



## ASSOCIATION OF GESTATIONAL WEIGHT GAIN AND GESTATIONAL HYPERTENSION AMONG ANTENATAL MOTHERS ATTENDING A TERTIARY CARE CENTRE, SOUTH KERALA

### Obstetrics & Gynaecology

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### ABSTRACT

**Background:** Maternal mortality and morbidity remain significant public health concerns, despite modern perinatal care. Excessive and insufficient gestational weight gain have been associated with several adverse pregnancy outcomes, of which hypertensive disorders of pregnancy constitute 10%. **Objective:** The aim of the study was to find an association between gestational weight gain (GWG) and the development of gestational hypertension. This cross-sectional study included all the antenatal women attending the OPD of the obstetrics department in Dr SMCSI medical college from June 2018 to October 2019. Their BMI was calculated and based on that, these patients were categorized into 4 groups as normal weight, underweight, overweight, and obese. Their weight gain was recorded on each visit and monitored. Antenatal complications were noted and followed up for the development of gestational hypertension. **Results:** Among 930 antenatal women selected, all mothers with normal BMI were in the recommended weight gain group. Less than recommended weight gain mothers were mostly underweight (80.6%) and more than recommended mothers were overweight (66.6%). In our study there were a significant number of mothers with gestational hypertension 22.6% who had more than the recommended amount of weight gain ( $p=0.005$ ) **Conclusion:** Gestational hypertension was seen more among mothers with more than the recommended amount of weight gain.

### KEYWORDS

BMI, Gestational hypertension, Gestational weight gain

### INTRODUCTION

The hypertensive disorders of pregnancy (HDP), including gestational hypertension and preeclampsia, is a leading cause of perinatal morbidity and mortality; affecting 1 in 10 pregnancies. Establishing a comprehensive preventive strategy is crucial to reduce the risk of unfavourable outcomes. Pre-conceptional maternal adiposity is one of the strongest reversible risk factors for HDP. As a result, extensive studies have been done to determine how gestational weight gain (GWG) may influence HDP and hence provide a potential target for interventions aimed at reducing its risk<sup>1</sup>.

### MATERIALS AND METHODS

Our study population were all the antenatal women attending the antenatal OPD of the department of obstetrics and gynaecology, Dr Somervell Memorial CSI medical college and hospital. The study period was between June 2018 and November 2020. We excluded women with pre-pregnancy hypertension and pregnancies of women without early-pregnancy body mass index (BMI;  $\text{kg}/\text{m}^2$ ) or no gestational weight gain measurement and cases of preeclampsia where the date of diagnosis was unknown. Our study was approved by The Institutional Ethics Committee in Karakoram.

### DATA COLLECTION METHOD

Weight and height were recorded using a weighing machine with sensitivity of 500g and stadiometer with sensitivity of 0.5cm respectively to calculate their BMI. (BMI is calculated by using the formula =  $\text{Weight (kg)}/\text{Height in meter square}^2$ ). We defined normal weight as an early-pregnancy BMI of  $18.5$  to  $24.9 \text{ kg}/\text{m}^2$ , overweight as  $25$  to  $29.9 \text{ kg}/\text{m}^2$ , and obese as  $\geq 30 \text{ kg}/\text{m}^2$  according to the classification by WHO<sup>3</sup>. A proper history of these patients was taken and their weight gain was recorded on each visit (the typical schedule of routine antenatal visits is at weeks 8 to 12, week 18, week 24, week 28, weeks 31 to 32 and, thereafter, every second week until birth) and monitored to see if they are attaining the recommended weight pertaining to their respective groups and categorized recommended, less than recommended and more than recommended. In 2009 the Institute of Medicine (IOM) recommended that thin, normal, mildly obese and obese pregnant women should gain  $11.5$ – $16 \text{ kg}$ ,  $7.0$ – $11.5 \text{ kg}$ ,  $12.5$ – $18 \text{ kg}$  and  $9 \text{ kg}$  respectively<sup>4</sup>.

### RESULTS

This research aims to study the effects of gestational weight gain on gestational hypertension which included 930 antenatal women who fulfilled our criteria. Most of the patients were having height ranging from  $156$  to  $165 \text{ cm}$  (61.8%), weight was mostly between  $46$  and  $55 \text{ kg}$

in 61.9%).

The BMI of the mothers showed nearly three-fourths of the normal range 74.8% ( $n=696$ ), with 12.9% ( $n=120$ ) as underweight and 12.3% ( $n=114$ ) as overweight/obese.

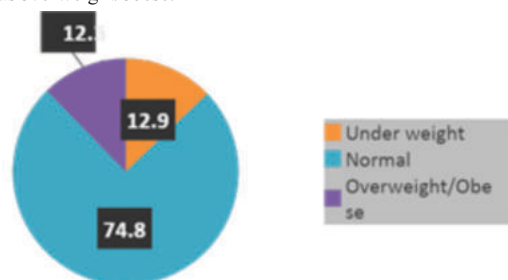


Figure 1: BMI (%)

Weight gain during pregnancy showed the majority had a recommended weight gain (69.8%), 144 patients had less than the recommended weight gain (15.5%) and 137 patients had a more than the recommended weight gain (14.7%).

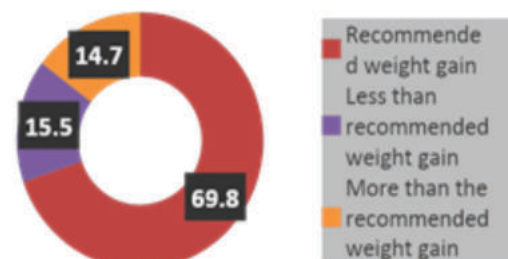


Table 1 : Anthropometry measurements (N=930)

| Height (cm) | n   | %    |
|-------------|-----|------|
| 145-155 cm  | 228 | 24.5 |
| 156-165 cm  | 575 | 61.8 |
| 166-177 cm  | 127 | 13.7 |
| Weight (Kg) | n   | %    |

|       |     |      |
|-------|-----|------|
| 46-55 | 576 | 61.9 |
| 56-65 | 233 | 25.1 |
| 66-75 | 121 | 13.0 |

| Table 2: Comparison of Total weight gain to BMI & maternal risk factor | Total Weight gain         |                                |                                     | CHI-SQUARE TEST<br>P value |
|------------------------------------------------------------------------|---------------------------|--------------------------------|-------------------------------------|----------------------------|
|                                                                        | Recommended<br>d<br>N=649 | Less than recommended<br>N=144 | More than recommended<br>d<br>N=137 |                            |
| Daily calorie intake                                                   | n (%)                     | n (%)                          | n (%)                               |                            |
| <2250 kcal                                                             | 196 (30.2)                | 03 (2.1)                       | 35 (25.5)                           | <0.001                     |
| >2250 kcal                                                             | 453 (69.8)                | 141 (97.9)                     | 102 (74.5)                          | <0.001                     |
| Lifestyle                                                              |                           |                                |                                     |                            |
| Sedentary                                                              | 461 (71.0)                | 63 (43.7)                      | 128 (93.4)                          | <0.001                     |
| Active                                                                 | 188 (29.0)                | 81 (56.3)                      | 09 (6.6)                            | <0.001                     |
| BMI                                                                    |                           |                                |                                     |                            |
| Underweight                                                            | 00 (00.0)                 | 116 (80.6)                     | 04 (02.8)                           | <0.001                     |
| Normal weight                                                          | 649 (100)                 | 05 (03.5)                      | 42 (30.6)                           | 0.021                      |
| Overweight                                                             | 00 (00.0)                 | 23 (15.9)                      | 91 (66.6)                           | 0.033                      |
| Maternal Risk factors                                                  |                           |                                |                                     |                            |
| Gestational hypertension                                               | 00                        | 20(13.9)                       | 31(22.6)                            | 0.005                      |
| Gestational Diabetes                                                   | 83(12.8)                  | 7(4.9)                         | 00                                  | <0.001                     |
| Anaemia                                                                | 135(20.8)                 | 00                             | 10(7.3)                             | 0.025                      |
| Nil                                                                    | 431(66.4)                 | 117(81.2)                      | 96(70.1)                            | 0.009                      |

### Comparison of Mothers with Recommended weight gain and variables

There were 649 patients out of 930 who had recommended levels of weight gain throughout their pregnancy. In them 30.2% had a daily calorie intake of less than 2250 kcal, rest 69.8% had more than 2250 kcal per day intake. Lifestyle choices of these mothers showed nearly three fourth of them were having a sedentary lifestyle. Maternal risk factors were not present in 66.4% of the mothers, with just 12.8% having gestational diabetes and 20.8% having anaemia. The BMI of the mothers showed all 649 patients having normal BMI.

### Comparison of Mothers with Less than Recommended weight gain and variables

There were 144 patients out of 930 who had lower than recommended levels of weight gain throughout their pregnancy. In them 97.9% had daily calorie intake of more than 2250 kcal per day. Lifestyle choices of these mothers more than half of them were having an active lifestyle (56.3%). Maternal risk factors were not present in 81.2% of the mothers, with just 4.9% having gestational diabetes and 13.9% having gestational hypertension. The BMI of the mothers showed underweight BMI at 80.5%, 15.9% overweight and just 3.4% normal BMI.

### Comparison of Mothers with More than Recommended weight gain and variables

There were 137 patients out of 930 who had more than recommended levels of weight gain throughout their pregnancy. In them 74.5% had daily calorie intake of more than 2250 kcal per day. Lifestyle choices of these mothers most of them were having a sedentary lifestyle (93.4%). Maternal risk factors were not present in 70.1% of the mothers, with 22.6% having gestational hypertension and 7.3% having anaemia. The BMI of the mothers showed most of them were overweight 66.7%, 2.9% underweight and 30.6% with normal BMI.

## DISCUSSION

In our study, there was a significant number of mothers with gestational hypertension 22.6% who had more GWG. This finding was similar to the reviewed study by Fortner et al. where it was noted 3-fold increased risk of a hypertensive disorder of pregnancy and a 4-fold risk of preeclampsia in a population of Latina women, as well as Cedergren M et al where there was a 2 fold increase. There was also a cohort study from China which showed a positive association between GWG, pre pregnant BMI and HDP.

## CONCLUSION

These findings show that excessive GWG is positively associated with gestational hypertension and could be a modifiable risk factor to reduce the burden of the disease.

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