



GESTATIONAL WEIGHT GAIN AND ITS EFFECT ON MATERNAL AND PERINATAL OUTCOME

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ABSTRACT

Objective- To assess the association of Gestational weight gain and its effect on maternal and perinatal outcome. **Methods-** Its a prospective cohort study with pregnant singleton women attending OPD and required data is collected. The eligible data collected includes prepregnancy weight, height, BMI and weight at first antenatal visit, serial measurement in each visit and weight measured in the last week of pregnancy before delivery. BMI will be calculated and categorised according to IOM recommendations. Total GWG (Gestational Weight Gain) calculated as last measurement of weight before delivery minus pre pregnancy weight, stratified by BMI categories and the adverse maternal and neonatal outcomes will be studied. **Result:** In the present study, majority of cases belonged to the normal BMI group -72%, underweight -16%, Overweight -10% and obese-2%. It was observed that only 12.5% of Underweight, 22.3% of Normal, 60% of Overweight women met the recommendations for GWG. Women who gained less than recommended GWG were at high risk for anemia, Preterm labour, delayed wound healing, and fetal adverse outcomes like IUGR, LBW babies, NICU admissions. Overweight and obese women who gained more weight than recommended were at higher risk of GDM, Polyhydramnios, Pre-eclampsia, and cesarean section, delayed wound healing. **Conclusion:** This study reflects the importance of Preconceptional Counseling about weight management and regular antenatal checkups and adequate nutrition in pregnancy. Baseline weight plays an important role in antenatal care to prevent adverse outcomes for mother and fetus.

KEYWORDS : BMI, GWG, Preconceptional Counselling, LBW, GDM

INTRODUCTION

An unbalanced diet during pregnancy, leading to inadequate or excessive weight gain, is associated with various adverse pregnancy outcomes. Gestational diabetes, high blood pressure during pregnancy, increased cesarean section rates, and altered fetal growth dynamics are among the most common consequences.¹

GWG recommendations aim to optimize adverse outcomes for the woman and the infant. In 2009, IOM published revised gestational weight gain guidelines that are based on prepregnancy BMI ranges for underweight, normal weight, overweight and obese women recommended by the WHO and are independent of age, parity, race and ethnic background.² Demographic surveillance showed that the average weight gain among normal weight pregnant women in India is only 60% of the recommended weight gain. The Demographic and Health Survey (DHS) 2005, showed that 35.5% of women aged 15-49 years are underweight, suggesting that maternal health and nutrition are extremely poor in India.³ Women who are underweight/undernourished at the beginning of the pregnancy are unlikely to improve their nutritional status during pregnancy, and have higher occasions of underweight/still-births/mentally retarded/preterm deliveries.⁴ In India, maternal malnutrition is highly prevalent and there is a high burden of inadequate GWG.⁵

In southeast Asia, particularly in India, Low birth weight (LBW, prematurity and SGA) and stunting at birth are major public health problems. In India the prevalence of LBW, Preterm birth, Stunting at birth and SGA are 16%, 18%, 15% and 36% respectively. These infants are at an increased risk of neonatal and post-neonatal mortality, suboptimal neurodevelopment.⁶

Gestational weight gain is necessary to ensure a healthy fetus, but excessive gestational weight gain has been associated with adverse outcomes. Gestational weight gain reflects multiple characteristics, including maternal fat accumulation, fluid expansion, and the growth of the fetus, placenta, and uterus.⁷

Obesity in pregnancy is associated with increased obstetrical,

medical, and surgical complications with pregnancy, labor, delivery, and the puerperium (American College of Obstetricians and Gynecologists, 2013a). Higher GWG in pregnancy is seen to be associated with higher risks of GDM, cesarean section and prolonged hospitalisation, LGA, macrosomia. In addition, the risk of gestational hypertension increased significantly with increased total GWG.

Objective

To assess the association of Gestational weight gain and its effect on maternal and perinatal outcome.

Method

It's a prospective study with 100 singleton pregnant women attending OPD over a period of one year and followed up till delivery, after taking ethical committee clearance from the institute and analyzed using SPSS 22 version software.

Pre-pregnancy weight, height and weight at first antenatal visit, serial measurement in each visit and weight is measured before delivery. BMI (kg/m²) calculated at first booking visit and classified according to WHO Asia Pacific Criteria and weight gain during pregnancy was classified according to IOM recommendations for gestational weight gain: Underweight (<18.5) - 12-18kgs, Normal (18.5-22.9) - 11.5-16kgs, Overweight (23-24.9) - 7-11.5kg and Obese (>25) - 5-9 kgs.

Total GWG will be calculated as last measurement of weight before delivery minus pre pregnancy weight, and they will be standardized into z-scores by gestational age, stratified by BMI categories and the adverse maternal and neonatal outcomes will be studied.

Inclusion Criteria:

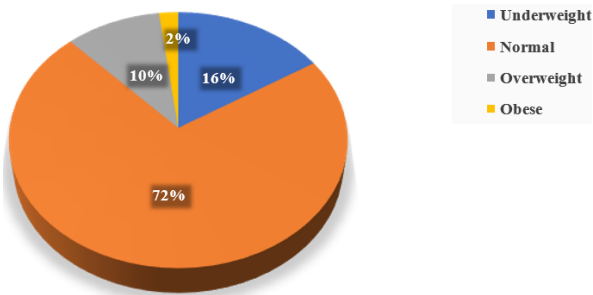
- Women with age ≥20 years old Singleton pregnancy Primigravida and Multigravida
- Woman from their first antenatal visit and delivered > 28 weeks POG

Exclusion Criteria :

- Multiple pregnancies Abortions
- Pregnancy with pre existing medical conditions like pre

gestational diabetes , chronic hypertension , hypothyroidism or hyperthyroidism , and heart / liver / kidney disea.

RESULTS



Pie chart 1:- Pie chart showing Distribution of subjects according to BMI

Chart 1 showing : 100 patients were stratified according to their BMI at first visit and their weight gain throught pregnancy was studied till delivery and outcomes were analysed. In present study maximum belong to Normal BMI-72%, compared to underweight-16%, Overweight-10%, obese-2% .

Table 1

	Normal weight		Underweight		Overweight		Obese		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Age	26	3	25	4	25	5	30	1	0.453

Table 1 shows mean age was 26 years in Underweight group whereas it was observed to be 30 year in Obese group.

Table 2

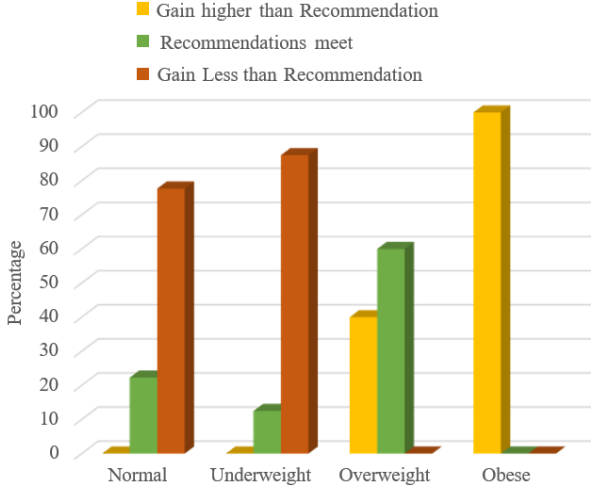
	Normal weight		Underweight		Overweight		Obese		P value
	N	%	N	%	N	%	N	%	
Gravida									
Multi	54	75%	12	75%	7	70%	1	50%	0.876
Primi	18	25%	4	25%	3	30%	1	50%	

Table 2 shows multigravida more common than primi in all BMI categories though the study is not statistically significant.

Table 3

	Normal weight		Underweight		Overweight		Obese	
	N	%	N	%	N	%	N	%
Recommendation met	16	22.3	2	12.5	6	60%	0	0
Gain higher than recommendation	0	0	0	0	4	40%	2	100%
Gain lower than recommendation	56	77.5	14	87.5	0	0	0	0

Table 3 and Graph 1 showing GWG as per IOM recommendations met in different BMI groups , It was seen that only 12.5% Underweight, 22.3% Normal, 60%Overweight women met the recommendations for GWG. Table 4



Graph1

	Underweight		Normal weight		Overweight		Obese		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Total gestational weight gain	9.4	1.3	9.6	1.8	11.2	1.8	14	2.8	<0.001
Weight of the baby	2.49	.4934	2.964	.4794	2.99	.38	3.22	.7354	0.004

Table 4 shows Mean weight gain during pregnancy was 9.4kg for underweight, 9.6kg for Normal 11.2kg for overweight women compared to statistically high weight gain i.e 14kg in obese women. Statistically significant low birth weight of the babies were observed in underweight group with mean weight 2.4kg whereas mean weight in obese patients who gained more weight than recommendations was 3.2 kg .

Table 5

Mode of delivery	Normal weight		Underweight		Overweight		Obese		P value
FTVD	30	41.6 %	7	43.75 %	6	60%	1	50%	0.375
LSCS	39	54.2 %	6	37.5 %	3	30%	1	50%	
PTVD	3	4.2%	3	18.75 %	1	10%	0	0	

Table 5 shows the rate of Preterm vaginal delivery was high in Underweight group as compared to the Overweight and Obese women who gained more GWG , had high risk of undergoing Cesarean section.

Table 6- Association Of Gestational Weight Gain With Pregnancy Outcome In Women Who Gained Less Than Recommended Weight.

Parameter	Underweight (N=14)	Normal (N=56)
Anemia	35.7% (5)	37.5% (21)
IUGR	7.14% (1)	3.57% (2)
Preterm labour	21.4% (3)	5.35% (3)
Low birth weight	64.2%(9)	37.5(21)
C section	28.5% (4)	33.9% (19)
NICU admission	21.4% (3)	17.85% (10)

Table 6 showing Women who gained less than recommended GWG in underweight and Normal weight women were at significantly high risk for anemia (35.7%, 37.5%), Preterm labour (21.4%, 5.35%), delayed wound healing (7.14%, 5.35%) and fetal adverse outcomes like IUGR (7.14%, 3.57%), LBW babies (64.2%, 37.5%), NICU admission (21.4%, 17.85%) respectively, than women with adequate GWG.

Table 7- Showing Association Of Gestational Weight Gain With Pregnancy Outcome In Women Who Gained More Weight Than Recommended

Parameter	Overweight (N=4)	Obese(N=2)
GDM	25% (n=1)	-
Polyhydramnios	25% (n=1)	-
Pre eclampsia	-	50%(n=1)
Cesarean section	50%(2)	50%(n=1)
Delayed wound healing	-	50%(n=1)

Table 7 showing Overweight and obese women who gained more weight than recommended were at significantly higher risk of GDM (25% in overweight), Polyhydramnios (25% in overweight), Pre eclampsia(50% in Obese) and LSCS (50% in overweight and obese each), delayed wound healing(50%). Although high rate of cesarean section were seen in overweight and obese categories, it was not statistically significant.

DISCUSSION

In present study maximum belong to Normal BMI-72%, compared to underweight -16%, Overweight-10%, obese-2%. Compared to study by Patel K et al, 96.38% patients had Normal BMI, 2.36% were underweight, 1.18% overweight and 1 out of 1104 patients was obese.³

In a study by Bhavadharini B et al, mean age of women was 27.4 years whereas in our study mean age was 26.5 years. In our study, 22.3% of Normal, 12.5% of Underweight and 60% of overweight women met IOM recommendations. Majority of underweight (87.5%), Normal weight (77.5%) gained weight less than recommended while 40% of overweight and 100% (n=2) of obese group gained more than recommended GWG compared to study by, Bhavadharini, et al, 30.5 % of underweight, 23.4% of normal weight, 22.5% overweight, 37.1% obese women met recommendations for GWG while majority of underweight (66.2%), normal weight (69.4%), and overweight women (68.8%) gained weight less than recommended, among obese 28.5% gained more and 34.4% less than recommended.²

Table 5 shows Mean weight gain for underweight(9.4kg), Normal (9.6kg), overweight(11.2kg) and obese women (14kg) which was statistically significant. In a study, Bhavadharini et al, Mean weight gain was 9.3kg- underweight, 9.1kg - normal BMI, 9kg- overweight, 8.5kg- Obese women with mean weight gain during pregnancy 8.8 +/- 4.8kg.²

In our study, Statistically significant low birth weight of the babies were observed in underweight group with mean weight 2.4kg whereas mean weight in obese patients who gained more weight than recommendations was 3.2 kg. (Table 5). In a study by, Patel K et al, women were divided into 2 groups, significant difference was seen in birth weight i.e LBW (92.75% of babies in group 1 (less than recommended GWG), compared to 42.21% in group 2 (recommended weight gain).³

In our study the rate of Preterm vaginal delivery was high (18.75%) in Underweight group as compared to 4.2% in normal and 10% in overweight group. Compared to a study, Lui et al, reported similar results where GWG below guidelines had increased odds of preterm birth with high odds among women with pre pregnancy underweight (the ORs are 2.12 for underweight, 1.76-Normal, 1.33- overweight, 1.15 –

obesity).¹⁰

A study by Wu Y, et al. higher GWG in early pregnancy was associated with higher risk of gestational diabetes mellitus, cesarean section, and prolonged hospitalization. Higher GWG in late pregnancy was independently associated with higher risks of caesarean section, large for gestational age and macrosomia. In addition, the risk of gestational hypertension increased significantly with increased total GWG.⁸ In our study women with GWG above recommended, had increases risk of GDM, Macrosomia, PIH, Cesarean section, Delayed wound healing.

CONCLUSION

This reflects the importance of pre conceptional counselling about weight management and regular antenatal check ups and adequate nutrition in pregnancy. Baseline weight plays an important role in antenatal care to prevent adverse outcomes of mother and fetus both. Gestational weight gain can serve as an early marker for at risk pregnancies. In pregnancy maintaining adequate gestational weight gain and balanced nutrition plays a very important role to prevent maternal and fetal complications.

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