

TITLE: “THE IMPACT OF MATERNAL BMI ON OUTCOME OF LABOR”

Dr. Nitanjali Patil

Assistant Professor, Krishna Institute of Nursing Sciences, KIMSUDU, Karad.

Dr. R. P. Patange*

Professor & Head of Department of Obstetrics and Gynecology, Krishna Institute of Medical Sciences Deemed To Be University, Karad.

Dr.(Mrs) Vaishali R. Mohite

Dean, Krishna Institute of Nursing Sciences Karad, Maharashtra, India.

Dr. S.V. Kakade

Associate Professor, Dept. of Preventive and Social Medicine, KIMS, KIMSUDU, Karad, Maharashtra, India.

Abstract

Introduction : Since at least 1990 Institute of Medicine (IOM) last revised recommendations for BMI and weight gain during pregnancy and gestational weight gain (GWG) are associated with the outcome of pregnancy. A large body links with high pre pregnancy BMI may leads to fetal and maternal complications, like preeclampsia, gestational diabetes, macrosomia, fetal death, , and complicated deliveries GWG has also been thoroughly studied as a predictor of adverse pregnancy outcomes, mainly because of the belief that it is potentially modifiable after conception. Low gain is associated with birth of a small-for-gestational age (SGA) infant. Research studies have shown there is association with maternal Body Mass Index for women with underweight women and obese women . as obese women has increased the duration of labor and the rate of cesarean section.

Materials and Methods- The present study has conducted at Maternity unit of Krishna Hospital and Medical Research Centre , Karad. Prospective research design with purposive sampling technique. Woman willing to participate with singleton pregnancy without any medical and obstetrical complications were enrolled in the study. The present study was accredited by the Ethics Committee of Krishna Institute of Medical Sciences Deemed to be University Karad. Succinctly prepared questionnaire, meetings and medical records were used to collect data. Written informed consent was obtained from study participants after explaining the purpose of the study. Data Analysis - Data were analyzed by using the SPSS 20 version. Results were reported as mean \pm SD, ‘t’ test and p values were used.

Result: Increased age (29 years & above) of antenatal woman is associated with LBW. Mean \pm SD for NBW 23.86 ± 3.067 and Mean \pm SD for LBW 24.38 ± 3.747 ‘t’ Value-6.517 and p value- <0.0001 indicates as age is associated with LBW. Height of the mother is not significantly associated with birth weight of baby ‘t’ value-1.487 and p value-0.1435. Weight of mother is significantly

associated with birth weight of baby. t' value 13.508 and p value -0.0010 suggest that weight of mother is significantly associated with birth weight of baby. BMI of women was significantly associated with birth weight of new born as Chi-square=96.354, P value= <0.0001 indicates antenatal women who were underweight according to their BMI shows significantly high proportion of LBW. There is increased risk of operative delivery like lower segmental cesarean section in both the groups.

CONCLUSION: Increased age, Weight of mother and BMI at the time of birth was significantly associated with birth weight of new born. BMI (Obese group) has shown significantly high proportion lower segmental cesarean section in both the groups.

Key words: Birth weight, Body Mass Index, Impact, obesity, Outcome of labour, cesarean section

Introduction

Low Body Mass Index during pregnancy, when gestational weight gain is < 10 kg puts her at risk of delivering an infant too small for gestational age,¹. The educational status, socioeconomic status of woman, parity, anemia during pregnancy and duration between two deliveries were the influencing factors for birth weight of child². Thin women with a poor psychosocial profile and mothers those who are depressed during antenatal period (pregnancy) are at increased risk of giving birth to low birth weight and preterm infants.³

Since at least 1990 Institute of Medicine (IOM) last revised recommendations for BMI and weight gain during pregnancy and gestational weight gain (GWG) are associated with the outcome of pregnancy. A large body links with high pre pregnancy BMI may leads to fetal and maternal complications, like preeclampsia, gestational diabetes, macrosomia, fetal death, , and complicated deliveries GWG has also been thoroughly studied as a predictor of adverse pregnancy outcomes, mainly because of the belief that it is potentially modifiable after conception. Low gain is associated with birth of a small-for-gestational age (SGA) infant⁴

Body Mass Index is commonly used for measurement for defining obesity, which refers to an in weight in kilograms is divided by the square of height in meters. A person is called overweight when his/her BMI in between 25 - 30 kg/m²; when BMI greater than or equal to 30 kg/m² he/she is called having obesity and BMI greater or equal to 40 kg/m² its morbid obesity⁵.

Research studies have shown association with maternal Body Mass Index for women with underweight women and women with BMI ≥ 40 kg/m². Women with BMI ≥ 40 kg/m² had increased the duration of active labor and also the rate of cesarean section also increased⁶.

Objectives

1. To assess the maternal BMI antenatal woman during pregnancy.
2. To assess the impact BMI on outcome of labour.

Materials and Methods-

The present study has conducted at Maternity unit of Krishna Hospital and Medical Research Centre , Karad. Prospective research design was used. Sampling techniques used was purposive

sampling technique. Population for present study was antenatal women admitted in maternity unit of KH Karad. To select antenatal women admitted at maternity unit we used inclusion and exclusion criteria like antenatal woman willing to participate in study. Woman with singleton pregnancy without any medical and obstetrical complications during pregnancy and labour were included in the study. The present study was accredited by the Ethics Committee of Krishna Institute of Medical Sciences Deemed to be University Karad. Succinctly prepared questionnaire, meetings and medical records were used to collect data like maternal age at the time of pregnancy, height in cm, weight in kg and BMI calculated at the time of delivery and method of delivery were used to study impact if BMI on outcome of labour. Body Mass Index (BMI) is an index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m²). To categorized antenatal woman according to their BMI we have used WHO criteria Underweight, Normal range, Overweight and Obese. Written informed consent was obtained from study participants after explaining the purpose of the study and data gathered. Gathered data arranged in Microsoft xl sheet. Data Analysis - Data were analyzed by using the SPSS 20 version. Results were reported as mean \pm SD, 't' test and p values were used.

Results

Table No- 1: Frequency and percentage distribution of antenatal women according to age.
N=124

Age	NBW		LBW	
	No.	%	No.	%
17-20years	8	53.33	7	46.67
21-24 years	39	62.90	23	37.10
25-28years	23	65.71	12	34.29
29 years &above.	4	33.33	8	66.67

Data in table 1 shows age wise distribution of antenatal women from age group of 17-20 years of age maximum 8 (53.33%) delivered NBW, 7(46.67%) delivered LBW. 21-24 years of age maximum 39 (62.90%) delivered NBW, 23 (37.10%) delivered LBW. 25-28 years of age maximum 23 (65.71%) delivered NBW, 12 (34.29%) delivered LBW. 29 years &above age maximum 8 (66.67%) delivered LBW, 3 (33.33%) delivered NBW. Mean \pm SD for mothers who delivered NBW 23.86 \pm 3.067 and Mean \pm SD for mothers who delivered LBW 24.38 \pm 3.747 't' Value-6.517 and p value- <0.0001 indicates as age is associated with LBW.

Table No- 2: Mean and SD of antenatal women according to height. N=124

Categories according to weight	Height in cm				
	Minimum	Maximum	Mean \pm SD	't' Value	p value
NBW	141	168	156.22 \pm 5.877	1.487	0.1435
LBW	139	170	153.88 \pm 5.961		

Data in above table reveals that Mean \pm SD for mothers height who gave birth to NBW babies 156.22 \pm 5.877 and Mean \pm SD for mothers who gave birth to LBW babies 153.88 \pm 5.961, 't' value-1.487 and p value-0.1435 suggest that height of the mother is not significantly associated with birth weight of baby.

Table No- 3: Mean and SD of antenatal women according to weight . N=124

Categories according to weight	Weight in Kg.				
	Minimum	Maximum	Mean \pm SD	't' Value	p value
NBW	48	90	64.08 \pm 9.892	3.508	0.0010
LBW	42	91	56.26 \pm 11.217		

Data in above table reveals that Mean \pm SD for mothers weight who gave birth to NBW babies 64.08 \pm 9.892 and Mean \pm SD for mothers who gave birth to LBW babies 56.26 \pm 11.217, t' value 13.508 and p value -0.0010 suggest that weight of mother is significantly associated with birth weight of baby.

Table No- 4: Frequency and percentage distribution of antenatal women according to BMI N=124

BMI Category	Normal Birth weight(74)		Low Birth Weight s(50)	
	No.	%	No.	%
Underweight (n=3)	0	0	3	100
Normal range (n=62)	30	48.38	32	51.61
Overweight (n=37)	28	75.67	9	24.32
Obese (n=22)	16	72.72	6	27.27
Mean \pm SD	26.28 \pm 3.87		23.76 \pm 4.42	

Chi-square=96.354, P value= <0.0001 indicates antenatal women who were underweight according to their BMI shows significantly high proportion of LBW indicates, BMI of women was significantly associated with birth weight of new born.

BMI Category wise distribution of antenatal women 3(100%) were gave birth to LBW no one was from underweight category gave birth to NBW. From normal BMI maximum 32(51.61%) mothers delivered LBW, 30(48.38%) mothers delivered NBW. Overweight category maximum

28(75.67%) mothers delivered NBW, 9(24.32%) mothers delivered LBW. From obese category maximum 16 (72.72%) mothers delivered NBW, 6(27.27%) mothers delivered LBW. Mean \pm SD for NBW 26.28 ± 3.87 , and Mean \pm SD for LBW 23.76 ± 4.42

Table No- 5: Distribution of antenatal women according type of delivery N=124

BMI Category	Normal Birth weight (74)				Low Birth weight (50)			
	Normal		LSCS		Normal		LSCS	
	No.	%	No.	%	No.	%	No.	%
Underweight (n=3)	0	0	0	0	3	100	0	0
Normal range (n=62)	27	90	3	10	27	84.38	5	15.63
Overweight (n=37)	28	100	0	0	0	0	9	100
Obese (n=22)	6	37.5	10	62.5	0	0	6	100

Data in above table reveals that obese group has increased risk of operative delivery like lower segmental cesarean section in both the groups. Maximum 10 (62.5%) mothers of NBW babies delivered by LSCS and 6 (37.5%) delivered NBW babies by normal vaginal delivery. LBW group all 6 (100%) of mothers delivered LBW babies by LSCS.

Major findings and Discussion

According to age wise distribution of antenatal women from age group of 17-20 years of age maximum 8 (53.33%) delivered NBW, 21-24 years of age maximum 39 (62.90%) delivered NBW, 25-28 years of age maximum 23 (65.71%) delivered NBW. 29 years & above age maximum 8 (66.67%) delivered LBW. Mean \pm SD for mothers who delivered NBW 23.86 ± 3.067 and Mean \pm SD for mothers who delivered LBW 24.38 ± 3.747 't' Value-6.517 and p value- <0.0001 indicates as age is associated with LBW. Similar finding by Bhavadharini B, Anjana RM, Deepa M, Jayashree G, Nrutya S, Shobana M, et al. found that Mean age of pregnant women in their study was 27.4 ± 4 years⁸. Another study by Antonakou Angeliki, Papoutsis Dimitrios, Tzavara Chara supported with findings out of 1274 women mean age was 26.3 ± 5.9 years⁹.

Mean \pm SD for mothers height who gave birth to NBW babies 156.22 ± 5.877 and Mean \pm SD for mothers who gave birth to LBW babies 153.88 ± 5.961 , 't' value-1.487 and p value-0.1435 suggest that height of the mother is not significantly associated with birth weight of baby.

Mean \pm SD for mothers weight who gave birth to NBW babies 64.08 ± 9.892 and Mean \pm SD for mothers who gave birth to LBW babies 56.26 ± 11.217 , 't' value 13.508 and p value -0.0010 suggest that weight of mother is significantly associated with birth weight of baby.

BMI Category wise distribution 3(100%) were gave birth to LBW, From normal BMI maximum 32(51.61%) mothers delivered LBW, Overweight category maximum 28(75.67%) mothers delivered NBW, From obese category maximum 16 (72.72%) mothers delivered NBW with Mean

\pm SD for NBW 26.28 ± 3.87 , and Mean \pm SD for LBW 23.76 ± 4.42 . Chi-square=96.354, p value= <0.0001 indicates antenatal women who were underweight according to their BMI shows significantly high proportion of LBW indicates, BMI of women was significantly associated with birth weight of new born. Similar finding by Bhavadharini B, Anjana RM, Deepa M, Jayashree G, Nrutya S, Shobana M, et al Mean BMI \pm SD was $25.1 \pm 4.8 \text{ kg/m}^2$ ⁸. Study supported by Bhavadharini B, Anjana RM, Deepa M, Jayashree G, Nrutya S, Shobana M, et al. found showed the risk for low birth weight in underweight women was high, in their study but same findings were contradict too as it was also not statistically significant, because the number of underweight women studied by them were less⁸.

Present study findings revealed that obese group has increased risk of operative delivery like lower segmental cesarean section. Maximum 10 (62.5%) mothers of NBW babies delivered by LSCS and 6 (100%) of mothers delivered LBW babies by LSCS. Similar finding by P. Kalk, F. Guthmann, K. Krause, K. Relle et al, findings by their study showed regarding obstetric outcome in overweight and obese mothers had exhibited an increased risk of delivering by caesarean section in comparison with mothers with healthy weight.⁷ Similar finding by Bhavadharini B, Anjana RM, Deepa M, Jayashree G, Nrutya S, Shobana M, et al. found that obese women who during pregnancy were at high risk of preterm labor and cesarean section⁸. Study by Antonakou Angeliki, Papoutsis Dimitrios, Tzavara Chara has also supported as an increasing BMI was independently associated with cesarean section, women who were overweight and obese were having a 1.58 and 2.75 times greater likelihood for a cesarean section⁹. Similar finding by Khalifa et al. found that Class I obesity group from their study has showed increased cesarean section¹⁰.

CONCLUSION

Present research study concluded increased maternal age showed highest incidence of LBW, indicates as age is associated with LBW. Height of the mother is not significantly associated with birth weight of baby but weight of mother at the time of labour was significantly associated with birth weight of baby. Antenatal women who were underweight according to their BMI shows significantly high proportion of LBW indicates, BMI of women was significantly associated with birth weight of new born. Obese group of pregnant woman at the time of delivery has shown significantly high proportion lower segmental cesarean section in mothers of NBW and LBW group.

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