

# Maternal perspectives on gestational weight gain: Critical information on developing weight control interventions

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## ABSTRACT

**Background:** Our aim was to demonstrate what women reported being counselled about weight gain in pregnancy, their perceptions of inappropriate gestational weight gain (GWG), and plans for weight gain in pregnancy. **Materials and Methods:** A cross-sectional survey of perceptions of prenatal attendees about inappropriate GWG was conducted at the prenatal clinic of a referral tertiary health facility in south western, Nigeria, between January 1, 2013 and June 30, 2013. Primary outcomes were the perceptions of women about risks involved with inappropriate weight gain and the proportion of women who self-reported being counselled at all on GWG, and had the right knowledge of risk(s) involved with inappropriate weight gain during pregnancy. **Results:** Of the 348 women who completed the survey, approximately four-fifths (82.8%) reported GWG being discussed at all by health care provider. Fewer women (29.3%) believed there were maternal risks with excess weight gain compared to inadequate weight gain (34.8%). With respect to perception of risks of inappropriate weight gain to infants, 23.65 and 18.4%, respectively, believed there were infant risks with excess and inadequate GWG. Overweight women [OR 0.39 (95% CI 0.16-0.98)] and those who received GWG information from more than one type of health care provider [OR 4.71 (95% CI 1.64-13.78)] had significant increased rate of correct knowledge of risks involved with inappropriate GWG. **Conclusion:** The lack of awareness of risks involved with inappropriate GWG by over half of respondents underscores the need for improvement in educational intervention on GWG in our environment.

**Key words:** Knowledge, obesity, pregnancy, perception, weight gain

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## INTRODUCTION

Weight gain in pregnancy remains a matter of great concern for women and health care providers. This worry about weight exists because of the influence of inappropriate weight or gestational weight gain (GWG) on pregnancy outcome.<sup>1-3</sup> The prevalence of obesity or overweight in pregnancy is rising,<sup>4</sup> and is of international concern.<sup>5</sup> Although obesity is a common nutritional problem among pregnant women particularly in the industrialised nations,<sup>6</sup> the westernisation of lifestyles in developing nations may tilt the statistics on obesity in pregnancy to reaching proportions in this population.

Estimates of the prevalence of overweight or obesity among adults in Nigeria range from 26% through 74.3%.<sup>7-10</sup> Studies indicate that overweight and obesity are more prevalent in women than men,<sup>8-10</sup> and approximately 40% of reproductive-aged women are overweight or obese.<sup>3</sup> In Nigeria, studies demonstrate prevalence ranging between 7.4% and 10.7% for obesity in pregnancy.<sup>11-13</sup>

Excessive or inadequate GWG has significant effects on maternal, foetal and neonatal outcomes, including long term maternal and childhood health risks in life.<sup>14-24</sup> Data from observational studies conducted in Nigeria found significant risk of obstetric complications with obesity; comprising hypertensive disorders, diabetes mellitus, operative delivery, dystocia in labour, macrosomia, and birth asphyxia.<sup>12,13,25-27</sup> Underweight or inadequate weight gain have the potential for increased risk of preterm birth, low birth weight, intrauterine growth restriction (IUGR) or small for gestational age (SGA).<sup>28,29</sup>

To promote weight-related antenatal interventions for improving pregnancy outcome in our obstetric population,

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this study sought to demonstrate what women reported being counselled about weight gain, their understandings and perception of the risks associated with inappropriate GWG and plans for weight gain in the index pregnancy. This research would provide necessary evidence for modification of practice and introduction of interventions to promoting healthy weight gain during pregnancy, as correct advice from care provider is more linked with optimal GWG.<sup>30</sup>

## MATERIALS AND METHODS

This cross-sectional study was conducted among pregnant women who were receiving antenatal care at the Prenatal Outpatient Clinic of our hospital after an informed consent, between January 1, 2013 and June 30, 2013 using a validated self-administered questionnaire. The survey questions were developed based on the extensive review of recently published studies on women's perception or understanding of weight gain and associated risks during pregnancy.<sup>5,31-33</sup> This study was approved by the Ethics and Research committee of Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.

Eligible participants for the study were women who had at least one prenatal visit after the first prenatal clinic registration visit, were able to respond to the questions in the survey unaided, and had a viable singleton pregnancy at the time of survey completion. Women were excluded from the study if they had multiple gestations or evidence suggestive of intrauterine foetal death.

The correctness of the anthropometric information (gestational age, maternal weight, maternal height, and the number of prenatal visits) on the completed questionnaire was established using the clinical prenatal care records.

### Outcome measures

Primary outcomes were the perceptions of women about risks involved with inappropriate weight gain and the proportion of women who self-reported being counselled at all on GWG, and had the right knowledge of risk(s) involved with inappropriate weight gain during pregnancy.

Based on the recent published study which found that 42.7% of prenatal attendees reported being counselled at all on weight gain in pregnancy,<sup>33</sup> we calculated that 261 surveys would be the minimum required to estimate the proportion of women who were counselled on weight gain at all to within  $\pm 6\%$ .

### Data analysis

Data analyses were performed using the statistical software package SPSS 17 (SPSS Inc., version 17.0, Chicago, IL, USA). We examined maternal plans for weight gain with respect to body mass index (BMI) category and perceived weight status. Univariate analysis was used to examine

the unadjusted odds of women's knowledge of risks with inappropriate weight gain for each maternal variable in relation to a particular referent category. The independent effects of variables associated with right knowledge of risks involved with gestational weight at the  $P < 0.05$  on univariate analysis were tested using multivariate logistic regression to evaluate the adjusted odds. Statistical significance level was set at a  $P$ -value less than 0.05.

## RESULTS

Of the women who were approached to participate in the survey between January and June 2013, 348 women were eligible for inclusion into the study analysis. The demographic and clinical characteristics of the study population are presented in Table 1.

Approximately 82.8% of the women reported receiving counselling on GWG at all from their health care providers [Table 2]. Twenty-two percent of respondents (22.4%) reported that their health care provider had recommended that they should gain a specific range of weight (12-12.5 kg). About three-fifths (56.6%) of women reported being counselled that there were increased risks with excess gestational weight; however, a higher proportion (69.5%) of the women reported being counselled on the risks with inadequate GWG. Approximately a third (29.3%) and quarter (23.6%) of the women believed there were maternal and infant risks, respectively, with excess GWG. Nearly a third (34.8%) of the respondents believed that inadequate weight gain below the recommended range poses risk to maternal health while fewer women (18.4%) believed that infant risks are also increased. Almost all the women (98.9%) believed that weight measurement at each prenatal visit would be helpful in their plans for weight gain during pregnancy. Ninety percent (89.9%) of women thought that the provision of weight gain information at prenatal booking visit would help to maintain appropriate GWG. With respect to maternal perception of weight status at survey, nine out of every ten women (90.5%) perceived themselves to be normal weight; the weight perception of the remaining one-tenth was largely overweight (7.5%). Only 2% of the respondents reported self-perception of their weight status as underweight. None of the women perceived themselves to be obese in contrast to the obesity prevalence of 29.9% at survey.

When enquired as to the sources of information on GWG, 40.2%, 22.7%, and 13.2% of respondents, respectively, stated nurses, dieticians, and doctors (obstetricians or family physicians), with 13.2% reporting that they received information from two or more aforementioned care providers. Approximately one-fifth (17.2%) of the respondents reported not ever receiving information on GWG at all from health care provider. Approximately

**Table 1: Demographic characteristics of respondents**

Variables	Respondents, n [%]
*Maternal age (years)	30.5±4.4 (21-47)
*Gestational age at prenatal booking (weeks)	20.0 (14.0-25.0)
*Gestational at survey(weeks)	32.0 (27.0-36.0)
Married	324 (93.1)
Education	
Secondary or less	49 (14.1)
Post Secondary	299 (85.9)
Current Smoker	16 (4.6)
Parity	
0	156 (44.8)
1	98 (28.2)
≥2	94 (27.0)
Prepregnancy BMI [kg/m <sup>2</sup> ] of 237 {68.1%} participants	28.2±5.2
Prepregnancy BMI classification	
Underweight [<18.5 kg/m <sup>2</sup> ]	3 (1.3)
Normal weight [18.5-24.9 kg/m <sup>2</sup> ]	55 (23.2)
Overweight [25.0-29.9 kg/m <sup>2</sup> ]	95 (40.1)
Obese [≥30 kg/m <sup>2</sup> ]	84 (35.4)
BMI of participants at survey	27.4 ± 5.2
BMI classification at survey	
Underweight [<18.5 kg/m <sup>2</sup> ]	3 (0.9)
Normal weight [18.5-24.9 kg/m <sup>2</sup> ]	126 (36.2)
Overweight [25.0-29.9 kg/m <sup>2</sup> ]	115 (33.0)
Obese [≥30 kg/m <sup>2</sup> ]	49.9

\*Mean ± SD (range), \*Median ± SD (Interquartile range)

**Table 2: Patient perception of gestational weight gain**

Outcome	Respondents, n (%)
Weight gain discussed at all by health care provider	288 (82.8)
To gain a specific amount or range	197 (56.6)
Counselled that excess weight gain is associated with increased risks	197 (56.6)
Perception with excess weight gain	
Maternal Risk(s)	102 (29.3)
Infants Risk(s)	82 (23.6)
Counselled that inadequate weight gain is associated with increased risks	242 (69.5)
Perception with inadequate weight gain	
Maternal risk (s)	64 (18.4)
Infants risk(s)	121 (34.8)
Believe that information at first prenatal visit on correct amount or range of weight expected to gain would be helpful	313 (89.9)
Perception of weight at survey	
Underweight (<18.5 kg/m <sup>2</sup> )	7 (2.0)
Normal weight (18.5-24.9 kg/m <sup>2</sup> )	315 (90.5)
Overweight (25.0-29.9 kg/m <sup>2</sup> )	26 (7.5)
Obese (>30 kg/m <sup>2</sup> )	—
Believe that weight measurement at every prenatal visit would be helpful	344 (98.9)
Information on gestational weight gain	85 (24.4)
Received information on gestational weight gain from media/books	170 (48.9)

one-quarter (24.4%) of the women stated that family and friends provided counselling on weight gain besides care

provider and nearly one-half (48.9%) stated they acquired knowledge on weight gain from reading and internet.

Overall, 46.3% of women correctly reported risk(s) with inappropriate weight gain during pregnancy. The common reported maternal risks involved with excess weight gain were caesarean section, gestational diabetes, labour dystocia and hypertension (15.8%, 6.3%, 4.6%, and 4.0% respectively). Only 3(0.9%) women each reported haemorrhage and obesity as risks to themselves during pregnancy and longer term respectively. The frequently reported risk of excess GWG to infant was macrosomia (20.7%); with perinatal mortality and childhood obesity being reported by one (0.3%) and two (0.6) women respectively. Approximately 1 in 5 women (20.7%) reported foetal growth restriction as risk of inadequate weight gain. The reported rates of low birth weight and prematurity as risks associated with inadequate GWG were 12.4% and 1.4% respectively.

The relationship between BMI category (Prepregnancy and survey BMI), patients' perception of own weight and their plans for weight gain during pregnancy were examined [Table 3]. Among the two hundred and thirty eight of the final study sample of 348 respondents who provided information (prepregnancy weight and height) for calculation of prepregnancy BMI, slightly higher than two-thirds (68.4%) were planning to maintain normal weight or gain within the recommended range; the BMI classification of respondents planning to maintain normal weight was underweight, normal weight, overweight and obese (33.3%, 72.4%, 61.1% and 75.0% respectively). Thirty percent (30.8%) of the sub-group with prepregnancy BMI were intending to gain excess weight (66.7%, 27.3%, 39.0%, 22.6%, respectively of underweight, normal weight, overweight and obese respondents) while only obese women (0.8%) were planning to lose weight.

With respect to BMI category at prenatal booking visit and maternally perceived weight status at survey completion, approximately 70%, 28%, and 1% of the final study population, respectively, were planning to maintain normal weight, gain excessive weight and lose weight. Among women who plan to maintain normal gestational weight, their distribution was 100.0%, 68.3%, 67.8% and 76.0% of underweight women, normal weight women, overweight women and obese women respectively. The distribution of the respondents planning to gain excess weight across the strata of BMI at booking was 31.0%, 31.3% and 22.1% of normal weight women, overweight women and obese women respectively. The proportion of women who planned to lose weight in relationship to the BMI status at prenatal booking visit shows slightly rising trend with increasing maternal weight status (0.0%, 0.8%, 0.9% and 0.9% respectively for underweight women, normal weight women, overweight women and obese women).

Based on maternally perceived weight status, 57.2%, 26.9 and 31.6% of underweight women, normal weight women

and overweight women respectively were planning to gain excess weight. Conversely, a higher proportion of normal weight women (72.1%) and overweight women (61.5%) and smaller proportion of underweight women planned to maintain weight gain within recommended range. Only a small percentage of normal weight (1.1%) and overweight women (3.8%) planned to lose weight.

**Table 3: Patients' intentions of or plans for gestational weight gain (GWG)**

BMI category	Plans for GWG			Total (%)
	Gain recommended Weight (%)	Gain excess weight (%)	Lose weight (%)	
<b>Prepregnancy BMI category</b>				
Underweight	1 (33.3)	2 (66.7)	0 (0.0)	3 (100)
Normal weight	40 (72.4)	15 (27.3)	0 (0.0)	55 (100)
Overweight	58 (61.1)	37 (39.0)	0 (0.0)	95 (100)
Obese	63 (75.0)	19 (22.6)	2 (2.4)	84 (100)
Total	162 (68.4)	73 (30.8)	2 (0.8)	237 (100)
<b>BMI category at booking</b>				
Underweight	3 (100)	0 (0.0)	0 (0.0)	3 (100)
Normal weight	86 (68.3)	39 (31.0)	1 (0.8)	6 (100)
Overweight	78 (67.8)	36 (31.3)	1 (0.9)	115 (100)
Obese	79 (76.0)	23 (22.1)	2 (1.9)	104 (100)
Total	246 (70.7)	98 (28.1)	4 (1.1)	348 (100)
<b>Weight perception at survey</b>				
Underweight	3 (42.9)	4 (57.2)	0 (0.0)	7 (100)
Normal weight	227 (72.1)	85 (26.9)	3 (1.0)	315 (100)
Overweight	16 (61.5)	9 (31.6)	1 (3.8)	26 (100)
Obese	—	—	—	—
Total	246 (70.7)	98 (28.1)	4 (1.1)	348 (100)

The relationships of maternal demographics, type of health care provider and weight perception to right/correct report of risks with inappropriate GWG are shown in Table 4. On univariate analysis, correct report of risks associated with inappropriate weight gain was significantly associated with having information on weight gain provided by multiple health care providers (Crude OR 4.25; 95% CI, 1.51-11.94) and perceived weight status being overweight (Crude OR 0.41; 95% CI, 0.17-0.99). Multivariate analysis with type of health care provider and perceived weight status in the regression model further showed that information on weight gain from multiple health care providers (AOR 4.71; 95% CI, 1.64-13.48) was associated with correct report of risk with inappropriate weight gain compared to women who received no information on weight from health care provider. Also, maternally perceived overweight status (AOR 0.39, 95% CI, 0.16-0.98) was significantly associated with poor report of risks with inappropriate weight gain compared to women who perceived their weight status as normal weight.

**Table 4: Predictors of patient correct knowledge of risk(s) with inappropriate weight gain**

Variable	Correct knowledge	No correct knowledge	Crude OR [95% CI]	AOR [95% CI]
<b>Age (yrs)</b>				
<35	131 (81.4)	154 (82.4)	1	
≥35	30 (18.6)	33 (17.6)	1.07 (0.6-1.85)	
<b>Pregnancy history</b>				
Para 0	86 (53.4)	106 (56.7)	1.14 (0.75-1.75)	
Para ≥1	75 (46.6)	81 (43.3)	1	
<b>Education</b>				
Secondary or less	17 (10.6)	32 (17.1)	0.57 (0.30-1.07)	
Post secondary	144 (89.4)	155 (82.9)	1	
<b>Smoker</b>				
Yes	5 (3.1)	11 (5.9)	0.51 (0.17-1.51)	
No	156 (96.9)	176 (94.1)	1	
<b>Type of HCP</b>				
Multiple	16 (9.9)	7 (3.7)	4.25 (1.51-11.94)	4.71 (1.64-13.78)
Obstetrician/Doctor	24 (14.9)	22 (11.8)	2.03 (0.92-4.44)	2.13 (0.96-4.73)
Midwife/Nurses	61 (37.9)	79 (42.2)	1.43 (0.77-2.68)	1.56 (0.82-2.96)
Dietician/Nutritionist	21 (13.0)	39 (20.9)	1.81 (0.91-3.16)	1.92 (0.9-3.87)
None	21 (13.0)	39 (20.9)	1	1
<b>Marital Status</b>				
Single	8 (5.0)	14 (7.5)	0.65 (0.26-1.58)	
Married	152 (95.0)	172 (92.5)	1	
<b>Perception of weight in index pregnancy</b>				
Normal weight	4 (2.5)	3 (1.6)	1.47 (0.32-6.66)	2.02 (0.43-9.51)
Underweight	150 (93.2)	165 (88.2)	1	1
Overweight	7 (4.3)	19 (10.2)	0.14 (0.17-0.99)	0.39 (0.16-0.98)
Obese	—	—	—	—



## DISCUSSION

In this present study on maternal perspectives on GWG, approximately four-fifths (82.8%) reported being counselled on GWG at all, with one-fifth (22.4%) being counselled to gain a specific amount or range of weight during pregnancy. Compared to a recent study by McDonald *et al.*,<sup>32</sup> the proportion of women (28.5%) who recalled being counselled to gain specific amount of weight is slightly higher than that of this present study. Other GWG studies based on revised IOM recommendations have consistently found higher rates of women being counselled correctly to gain an amount or range of weight.<sup>30,37</sup>

Phelan *et al.*, found that over one-third of women were not counselled by health professionals about appropriate weight gain pregnancy.<sup>38</sup> In our setting, health professionals' advice about specific or range of weight gain may be limited by their awareness of the well-documented IOM guidelines. As BMI classification in our obstetric practice is based on weight-for-height at first antenatal consultation, irrespective of gestational age; care providers' awareness of IOM guidelines which encourage weight gain based on pre-pregnancy BMI ranges may limit counselling women about the traditional average maternal weight of 12-12.5 kg which does not depend on maternal BMI ranges. The perception by the majority of women that 'weight measurement at every antenatal consultation (98.9%)' and 'health professionals' provision of information on the correct, specific amount or range of weight expected to gain in pregnancy at first antenatal consultation would be helpful suggest that absence of advice on the recommended weight gain may be associated with the reported lack of information on expected GWG health provider advise.

Despite the awareness of adverse obstetric outcomes with inappropriate GWG by nearly a half of our respondents, approximately a fifth (22.1%) to two-fifths (39.0%) of respondents who were overweight or obese based on pre-pregnancy BMI, first antenatal consultation's BMI or self-reported perceived weight status planned to gain weight in excess of the specific amount or range. These findings are consistent with a previous study from Canada which found that overweight or obese women planned to gain weight above guidelines.<sup>32</sup> Additionally, the classification of approximately two-thirds (63.2%) of women as 'inappropriate weight status (underweight, overweight, and obese)' among women who considered themselves normal weight ( $n = 315$ ) at first antenatal consultation underscores the importance of provider objective assessment of maternal weight status and advice on appropriate weight gain in pregnancy.

Our study also found that less than or approximately one-third of the women believed there are maternal or infant

risks associated with inappropriate GWG (inadequate or excess weight gain) despite over half of the respondents reported being counselled by care providers that there were risks with inappropriate weight gain. This study also demonstrates that a higher proportion of women believed that there were risks with excess weight gains to themselves compared to their infants. Conversely, the proportion of women who perceived infant risks with inadequate weight gain is greater than those perceiving maternal risks with inadequate weight gain. The concern about caesarean section and foetal growth restriction, most frequent reported consequences of excessive and inadequate weight gain, respectively, may explain these findings. These findings are consistent with two prior studies by McDonald *et al.*<sup>31,32</sup>

We found that 'receiving information on GWG from multiple health care professionals (AOR 4.71; 95% CI, 1.64-13.48), and 'self-perceived weight status as overweight' (AOR 0.39, 95% CI, 0.16-0.98) to be independent predictors of right knowledge of risk(s) with inappropriate GWG. We could not compare our findings with previous research as none has previously described the factors associated with correct report of risks involved with inappropriate weight gain. The strong relationship of advice on GWG from multiple health professionals suggests that the quality of counselling may strongly influence patients' knowledge on weight gain in pregnancy.

Although our study was conducted using self-administered questionnaire, the anthropometric information given by women was validated using the prenatal clinical records. The median prenatal visit (four visits) in this study shows that many women had opportunities for counselling on GWG during the period of prenatal care. By enquiring on maternal self-perception of weight at prenatal booking visit, we could adequately counsel women whose weight perception differs from objective weight status as perceived weight status would influence plans for weight gain.

Despite the aforementioned strengths, our study has a number of limitations. This survey could not assess the information women acquired on amount or range of weight expected to gain based on the 2009 IOM guidelines, but this was not the primary outcome of this study. Recall bias in remembering prepregnancy weight may limit our findings. The lack of information on the number of health talks (a potential confounder on perceptions and knowledge of participants) received by each participants may limit the interpretation of our findings. As shown in Table 3, we chose to explore plans for GWG in current pregnancy by asking participants to check 'Excessive weight gain', 'Excessive weight loss', or 'Maintain steady weight gain', because this would reveal insight about the need for educational intervention based on the new weight gain guidelines in our country. However, this

would be a common weakness of any study evaluating the information women received on weight gain in most countries that are yet to adopt the new pregnancy weight gain guidelines.

In conclusion, there were lower rates of perception of maternal and infant risks associated with inappropriate GWG (ranging from approximately 23-34%) despite the reported rate of counselling on risks involved with inappropriate weight gain by approximately two-thirds of the women in our study. Furthermore, a sizeable proportion of women who were considered overweight or obese based on pre-pregnancy, first antenatal consultation's BMI or self-reported perceived weight status planned to gain weight in excess of the specific amount or range. These findings may assist in strengthening the knowledge of women on all aspects of weight gain in pregnancy.

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