

Maternal Knowledge of Recommended Weight Gain in Pregnancy and Its Effect on Gestational Weight Gain

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ABSTRACT

Background: Pregnant women and their doctors continue to worry about the potential health consequences of maternal weight increase. **Objective:** The aim of the current work was to describe the accurate maternal knowledge of recommended weight gain during pregnancy and assessment of this knowledge effect on actual gestational weight gain.

Subjects and Methods: This cross-sectional study included a total of 523 pregnant women receiving antenatal treatment, attending at the Prenatal Outpatient Clinic, Al-Azhar university hospitals, using a self-administered questionnaire. This study was conducted between October 2016 and April 2017.

Results: Low rates of acceptable gestational weight growth (27.6%) and low rates of proper understanding of weight increase recommendations during pregnancy (10.3%) characterize our sample cohort (40.4 percent). Accurate awareness of prenatal weight increase guidelines was linked to healthy weight gain. ($P=0.007$). Mothers' understanding of healthy weight increase did not improve with higher levels of education. ($P=0.458$).

Conclusion: It could be concluded that the findings of this study support the need for improvements in educational efforts about weight gain in pregnancy. The main source of ANC knowledge especially gestational weight gain knowledge is low. The vast majority of pregnant women do not regularly practice exercise before pregnancy.

Keywords: Maternal Knowledge, Weight Gain, Pregnancy.

INTRODUCTION

Pregnant women and their doctors continue to be concerned about pregnancy weight gain. Because excessive weight gain during pregnancy might negatively affect the baby, weight anxiety is a real concern. Worldwide, there is a growing cause for alarm regarding the increased incidence of maternal obesity and overweight. Obesity is a major nutritional issue for pregnant women, especially in developed countries. However, as more and more people in developing countries adopt Western ways of life, the prevalence of obesity during pregnancy could rise to levels previously seen only in developed nations^(1,2).

Only 30–40% of pregnant women achieve a healthy body mass index (BMI) range, notwithstanding the current recommendations and their predecessor from 1990. More than half of pregnant women are overweight or obese, which greatly increases their risk of difficulties during and after birth (including diabetes mellitus, hypertension, and the need for a caesarean section or surgical vaginal delivery). Macrosomia, birth trauma, and later childhood obesity are all increased with excessive weight growth during pregnancy. On the other hand, low birth weight and premature birth are more likely among babies whose mothers did not acquire enough weight throughout pregnancy⁽³⁾. There is a dearth of data on the extent to which women are advised about the hazards of inappropriate weight increase during pregnancy, despite the well-documented negative maternal, baby, and childhood outcomes that accompany both excess and deficient gestational weight growth. Moreover, since the new recommendations were announced, there has been a lack of information on the percentage of women who have been counselled regarding gestational weight gain. To remedy the dearth

of data, we conducted a survey among expectant mothers to ascertain whether or not they understood their doctor's advice regarding weight increase and the dangers of excess weight gain during pregnancy⁽⁴⁾. Few research have evaluated mothers' familiarity with the IOM's 2009 guidelines for prenatal weight gain as of yet. There was a range of 31%–48% of people in previous surveys who could correctly identify these recommendations. However, it is not known if there is a correlation between knowing the recommendations and actual weight increase during pregnancy^(4,5). It was the goal of this study; description of accurate maternal knowledge of weight gain recommended during pregnancy and assessment of this knowledge effect on actual gestational weight gain for pregnant women.

SUBJECTS AND METHODS

This cross-sectional study included a total of 523 pregnant women receiving antenatal treatment, attending at the Prenatal Outpatient Clinic, Al-Azhar university hospitals, using a self-administered questionnaire. This study was conducted between October 2016 and April 2017.

Ethical Consideration:

This study was ethically approved by Research Ethics Council Al-Azhar university. Written informed consent of all the participants was obtained. The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Inclusion criteria: Patients which were eligible to be included in the study were pregnant women with a viable singleton pregnancy.

Exclusion criteria: Known multiple gestations, patients with evidence suggestive of intrauterine fetal death, refusal of consent writing, and patients reported age of less than 18 years.

The survey questions were crafted after a comprehensive literature evaluation of current studies on pregnant women's thoughts and beliefs about pregnancy weight gain and its hazards ⁽⁶⁾.

All were assessed using following questionnaire:

Questionnaire about maternal knowledge of recommended weight gain during pregnancy:

- 1- Ageyears
 - 2- Height cm
 - 3- Weight before pregnancy kg
 - 4- Current weight kg
 - 5- You live in rural area urban area
 - 6- Your pregnancy age weeks
- 7- What is your weight category before pregnancy?
- Underweight (BMI > 18.5)
 - Ideal weight (BMI 18.5-24.9)
 - Overweight (BMI 25-29.9)
 - Obese (BMI > 30)
 - I don't know
- 8- What do you know about your weight gain during pregnancy?
- No weight gain
 - 12-18 kg
 - 12-16 kg
 - 7-12 kg
 - 5-9 kg
 - I don't know
- 9- What is the source of your information about weight gain during pregnancy?
- I have no information
 - Television or Internet
 - Hospital or Health unit
 - Relatives and neighbors
- 10- What are your dietary plans for this pregnancy?
- Eat twice as much "eat for two"
 - Eat a little more
 - Eat the same amount
 - Eat less
 - I don't know
- 11- Were you practicing exercise before pregnancy? Yes No
- 12- What are your plans for exercise during this pregnancy?
- No exercise at all
 - Exercise less
 - Exercise more
 - Exercise the same as before
 - I don't know
- 13- What is your highest level of education?
- Not educated
 - Primary school degree
 - Secondary school degree
 - Secondary institute degree
 - University degree
 - Master or PhD degree

Statistical analysis

In order to analyze the data acquired, Statistical Package of Social Services version 22 was used to execute it on a computer (SPSS). In order to convey the findings, tables and graphs were employed. The quantitative data was presented in the form of the mean, median, standard deviation, and confidence intervals. The information was presented using qualitative statistics such as frequency and percentage. The student's t test (T) is used to assess the data while dealing with quantitative independent variables. Pearson Chi-Square and Chi-Square for Linear Trend (X²) were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

As demonstrated in Table (1), the highest number of cases (201) was in (18-25) age group indicates the percentage by (38.4%) while the highest percentage of true maternal knowledge was in (26-30) age group by 11.9%.

Table (1): Characteristics of the studied pregnant women according to their age group.

Age	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
18-25	179	89.1	22	10.9	201	100	0.882
26-30	140	88.1	19	11.9	159	100	
31-35	93	92.1	8	7.9	101	100	
36-40	40	90.9	4	9.1	44	100	
41-45	15	93.8	1	6.3	16	100	
46-50	2	100	0	0	2	100	
Total	469	89.7	54	10.3	523	100	

According to table (2), the vast majority of cases included in the study are living in urban area by (68.3%) and the percentage of true maternal knowledge of recommended weight gain during pregnancy is very close between rural and urban areas by (10.2%) and (10.4%) respectively.

Table (2): Characteristics of the studied pregnant women according to their occupation.

Occupation	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
Urban area	320	89.6	37	10.4	357	100	0.966
Rural area	149	89.8	17	10.2	166	100	
Total	469	89.7	54	10.3	523	100	

Table (3) shows that the vast majority of cases are not educated or of low educational grade by 183 cases (35%) and 175 cases (33.5%) respectively.

Table (3): Characteristics of the studied pregnant women according to their education.

Education	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
Not educated	160	87.4	23	12.6	183	100	0.458
Primary school	162	92.6	13	7.4	175	100	
Secondary school	88	87.1	13	12.9	101	100	
Secondary institute	21	95.5	1	4.5	22	100	
University	33	89.2	4	10.8	37	100	
Master/ PhD	5	100	0	0	5	100	
Total	469	89.7	54	10.3	523	100	

Table (4) indicate that the majority of cases are falling between (51-60) and (61-70) age groups detailed as 169 cases weighed (51-60) kg before pregnancy by (32.3%) and 153 cases weighed (61-70) kg by (29.3%).

Table (4): Characteristics of the studied pregnant women according to their weight before pregnancy.

Weight before pregnancy (kg)	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
40-50	58	87.9	8	12.1	66	100	0.601
51-60	148	87.6	21	12.4	169	100	
61-70	142	92.8	11	7.2	153	100	
71-80	71	91	7	9	78	100	
81-90	36	90	4	10	40	100	
91-100	12	80	3	20	15	100	
101-110	2	100	0	0	2	100	
Total	469	89.7	54	10.3	523	100	

According to Table (5) and Figure (14), the vast majority of cases are falling in-between (71-80) kg and (61-70) kg by (30.8%) and (27.2%) respectively.

Table (5): Characteristics of the studied pregnant women according to their weight during pregnancy.

Weight during Pregnancy (kg)	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
40-50	6	100	0	0	6	100	0.414
51-60	50	89.3	6	10.7	56	100	
61-70	127	89.4	15	10.6	142	100	
71-80	143	88.8	18	11.2	161	100	
81-90	89	91.8	8	8.2	97	100	
91-100	37	94.9	2	5.1	39	100	
101-110	17	77.3	5	22.7	22	100	
Total	469	89.7	54	10.3	523	100	

Table (6) indicates that the majority of cases reported that they had an ideal weight before pregnancy (BMI between 18.5-24.9) by (40.5%) of cases. While, Figure (1) shows that the highest percentage of true maternal knowledge of weight gain during pregnancy is (28.6%) and it was informed by those who informed that they were obese (BMI >30) before pregnancy.

Table (6): Characteristics of the studied pregnant women according to self-reported before pregnancy BMI.

Weight category (BMI) before pregnancy	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
Underweight	34	89.5	4	10.5	38	100	0.154
Ideal weight	190	89.6	22	10.4	212	100	
Overweight	134	87	20	13	154	100	
Obese	5	71.4	2	28.6	7	100	
Don't Know	106	94.6	6	5.4	112	100	
Total	469	89.7	54	10.3	523	100	

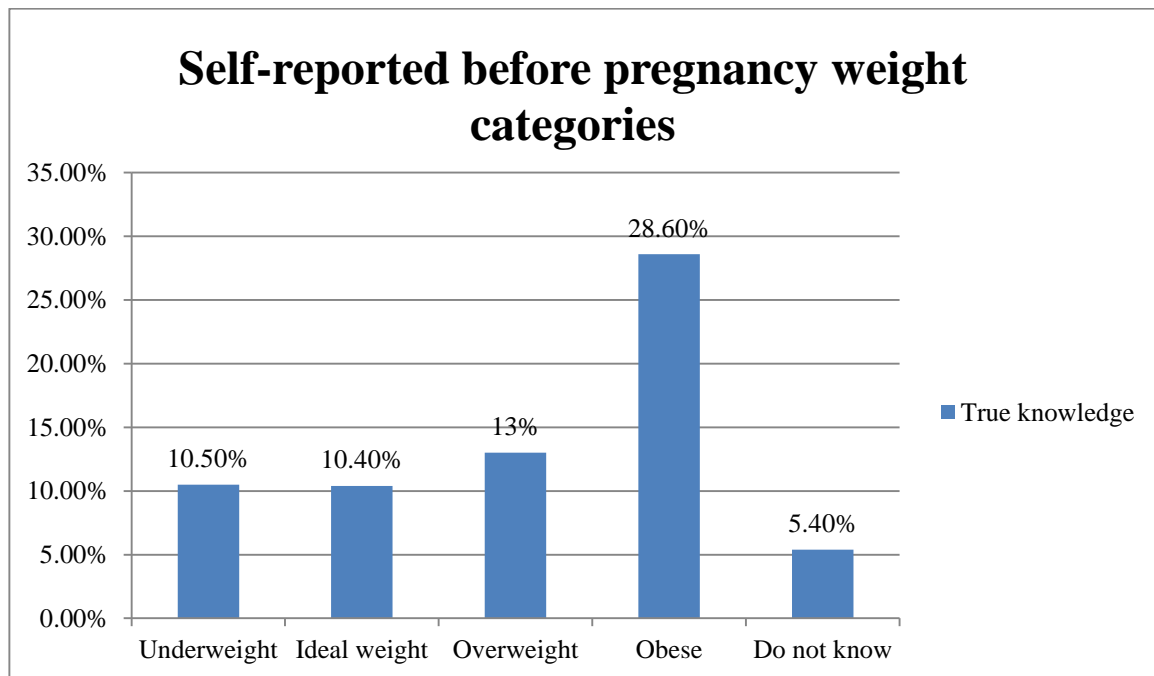


Figure (1): Percentage of true knowledge to weight categories (self-reported before pregnancy BMI).

Table (7) indicates that the majority of cases had an ideal weight before pregnancy (BMI between 18.5-24.9) by (45.12%) of cases. While, Figure (2) shows that the highest percentage of true maternal knowledge of weight gain during pregnancy is (25%) and it was to before pregnancy underweight category (BMI <18.5) followed by obese category (BMI >30) by (18.9%).

Table (7): Characteristics of the studied pregnant women according to actual BMI before pregnancy.

Weight category (BMI) before pregnancy	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
Underweight	3	75	1	25	4	100	0.168
Ideal weight	210	89	26	11	236	100	
Overweight	196	93.8	13	6.2	209	100	
Obese	60	81.1	14	18.9	74	100	
Total	469	89.7	54	10.3	523	100	

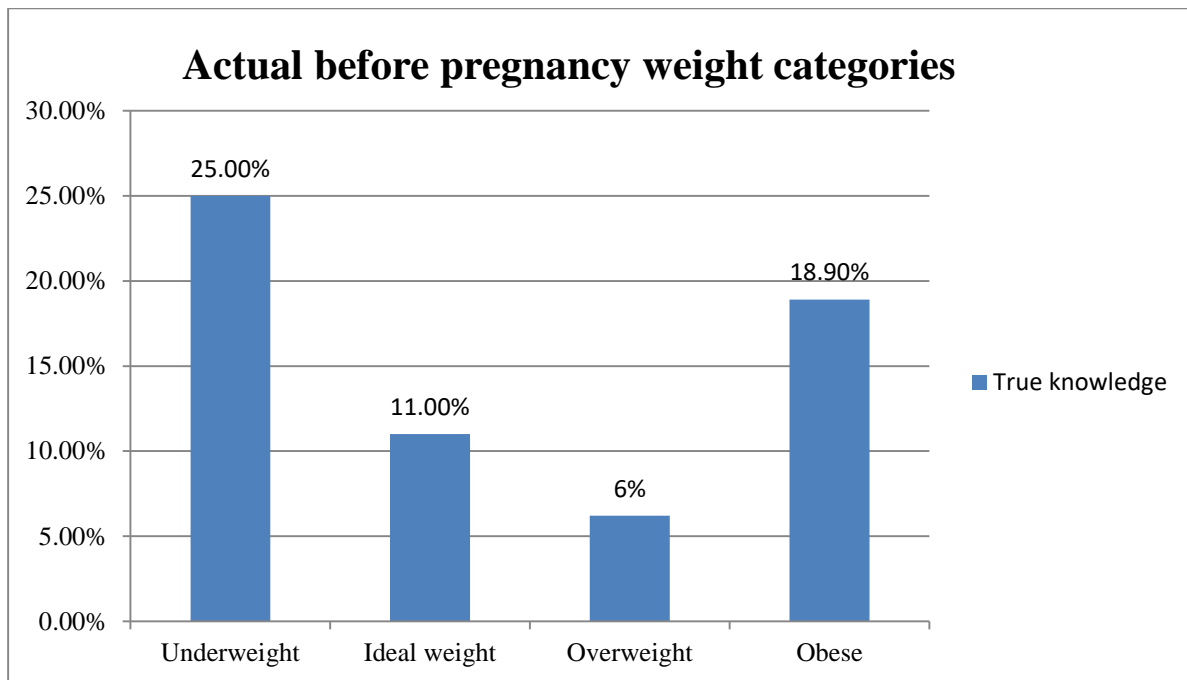


Figure (2): Percentage of true knowledge to actual before pregnancy BMI.

The table (8) indicates that only (186 of 523) (35.6%) of all participants have reported accurate pre-pregnancy BMI while obese and overweight categories tended to underestimate their BMI.

Table (8): A comparison between self-reported before pregnancy BMI and actual BMI before pregnancy

Self-reported BMI	Actual BMI									
	Underweight		Ideal weight		Overweight		Obese		Total	
	n.	%	n.	%	n.	%	n.	%	n.	%
Underweight	3	7.9	28	73.7	7	18.4	0	0	38	100
Ideal weight	1	0.47	105	49.5	83	39.1	23	10.8	212	100
Overweight	0	0	41	26.6	71	46.1	42	27.3	154	100
Obese	0	0	0	0	0	0	7	100	7	100
I do not know	0	0	62	55.4	48	42.9	2	1.8	112	100
Total	4	0.76	236	45.1	209	40	74	14.1	523	100

	Underestimation		Correct estimation		Overestimation
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Table (9) shows that (131) of the third trimester (324) cases gained appropriate amount of weigh according to IOM recommendations by (40.4%). And Figure (3) indicates that the highest true maternal knowledge percentage belongs to pregnant women group who shows appropriate weight gain during pregnancy according to IOM recommendations by (16.8%).

Table (9): Characteristics of the studied pregnant women according to appropriateness of actual weight gain to IOM recommendations during third trimester of pregnancy.

Actual weight gain	False knowledge		True knowledge		Total		P value
	n.=288	%	n.=36	%	n.=324	%	
Appropriate	109	83.2	22	16.8	131	100	0.007
Inappropriate	179	92.7	14	7.3	193	100	
Total	288	88.9	36	11.1	324	100	

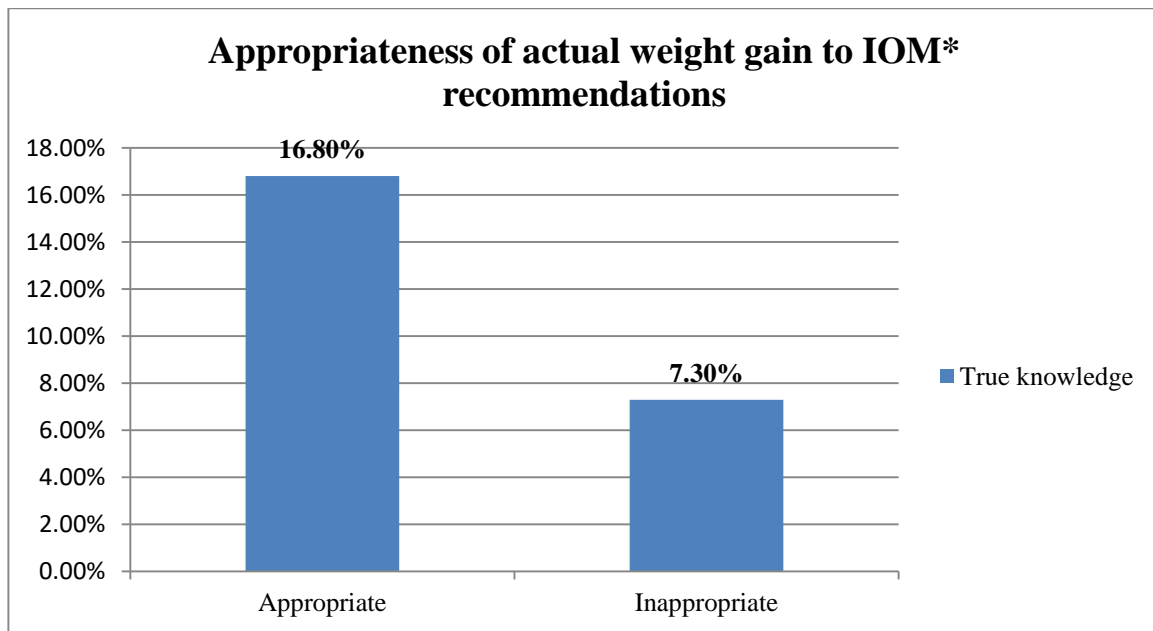


Figure (3): Percentage of true maternal knowledge to appropriate and inappropriate weight gain between third trimester pregnant women.

According to Table (10), the vast majority of cases (324) were in third trimester of pregnancy by (61.8%), and the highest percentage of true maternal knowledge of weight gain recommendations was between 3rd trimester cases by (11.1%).

Table (10): Characteristics of the studied pregnant women according to pregnancy age.

Preg Age	False knowledge		True knowledge		Total		P value
	n.=469	%	n.=54	%	n.=523	%	
First trimester	41	95.3	2	4.7	43	100	0.420
Second trimester	140	89.8	16	10.2	156	100	
Third trimester	288	88.9	36	11.1	324	100	
Total	469	89.7	54	10.3	523	100	

DISCUSSION

This study was aimed to describe accurate maternal knowledge of weight gain recommended during pregnancy. The secondary aim was to assess effect of maternal knowledge on actual gestational weight gain. The study was a group of 523 pregnant women coming to Al-Azhar University Hospitals Outpatient Clinics. The main findings of this study were: due to participants' inaccurate self-assessments of their weight and a lack of familiarity with the guidelines for pregnant weight increase.

Age of participants, indicates that the main age group was (18-25 years) for 201 cases and it is clearly understood because of the early age of marriage in Egypt. The percentage was (38.4%) and the highest percentage of true recommended weight gain maternal knowledge was in (26-30 years) age group (11.9%) while in another study, in New Zealand, the main age group was (30-34 years) (34.1%) of cases ⁽⁷⁾ and it could be due to the difference in traditions between Egypt and New Zealand.

Occupation of participants, the vast majority of cases, about 357 cases, included in the study are living in urban area (68.3%) and the reason for that could be because of establishing the study between different outpatient clinics of Al-Azhar university hospitals in Cairo and New Damietta where it may be far from rural areas people. The percentage of true maternal knowledge of recommended weight gain during pregnancy seems to be very close between rural and urban areas participants by (10.2%) and (10.4%) respectively.

Compared to previous studies, when rates ranged from 31 to 48 percent, the women in this study had an extremely low degree of precise awareness of appropriate weight increase in pregnancy (10.3 percent) ⁽⁵⁾. Our results, however, were in line with previous research showing that low-income pregnant women are more likely to have false beliefs about their weight increase ⁽⁸⁾.

Our findings showed that pregnant women generally have no idea how much weight they should gain. Over eighty-nine percent of respondents got the

Institute of Medicine's 2009 recommendations for pregnant weight increase wrongly.

Our study assessed the appropriateness of actual weight gain to IOM recommendations during third trimester of pregnancy. Table (9) and figure (3) show that (131) of the third trimester (324) cases gained appropriate amount of weight according to IOM recommendations by (40.4%) which indicates the increase by far between the percentage of true weight gain recommendations knowledge and the actual appropriate weight gain. While (59.6%) gained inappropriate amount of weight during pregnancy according to Institute of medicine 2009 recommendations.

On the other side, the results showed an association between appropriate weight gain during pregnancy according to IOM recommendations and true maternal knowledge of appropriate weight gain percentage which is (16.8%) in comparison of (7.3%) for inappropriate weight gain group.

When mothers' self-reported pre-pregnancy BMIs are compared to their reported levels of knowledge about the amount of weight they should gain during pregnancy, we find that those who were underweight before pregnancy are more likely to have an accurate understanding of the recommended amount of weight gain (25%), followed by those who were obese before pregnancy (10%). (18.9 percent). While other studies have considered women's knowledge of appropriate weight gain in pregnancy. **Huning *et al.*** ⁽⁹⁾ It was found that women who were already overweight or obese were the least likely to estimate their weight gain correctly, with 65% of obese women exceeding the required amount of weight gain during pregnancy. **Thompson *et al.*** ⁽¹⁰⁾ observed that only 29.5% of respondents knew what the ideal weight gain should be during pregnancy. **Gaudet *et al.*** ⁽¹¹⁾ participants who were reported to be overweight or obese were substantially more likely to overestimate what would be considered a healthy minimum weight gain during pregnancy (60% and 40%, respectively), $P=0.02$. **Gaudet *et al.*** ⁽¹¹⁾ in addition, women who are overweight or obese tend to exaggerate how much weight they may safely gain (85 percent and 100 percent, respectively). Evidence suggests that pregnant women may not know how much weight they should gain. In addition, contrary to our findings, it is clear that women who are overweight or obese are more likely to believe that they can acquire more weight during pregnancy than is actually healthy.

Several studies have shown that women who were overweight before becoming pregnant had an erroneous perception of their body's ability to acquire weight during pregnancy ^(5,12). Despite our findings, a Canadian investigation also found no correlation between the two ⁽¹³⁾. **Ledoux** ⁽⁴⁾ correct pre-pregnancy weight category identification was linked to greater

overall health literacy, according to a new study ⁽⁴⁾. Accurate identification of weight category was not necessarily connected with accurate knowledge in this study. Accurate awareness of the recommended gestational weight growth was clearly linked to healthy weight gain in this group.

Targeted weight growth advice was substantially associated with actual weight increase in pregnancy, according to a study of 2,237 pregnant women in the United States ⁽¹⁴⁾, therefore it is important to educate women on appropriate weight gain.

CONCLUSION

It could be concluded that the findings of this study support the need for improvements in educational efforts about weight gain in pregnancy. The main source of ANC knowledge especially gestational weight gain knowledge is low. The vast majority of pregnant women do not regularly practice exercise before pregnancy.

The study showed a very low rate of accurate maternal knowledge of weight gain recommendations in pregnancy by (10.3%) while the appropriate gestational weight gain percentage according to the recommendations constituted (40.4%) of participants.

Accurate knowledge of gestational weight gain recommendations was associated with the group of appropriate weight gain in pregnancy by (16.8%) ($P=0.007$) whilst the educational grade was not associated with accurate maternal knowledge of weight gain recommendations ($P=0.458$) and most of the participants were of non-educated or primary educational level by 35% and 33.5% respectively.

Actual pre-pregnancy BMI recorded 45.12% for ideal weight and 39.96% for overweight category while 35.6% of participants could identify their pre-pregnancy BMI; however, obese and overweight participants tended to underestimate their pre-pregnancy BMI.

The study discovered that the main source of ANC knowledge especially gestational weight gain knowledge was relatives by 53.7%.

The vast majority of participants reported that they didn't regularly practice exercise before pregnancy by 89.1%.

Most of the study participants were in the third trimester by 61.8% and they reported accurate maternal knowledge of recommended weight gain by 11.1%.

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