



## A STUDY OF ASSOCIATION OF GESTATIONAL WEIGHT GAIN WITH PERINATAL OUTCOME OF PREGNANCY IN PRIMIGRAVIDA WOMEN DELIVERING SINGLE LIVE BABY

### Obstetrics & Gynaecology

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### ABSTRACT

**BACKGROUND:** Gestational weight gain and the body mass index (BMI) of the woman are two important factors for a good perinatal outcome. Maternal nutrition during pregnancy may also have a lifelong consequence on the baby. **AIM:** 1) To study gestational weight gain in primigravida women delivering a single live baby. 2) To study the association of gestational weight gain with morbidity during pregnancy and perinatal outcome in primigravida women delivering a single live baby. **MATERIAL AND METHODS:** 500 patients were included in the study. All primigravida in between 37 to 42 weeks of gestational age were included GWG, BMI and associations with the risks. **RESULTS:** Women with <18.5, 25- 29.9, >30 BMI had 65.3% of inadequate weight gain, 57.5% of excessive weight gain, 94.9% of excessive weight gain respectively. 9.3 %, 3.7% of women with excessive weight gain showed preeclampsia, GDM respectively. 15.9%, 17.4% of women with inadequate weight gain had oligohydramnios and BNNW admission respectively. 51% of women with excessive weight gain ended up in caesarean section. **CONCLUSION:** After analysing all the computed data in the present study, we can conclude that from the beginning of pregnancy, by keeping pre-pregnancy body weight under control and monitoring increase in gestational body weight within prescribed limits, few adverse outcomes of pregnancy can be prevented. **CLINICAL SIGNIFICANCE:** GWG is usually neglected. But increase or decrease in GWG can convert a normal pregnancy to high-risk pregnancy.

### KEYWORDS

Gestational Weight Gain(GWG), BMI, Preeclampsia, GDM, Caesarean section

#### 1) INTRODUCTION

Weight gain during pregnancy is of utmost importance for a successful outcome of pregnancy, both for the mother and the baby. Pre-gestational body weight, age, ethnicity, number of births, smoking, socioeconomic status and daily calorie intake are the main reasons for gestational weight gain<sup>1</sup>. Gestational weight gain and the body mass index (BMI) of the woman are two important factors for good perinatal outcome<sup>2</sup>. In the past few decades, the pre-pregnancy body mass index (BMI) of women is towards increasing trends, and this reflects in the increased prevalence of obesity<sup>3</sup>.

In the late 1800s obstetricians recommended dieting during pregnancy to limit GWG to 9kg or less as they believed that excessive GWG can lead to toxemia and birth complications due to larger babies. Beginning in the 1930s, with more studies on nutrition and health, a better understanding of the effect of GWG on the health of the foetus and the newborn was there. Increased awareness of disparities in infant mortality in the 1960s, with a systematic review of the literature, produced further refinements in GWG recommendations in the 1970s, which is still followed today<sup>4</sup>.

According to IOM guidelines, regardless of the pre-pregnancy BMI, the expected weight gain in the first trimester of pregnancy is 1.1 to 4.4 lb (0.5 to 2kg). IOM guidelines recommend 1 to 1.3 lb (0.4 to 0.5kg) per week weight gain in underweight women, 0.8 to 1 lb (0.3 to 0.4 kg) per week in women of normal weight, 0.5 to 0.7 lb (0.2 to 0.3 kg) per week in women who are overweight, and 0.4 to 0.6 lb (0.18 to 0.27 kg) per week for women with obesity in the second and third trimesters of pregnancy. World Health Organization has classified women into 6 classes according to BMI as follows: underweight (<18.5 kg/m<sup>2</sup>), normal weight (18.5-24.9 kg/m<sup>2</sup>), overweight (25-29.9 kg/m<sup>2</sup>), and obesity (>30 kg/m<sup>2</sup>). Obesity is further subdivided into 3 categories: Class I (30-34.9 kg/m<sup>2</sup>), Class II (35-39.9 kg/m<sup>2</sup>), and Class III (>40 kg/m<sup>2</sup>). IOM recommends lower gestational weight gain in women with obesity because of higher fat deposition and thus significantly lower energy costs. Although guidelines are there for gestational weight gain in different BMI groups no separate guidelines are there for adolescents, short stature women, women of different races and ethnic groups, and women with higher classes of obesity<sup>5</sup>. Some studies have concluded that regardless of pre-pregnancy BMI,

excessive gestational weight gain was associated with increased risk of large for gestational age babies, caesarean section delivery, gestational hypertension (GHT), preeclampsia, gestational diabetes mellitus (GDM), thromboembolic disorders, poor Apgar score and postpartum weight retention in women<sup>6</sup>. Thus, optimizing or reducing gestational weight gain can be one of the interventions to reduce adverse pregnancy outcome<sup>7</sup>.

Several studies have reported that maternal nutrition during pregnancy may also have a lifelong consequence on the baby, particularly neurocognitive outcomes<sup>8</sup>.

#### 2) AIMS

**The present study was aimed: -**

1. To study gestational weight gain in primigravida women delivering a single live baby.
2. To study the association of gestational weight gain with morbidity during pregnancy and perinatal outcome in primigravida women delivering a single live baby.

#### 3) MATERIAL & METHODS

This study was carried out in the Department of Obstetrics and Gynaecology, Umaid Hospital, a tertiary care centre, attached to Dr S.N. Medical College, Jodhpur. All primigravida women, admitted in the labour ward of Umaid Hospital, delivering single live babies during gestational week 37 to 42 were included in the study. The weight of the women was measured. Gestational weight gain was taken as the difference between the measured weight at the time of delivery and a documented weight within 12 weeks of gestational age as evidenced by ultrasonography. GWG was categorized as inadequate, adequate, and excessive, according to the IOM recommendations. The height of the patient was measured accurately and BMI was calculated. Antenatal parameters (oligohydramnios, preeclampsia, GDM), mode of delivery and peripartum outcome were observed. Data has been tabulated and presented as below.

#### 4) RESULTS AND OBSERVATIONS

500 patients were included in the study conducted in the year 2019-2020.

**Table 1: Distribution Of Study Population According To Age**

AGE (years)	INADEQUATE		ADEQUATE		EXCESSIVE		TOTAL
	N	%	N	%	N	%	
18-25	119	26.7	184	41.3	142	31.9	445
26-30	9	20.0	20	44.4	16	35.6	45
>30	4	40.0	3	30.0	3	30.0	10

**3. Chi-square 2.017, P value 0.732**

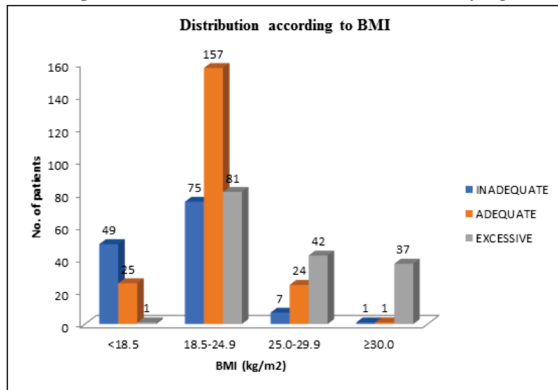
No statistically significant difference was observed, indicating no effect of age on GWG.

**Table 2: Distribution Of Study Population According To BMI**

BMI (kg/m <sup>2</sup> )	INADEQUATE		ADEQUATE		EXCESSIVE		TOTAL
	N	%	N	%	N	%	
<18.5	49	65.3	25	33.3	1	1.3	75
18.5-24.9	75	24.0	157	50.2	81	25.9	313
25.0-29.9	7	9.6	24	32.9	42	57.5	73
≥30.0	1	2.6	1	2.6	37	94.9	39

Chi square 170.64, P value <0.0001

When compared the difference was found to be statistically significant.



**Table 8: Distribution Of Study Population According To Development Of Preeclampsia**

Preeclampsia	INADEQUATE		ADEQUATE		EXCESSIVE	
	N	%	N	%	N	%
PRESENT	7	5.3	6	2.9	15	9.3
ABSENT	125	94.7	201	97.1	146	90.7
TOTAL	132	100.0	207	100.0	161	100.0

Chi square 7.086, P value 0.028

When compared, the difference was found to be statistically significant. preeclampsia was observed in more in excessive weight gain followed by inadequate weight gain and last by adequate weight gain patients

**Table 9: Distribution Of Study Population According To Development Of Gdm**

GDM	INADEQUATE		ADEQUATE		EXCESSIVE	
	N	%	N	%	N	%
PRESENT	0	0.0	1	0.5	6	3.7
ABSENT	132	100.0	206	99.5	155	96.3
TOTAL	132	100.0	207	100.0	161	100.0

Chi square 9.449, P value 0.008

When compared the difference was found to be statistically significant. GDM was more commonly seen in patients with excessive weight gain.

**Table 10: Distribution Of Study Population According To Development Of Oligohydramnios**

OLIGO	INADEQUATE		ADEQUATE		EXCESSIVE	
	N	%	N	%	N	%
PRESENT	21	15.9	10	4.8	5	3.1
ABSENT	111	84.1	197	95.2	156	96.9
TOTAL	132	100.0	207	100.0	161	100.0

Chi square 20.76, P value <0.0001

When compared the difference was found to be statistically significant. Oligohydramnios was found more in inadequate weight gain.

**Table 11: Distribution Of Study Population According To The Mode Of Delivery**

Mode of Delivery	INADEQUATE		ADEQUATE		EXCESSIVE	
	N	%	N	%	N	%
VAGINAL	106	80.3	175	84.5	110	68.3
LSCS	26	19.7	32	15.5	51	31.7
TOTAL	132	100.0	207	100.0	161	100.0

Chi square 14.43, P value 0.0007

When compared the difference was found to be statistically significant. Excessive weight gain results in higher chances of LSCS.

**Table 12: Distribution Of Study Population According To Mean Baby Weight**

Group	No. of patients	Baby Weight (Mean±SD)	p-value
INADEQUATE	132	2.64±0.50	<0.0001
ADEQUATE	207	2.80±0.39	
EXCESSIVE	161	2.95±0.45	

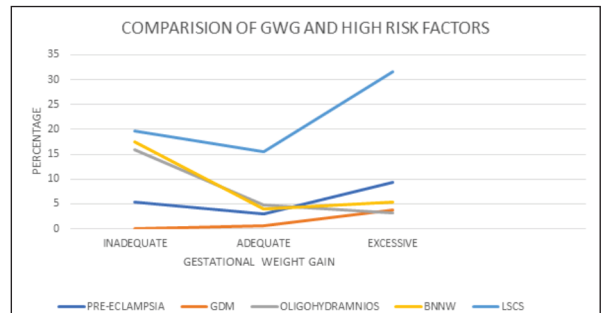
When compared the difference was found to be statistically significant. Mean baby weight is slightly more in excessive weight gain and slightly lower value in inadequate weight gain.

**Table 15: Distribution Of Study Population According To Nursery Admissions**

BNNW	INADEQUATE		ADEQUATE		EXCESSIVE	
	N	%	N	%	N	%
PRESENT	23	17.4	8	3.9	9	5.6
ABSENT	109	82.6	199	96.1	152	94.4
TOTAL	132	100.0	207	100.0	161	100.0

Chi square 22.00, P value <0.0001

When compared the difference was found to be statistically significant. Increased nursery admission was seen in patients with inadequate weight gain.



**DISCUSSION**

The nutritional status of women is of utmost importance for both the mother and the developing foetus. Two factors independently play a crucial role in determining the pregnancy outcome – one is the pre-pregnancy BMI and the other is Gestational weight gain. Gestational weight gain (GWG) is determined by various structural and functional changes that occur in a woman's body to fulfil the nutritional requirements of pregnancy like foetal and placental growth, increase in amniotic fluid, placenta, increased blood volume, increased adipose tissue, uterine and mammary growth, etc.

Majority of patients having BMI<18.5 had inadequate GWG (65%), while a majority of patients having BMI ≥30 had excessive GWG (94.9%) indicating a significant association between pre-pregnancy BMI and GWG. A significant association between GWG and development of preeclampsia was observed with 9.3% of women developing preeclampsia among excessive GWG group as compared to 5.3% of women among inadequate GWG group. More women having excessive GWG developed GDM as compared to other groups. A significantly higher percentage (31.7%) of women among the excessive GWG group needed to be delivered by LSCS as compared to other groups

## CONCLUSION

After analysing all the computed data in the present study, we can conclude that from the beginning of pregnancy, by keeping pre-pregnancy body weight under control and monitoring increase in gestational body weight within prescribed limits, few adverse outcomes of pregnancy can be prevented.

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