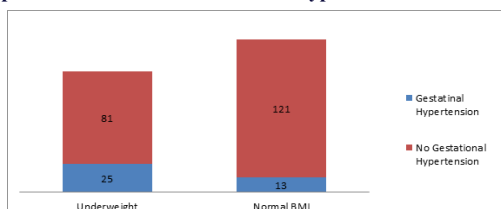
The difference in anemia in the two groups is statistically significant.

Graph 3: Distribution of anemia

Totally 36 women received blood transfusion. 24 transfusions were done in underweight women and 12 transfusions among normal BMI group. The difference is statistically significant (graph 4).

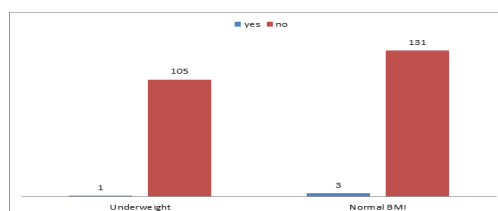
Graph 4: Distribution of Blood transfusion

Out of 131 women with normal BMI 13 had Gestational Hypertension and 25 among 103 underweight women had Gestational Hypertension. (graph 5)

Graph 5: Distribution of Gestational Hypertension

The mean gestational age at which Gestational Hypertension is 33.26 weeks and 34.15 weeks in Underweight and Normal BMI women respectively.

The incidence of Gestational Diabetes is 1 (9%) out of 103 in underweight women and 3 (2.2%) out of 131 in normal BMI women. The result was statistically significant and is shown in graph 6.

Graph 6: Gestational Diabetes distribution

The mean gestational age at which gestational diabetes developed is 32 weeks and it was 29.3 weeks in underweight and normal BMI group respectively.

The onset of labor was spontaneous in 71 out of 103 underweight women and 89 out of 131 women with normal BMI.

Table 3 : Obstetric Outcome

BMI	Obstetric Outcome					Total
	Abortion	Cesarean Section	Instrumental Vaginal Delivery	Normal Vaginal Delivery	Preterm Labour	
Under weight: <18.5 kg/m ²	3	15	6	52	30	106
	2.7%	14.2%	5.6%	49.1%	28.4%	100%
Normal: 18.5 – 24.9 kg/m ²	2.3%	13.4%	7.5%	60.4%	16.4%	100%
Total	6	33	16	133	52	240
	2.5%	13.7%	6.7%	55.4%	21.7%	100%

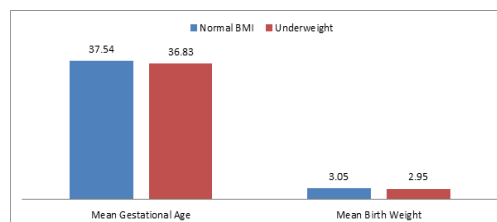
Table 4: Duration of hospital stay

BMI	Hospital stay of the patient in days		
	Before delivery	After delivery	Total
Normal BMI	1.71	2.41	4.12
Underweight	1.82	2.47	4.29

Table 5: IUGR distribution

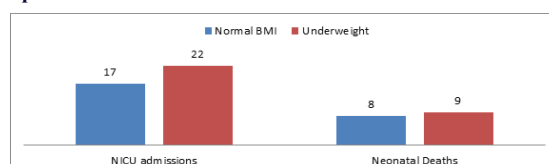
BMI	IUGR	
	Yes	No
Normal BMI (18.5 – 24.9 kg/m ²)	26	105
	19.8%	80.2%
Underweight (<18.5 Kg/m ²)	23	80
	22.3%	77.7%

The incidence of IUGR was more in underweight group (22.3%) than in normal BMI group (19.8%). (table 5)

Graph 7: Mean gestational age (wks) of delivery and birth weight (kgs)

The mean APGAR scores at 1 minute and 5 minutes were 7.47 and 9.47 in normal BMI and 7.18 and 9.17 in underweight group.

The NICU admissions and Neonatal Deaths were considerably more among underweight group women. (graph 8)

Graph 8: NICU admissions and neonatal deaths

DISCUSSION AND ANALYSIS

The incidence of gestational hypertension/ preeclampsia syndrome was 23.6% in underweight women compared to 9.7% in normal women. Though the incidence was less than that seen in overweight women, it was nevertheless a significant increase when compared to normal BMI women. Anemia significantly increases the risk of preeclampsia (31.2%) as per Indian Council of Medical Research⁵ and an independent study in Sudan⁶. Higher incidence of anemia in underweight women probably also explains the higher incidence of preeclampsia.

The incidence of gestational diabetes was significantly lower in underweight women when compared to women with normal BMI (0.9% vs 2.2%).

Underweight women are likely to be protected against impaired glucose tolerance and its adverse effects like macrosomia and increased caesarean sections.

The rate of preterm deliveries was increased in women with underweight^{8,9,10}. Yokohama university reported an incidence of 4.6% in underweight women¹¹.

However, the incidence was significantly higher in our study approaching one third of population (28.3%).

Study by Bhattacharya et al⁷ also showed significant increase in preterm labor. This is also supported by meta-analyses by Ronnenberg AG et al¹².

Intrauterine growth restriction has been high in underweight 22.3% when compared to women with normal body mass index 19.8%, which was a small but significant increase. Ehrenberg HM et al³ showed that body mass index <19.8 kg/m² was associated with preterm labor, intrauterine growth restriction and low birth weight and was protective against cesarean delivery just as in the present study these results were noticed in women with BMI <18.5 kg/m².

21.4% of the babies born underweight women had respiratory distress, needed resuscitation and were admitted to Neonatal ICU, this constituted 13% of babies in normal body mass index group. This difference can be attributed to increase in number of preterm births. Prematurity significantly decreases the chances of neonatal survival. Premature births and Neonatal ICU admissions often lead to emotional and economic burden over the family members and caregivers. It also leads to long term effects on child's growth and development.

In our study, we have relied on height and weight recorded in early pregnancy, before any real impact of gestational weight gain. Still, the values recorded in early pregnancy remain an approximation of pre-pregnancy weight, and therefore subject to bias.

CONCLUSION

The prevalence of underweight cases is high in the present study despite several policies to increase the maternal health conditions at different levels. Maternal BMI shows strong associations with pregnancy complications and outcome.

Underweight women have more incidence of anemia and blood transfusions. There is also increased incidence of pregnancy induced hypertension in underweight women. High rates of preterm labor and intra uterine growth restriction are identified in underweight women. Consequently, the neonatal admissions were more in underweight women.

Policy makers need to recognize increased BMI as a health issue is prevalent in our population and formulate guidelines on management of these women to optimize maternal and fetal outcome.

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