

## THE KNOWLEDGE TOWARD OBESITY AND GESTATIONAL WEIGHT GAIN OF PREGNANT WOMEN IN DUHOK CITY

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### ABSTRACT

The extensiveness of overweight and obesity among pregnant women is a growing public health concern in the developed countries, as it related to adverse pregnancy outcomes. This problem is considered by World Health Organization as a major health challenges. This study aimed to assess the pregnant women's knowledge toward obesity, gestational weight gain, and the safe method to prevent this gain.

A cross sectional descriptive study was conducted for 400 pregnant women who attended the antenatal care units in eight of Primary Health Care Centers, from 1<sup>st</sup> of August to the 20<sup>th</sup> of October 2016. They have been directly interviewed by a structured questionnaire to identify their knowledge regarding their weight and Body Mass Index category, their ideas toward the complications of excessive weight gain during pregnancy, and the safe preventive effective management. A bit less than half of the sample (46.3%) were within normal weight, and 208(52%) of participants were overweight or obese, while 137 (36.8%) of them believed that they were overweight and obese. The difference weight gain between first and third trimester of pregnancy was (10.7 Kg), and (91.3 %) agreed that the physical activities and the advices about them were the main ways to prevent the excess weight gain.

The majority of pregnant women had limited knowledge about obesity or overweight, excessive gestational weight gain and their adverse effects during pregnancy. The effective media, professional healthcare and providing health education programs are required to improve the level of this knowledge.

**KEYWORDS:** Knowledge, Obesity, Gestational weight gain , Body Mass Index.

### INTRODUCTION

Maternal obesity is a significant risk factor for childhood obesity, which persists into adulthood independent of other factors. Excessive weight gain with increased maternal weight during pregnancy are related to adverse pregnancy outcomes, like hypertension, preeclampsia, and low birth weight (< 2500 gm) or high birth weight (> 4.000 gm), increase the chance of operative delivery like Cesarean Section, and post-delivery weight retention (Thangaratinam *et al*, 2010). There is more evince which marks to the high risk of preterm birth in women with a high pre-pregnancy Body Mass Index (BMI) (McDonald *et al*, 2010). Infants of these women are less liable to be breastfed, and more likely to be overweight in childhood. So the amount of weight gained in pregnancy can affect the immediate and future health of a woman and her infant (Siega-Riz *et al*, 2009).

About (50%) of the women who die during pregnancy, childbirth, and puerperium in the United Kingdom are either overweight or obese (Ramachendran.*et al*, 2008). The Australian data revealed that half of the pregnant women were over-weight or obese, and (36%) of women in United States were obese (Dodd *et al*, 2011; Flegal *et al*, 2012).

There is a demand to determine the proper weight management interventions which are effective and safe in pregnancy. During the antenatal period, there are good opportunities for regular contact between the pregnant women with her health professionals, which is designed an ideal time to intervene as mothers are motivated to make changes that could optimize the outcomes for pregnancy and for the baby (NAO *et al*, 2001).

The recommendation of Gestational Weight Gain (GWG) aim to improve outcomes for the woman and the infant. In 2009, the Institute of Medicine (IOM) published the update guidelines of adjusted gestational weight gain that are based

on pre-pregnancy BMI ranges for underweight, normal weight, overweight, and obese women, and the WHO recommended these guidelines which are independent of age, parity, race, smoking history, and ethnic background. The controversial reactions from some physicians have met with the updated IOM recommendations who believe that the weight gain targets are too high, especially for overweight and obese women (IOM & NRC, 2009).

**1. Weight gain during pregnancy:** The updated guidelines by IOM regarding weight gain during pregnancy provide the clinicians with a basis for practice. A woman's BMI should be detected at

the first prenatal visit by the health care providers who take care of the pregnant women and discuss with them through the counseling visit the benefits of proper weight gain, nutrition, and exercise during pregnancy period, in order to restrict the excessive weight gain and to attain the best pregnancy outcomes. The management of the obese or overweight woman to gain less weight than recommended, but has a properly growing fetus is important; this needs Individualized care and good clinical judgment. Table 1: showed the recommendations for total and rate of GWG in pregnancy (IOM 2009).

**Table (1):** Recommendations for total and rate of GWG, by pre-pregnancy BMI (IOM 2009).

Pre-pregnancy BMI (Kg/m <sup>2</sup> )	Total weight gain range (Kg)	Rates of weight gain in the second and third trimesters (Kg /week)
Underweight (<18.5)	12.5-18	0.51(0.44-0.58)
Normal Weight(18.5-24.9)	11.5-16	0.42 (0.35-0.50)
Overweight (25.0-29.9)	7-11.5	0.28(0.23-0.33)
Obese (≥30.0)	5-9	0.22(0.17-0.27)

**2. Weight gain in the first trimester:** The 1<sup>st</sup> trimester begins from the 1st day of the last menstrual period and lasts until the end of 13 week of pregnancy. Women who gain about 1 to 2 kg in this period have good pregnancy outcomes (IOM 2009). The nausea and vomiting which are typical in early pregnancy, may lead to lose a small amount of weight. Although, some women may restrict their food to avert gaining weight. Women who lose more than 5-10% of their pre-pregnancy weight and the women who gain a large amount of weight (much more than 2 kg or 4 lbs) in the 1<sup>st</sup> trimester should be assessed. (Hedderson *et al*, 2010).

**3. Weight gain in the second and third trimesters:** The span from week 13 to week 27 of pregnancy is the 2<sup>nd</sup> trimester, and the 3<sup>rd</sup> trimester begins in week 28 and lasts until the birth of the baby which is usually around 40 weeks of pregnancy. After the 1<sup>st</sup> trimester, women gain weight fixedly, because they gain lean and fat tissues. If a woman's pattern of weight gain falls below or above the recommended amount, the health professional can work with her to bring her weight gain back to the recommended rate of gain through her pregnancy time. Many points should check, if the fetus is growing well, confirm there are no medical problems like edema, detect if there are any factors that can be changed such as a

high energy intake or a settled lifestyle, and recognize the woman's personal circumstance such as stress or not having enough income (Hedderson *et al*, 2010). However, women often gain more weight in 2<sup>nd</sup> than they do in 3<sup>rd</sup> trimester of pregnancy and the rate of weight gain can alter depending on the woman's age (IOM, 2009).

**4. Physical activity during pregnancy:** The physical activity in pregnancy may aid the women to maintain muscular and cardiovascular fitness, lower the risk of gestational diabetes or pre-eclampsia, and reduce physical complaints like back pain. It may make it easier for them to accept the physical changes that go with pregnancy. Being active during the time of pregnancy may help women to gain the proper amount of weight (IOM, 2009). Most of the women may start exercising in 2<sup>nd</sup> trimester of pregnancy and find it more easy because the nausea has abated and they are more healthy (Stuebe *et al*, 2009).

Health professionals have a main part in encouraging healthy women with uneventful and uncomplicated pregnancies to obtain the physical activity into their daily life. In addition to everyday physical activities like house cleaning and gardening, women can do walking, swimming and dancing, start with 15 minutes, work towards 30 minutes, and practice these

activities 3 to 4 times / week ( IOM, 2009 ; Downs *et al*, 2014).

**5. Knowledge about dietary:** Knowledge alone is not enough to alter the behaviors and bring about positive results, but it is mediated to be a necessary prerequisite. A recent Australian study found that pregnant women's views of their expected weight gain were a significant predictor of their actual GWG (Mcphie *et al*, 2015). A meta-analysis of studies that aimed to bettering GWG and pregnancy outcomes through dietary and lifestyle interventions revealed that dietary interventions which introduced dietary advice were associated with the largest decrease in women's GWG and derived in some improvement in pregnancy outcomes (Bookari, 2016), compared with other lifestyle change interventions (physical activity alone, and a mixed approach which mixed the diet and physical activity) (Thangaratinam.*et al*, 2012).While all pregnant women should aim to gain weight within the recommended weight range, reduced dietary regimes are not recommended. To conflict the excessive GWG, minimizing the intake of energy in combination with consuming a good amounts of nutrient dense foods from each of the five food groups and getting physical activity are recommended (NHMRC 2013).

Although most of the women showed a high level of knowledge of the broad dietary recommendations, their awareness of the detailed messages was poor. For example, women were aware of the common key dietary access to manage excessive GWG by reducing the intake of added sugar and fat and increasing the intake of dietary fiber. However, lack of knowledge was clear for the more detailed questions about how many serves there are days? How much a serve is ?, and the presence, type, and energy density of fat (Bookari, 2016). It has been manifested that overweight and obese pregnant women are less likely than women of normal weight to correctly estimate their own BMI (Callaway *et al*, 2009), and that overweight women who underestimate their BMI are more likely to get weight in pregnancy.

The aims of the study were: Firstly, to assess pregnant women's knowledge toward obesity, GWG, and prevention of excessive weight gain during pregnancy. Secondly, to know the amount of their GWG by comparing their weight in the 1<sup>st</sup> and 3<sup>rd</sup> trimester of the pregnancy. Thirdly, to find relationship between these knowledge and some

of demographic characteristics (parity, occupation, and BMI).

## MATERIALS AND METHODS

A cross sectional descriptive study was done among pregnant women for assessing their knowledge regarding overweight and obesity in Primary Health Care Centers (PHCCs) in Duhok city. This study was approved by the scientific committee of Nursing College and the ethical committee in General Directorate of Health in Duhok. Then the verbal approval was taken from each pregnant woman before participation to the study.

There were 14 PHCCs inside Duhok city, it was divided into four geographical areas, the study was conducted in the Ante natal Care units (ANC) in eight of the PHCCs , two were selected simply by the way of lottery form each area (simple random sampling method), the selected PHCCs were: Bahdinan, 11 Adair, Mohamad Salih Boty, Malta , Qazi Mohamad , Khabat , Barzan and Zanast.

All pregnant women aged (18-35) years in third trimester of their pregnancy attended selected PHCCs at the selected visit day and agreed to participate were included in the study. Women with twin pregnancy, pregnancy induced hypertension, and gestational diabetes were excluded. For sample size calculation Cochran's formula for categorical data (Cochran, 1977) adopted. For more conservative sample size, maximum variability assumed by using an estimated proportion of (0.5).The resultant sample size was (400) pregnant women, (50) women from each PHCCs. They were selected by using systematic random sampling method, the first choosing was from the list of names that usually prepared in the morning for all the visitors that came for ANC visits in that day, all these selected women must be in the 3<sup>rd</sup> trimester (28-40 weeks of pregnancy), by choosing every second or third pregnant woman according to the bulk of the attended pregnant women (crowdedness inside PHCCs), and depend on the BMI which must be in the 3<sup>rd</sup> fixed and In early booking (as pre-pregnancy weight) in their prenatal records as first weight to compare with it.The researcher through direct interview gathered data by using a structure-validated questionnaire.

The questionnaire was designed according to the study objectives and this tool was arranged

and validated through the previous literature and relevant specialists. Before gathering the information, the consent was obtained from the pregnant women for participation in the study before starting data collection. The data were collected during all weekdays at official working time 9:00 am to 1:00 pm. The time of interviewing with each pregnant woman took approximately (5-15 minutes). The researcher visited each PHCCs one by one.

The close ended questionnaire was prepared and modified by taking in consideration the other previous studies. The questionnaire has five parts: \*The first part about the socio-demographic characteristics of pregnant women, including (age, parity, residence, level of education, pregnant women's perception for their weight and BMI) - the weight and height were measured in first visit in first trimester of pregnancy. \*The second part was to assess the knowledge about the best weight gain during pregnancy with its five options. \*The third part attempted to assess the knowledge about excess weight gain effects on the pregnancy outcomes, there were 5 items. \*The fourth part had five items focused on the safe methods to manage and prevent the GWG.

The Statistical Data Analysis were conducted by using the statistical package for social science (SPSS version 23) Frequency, percentage,

between proportions. When more than 20% of the expected counts of the cells of the table were less than five, Fisher's exact test was used. A (*P* value) of  $\leq 0.05$  was considered statistically significant.

## RESULTS

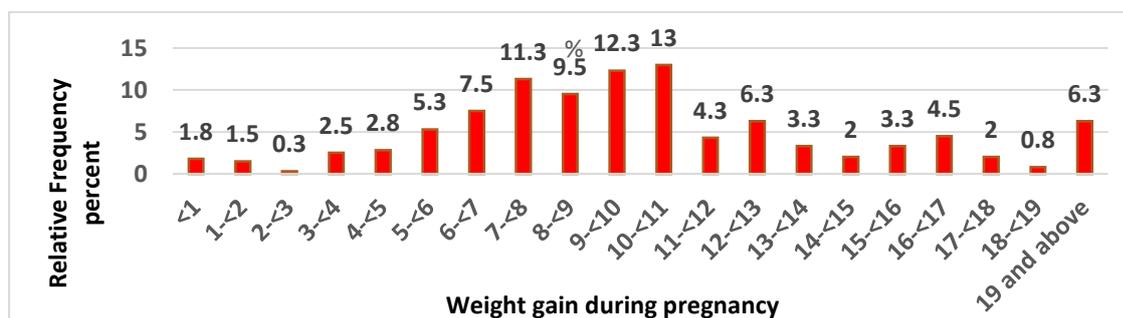
**1. Socio-demographic characteristics of the participants:** The mean age of participants was (26.8 years), the median was (27 years), and minimum age was 18 years while the maximum age was 35 years. In Table 2: (72.5%) of participants were housewives whereas (18.5%) were working outside of home and (9%) of them were students. Most of participants (31.8%) were secondary school graduates followed by (31%) primary school graduates, while (19.5%) of them had higher education level. Regarding to the parity of sample study, from Para 0 to Para 5 & above were sorted as (41.8%, 20.2%, 33%, 5%) respectively. About the pre pregnancy BMI of most of participants 185 (46.3%) were within normal BMI range (18.5-24.9), however, (58.8%) of them believed that they had a healthy weight, it means one in six. On the other sides, (36.8%) believed they were overweight while (52%) of the sample were obese and overweight, as shown in Table 2

**Table (2):** Distribution of pregnant women according to their occupation, educational level, parity, BMI, pregnant women's perception for their weight.

Variables (items)	No.	%
<b>*Occupation</b>		
House wife	290	72.5
Student	36	9.0
Working outside home (employee)	74	18.5
<b>*Educational level</b>		
Illiterate	71	17.7
Primary school graduate	124	<b>31.0</b>
Secondary school graduate	127	<b>31.8</b>
Institute +University graduate	78	19.5
<b>*Parity</b>		
0	167	<b>41.8</b>
1	81	20.2
2-4	132	33.0
5 and above	20	5.0
<b>*pregnant women's perception for their weight</b>		
Underweight	18	4.5
Normal	235	<b>58.8</b>
Overweight	131	32.8
Obese	16	4.0

*BMI		
less than 18.5 underweight	7	1.7
18.5-24.9 normal	185	46.3
25-29.9 overweight	102	25.5
30 and more obesity	106	26.5
<b>Total</b>	<b>400</b>	<b>100.0</b>

**2. Weight gain during pregnancy:** Average weight gain of study population during pregnancy (difference between first and third trimester) was 10.7 Kg., and (13% ) of the sample was the largest group and gained (10 -- <11 Kg.), while the group who gained (2- < 3Kgs) was the smallest one (0.3%), as in (Figure 1).



**Fig. (1):** Weight gain difference between first and third trimester.

**3. Pregnant women’s knowledge about the best amount of weight gains during pregnancy:** In Table 3 , about (62.5% ) of pregnant didn’t know the best amount of weight gain during pregnancy and (20.3%) believed that the best amount of weight gain during pregnancy is (10-15 Kg.), while (14.8% ) believed that the best amount of weight gain during pregnancy is (5-10 Kg.).

**Table (3):** Pregnant women’s knowledge about the best amount of weight gains during pregnancy.

# Best amount of weight gains during pregnancy( Kg)	No.	%
I don’t know	250	<b>62.5</b>
1-5	5	1.3
5-10	59	14.8
10-15	81	20.3
More than 15	5	1.3
<b>Total</b>	<b>400</b>	<b>100.0</b>

**4. Perceptions about the effects of excess weight gain.** In Table 4 : the plurality of studied population thought that the excess weight gain during pregnancy does not affect all of the following which showed in Table 4 as: “Need for Caesarean section” was in (50%) of them , or “Baby dies before delivery” was in (44.3%) ,or “Having problems with delivery” in (56.8%), or “Giving a small baby” was (43.3%) or “large baby” (47.3%) , “Having a baby with a structural abnormality” in (51%) , “Having high blood pressure” in (42.3%) and “Abortion” in (43.8%) .

**Table (4):** Distribution of pregnant women according to their perceptions about effects of excess weight gain.

Sn	#	Yes		No		I don't know	
		No.	%	No.	%	No.	%
1	Delivery baby in normal vaginal delivery.	218	54.5	57	14.3	125	31.3
2	Need for Caesarean section.	69	17.3	200	<b>50.0</b>	131	32.8
3	Baby dies before delivery	51	12.8	177	<b>44.3</b>	172	43.0
4	Having problems with vaginal delivery	33	8.3	227	<b>56.8</b>	140	35.0
5	Giving birth to a small baby.	91	22.8	173	43.3	136	34.0
6	Giving birth to a big baby.	119	29.8	189	<b>47.3</b>	92	23.0
7	Having a baby with a structural abnormality	60	15.0	204	51.0	136	34.0
8	Having high blood pressure.	120	30.0	169	42.3	111	27.8
9	Developing diabetes in pregnancy.	130	32.5	127	31.8	143	35.8
10	Having abortion (miscarriage).	111	27.8	175	43.8	114	28.5

**5. Perceptions of pregnant women about ways that may prevent them from gaining an excess weight** as in Table 5: it showed that the majority of studied population (91.3%) agreed that the advices about physical activities are main way that prevent them from gaining excess weight and

(41.3%) agreed that using internet for any information about weight during pregnancy may help, while only (1.3%) of them thought that attending a class in the ANC units about healthy eating during pregnancy.

**Table (5):** Distribution of pregnant according to their Perceptions about ways that may prevent her from gaining an excess weight.

Sn	#	Yes		No		I don't know	
		No.	%	No.	%	No.	%
1	Leaflets about Tonic & healthy eating during pregnancy.	72	18.0	278	69.5	50	12.5
2	Using internet for any information about weight during pregnancy.	165	<b>41.3</b>	200	50.0	35	8.8
3	Attending a class in the ANCU about healthy eating during pregnancy.	5	1.3	311	77.8	84	21.0
4	Advices about physical activity.	365	<b>91.3</b>	24	6.0	11	2.8
5	Access to sports, leisure facilities.	20	5.0	277	69.3	103	25.8

**6. Relationship between pregnant women's knowledge toward obesity and GWG and their Parity, educational level, occupation and BMI.**

Firstly: Table 6 showed significant statistical association between pregnant women's knowledge toward obesity and GWG with their parity, regarding most of the options related to the effects

of weight gain during pregnancy, "Increasing chances of having baby in normal vaginal delivery," "Need to do Caesarean section", "Baby dies before delivery", "Giving baby birth as small baby", "Giving baby birth as large baby" and "Having a baby with structural abnormality".

**Table (6):** Relationship between pregnant women’s knowledge toward obesity and GWG and Parity.

Options		Parity						P. value
		0	1	2	3	4	≥5	
Delivered baby in normal vaginal delivery	Yes	58	52	42	32	19	15	0.001
	No	27	14	7	6	0	3	
	I do not know	82	15	16	8	2	2	
Need for Caesarean section	Yes	26	13	11	13	0	6	0.001
	No	58	46	41	26	16	13	
	I do not know	83	22	13	7	5	1	
Baby dies before delivery (stillbirth)	Yes	18	9	15	8	0	1	0.001
	No	61	32	34	23	13	14	
	I do not know	88	40	16	15	8	5	
Having problems with normal delivery ( shoulder dystocia)	Yes	13	2	10	6	0	2	0.068
	No	92	45	33	28	14	15	
	I do not know	62	34	22	12	7	3	
Giving birth to a small baby	Yes	32	24	15	10	8	2	0.019
	No	79	32	18	25	10	9	
	I do not know	56	25	32	11	3	9	
Giving birth to a large baby	Yes	35	21	37	14	2	10	0.001
	No	84	42	17	24	16	6	
	I do not know	48	18	11	8	3	4	
Having a baby with structural abnormality	Yes	17	11	20	5	0	7	0.001
	No	95	39	22	24	12	12	
	I do not know	55	31	23	17	9	1	
Having high blood pressure	Yes	56	22	17	12	8	5	0.628
	No	66	32	28	21	10	12	
	I do not know	45	27	20	13	3	3	
Having diabetes in pregnancy.	Yes	56	26	16	14	12	6	0.091
	No	57	30	15	14	5	6	
	I do not know	54	25	34	18	4	8	
Having abortion (marriage).	Yes	32	25	24	13	7	10	0.054
	No	78	39	22	21	8	7	
	I do not know	57	17	19	12	6	3	

In Table 7: which showed significant statistical association between pregnant women’s knowledge toward obesity and GWG with their educational levels, regarding their thoughts only in the option of “Increasing chance of vaginal delivery of the baby” (  $P = 0.001$  ).On other hand, it showed insignificant statistical association with all other options.

In Table 8: It showed significant statistical association between pregnant women’s knowledge toward obesity and GWG with their occupation, related to 2 options of their thoughts:“ Increasing chances of baby dies before delivery (stillbirth)” (  $P = 0.001$  ) and “Having a baby with structural abnormality” (  $P = 0.049$  ) and it showed insignificant statistical association with other factors.

**Table (7):** Relationship between pregnant women’s knowledge toward obesity and GWG and educational level.

Option	Educational level					P. value
	Illiterate	Primary school graduate	Secondary school graduate	Institute + University graduate	Higher	
Vaginal delivery of the baby						
Yes	58	59	66	35	0	0.001
No	3	23	23	7	1	
I do not know	10	40	38	36	1	

**Table (8):** Relationship between pregnant women’s knowledge toward obesity and GWG and occupation.

Options	Occupation			P. value	
	House wife	Student	employed		
Baby dies before delivery	Yes	29	11	11	0.001
	No	127	20	30	
	I do not know	134	5	23	
Having a Having baby with structural abnormality	Yes	37	11	12	0.049
	No	155	16	33	
	I do not know	98	9	29	

\*About the statistical association between pregnant women’s knowledge toward obesity and gestational weight gain with their BMI, regarding their thoughts of weight gain during pregnancy, there were significant about the 2 options only : “Increasing chance of giving a large baby” ( $P = 0.006$ ) and “Having problems with normal delivery” ( $P = 0.040$ ). Contrarily, it showed insignificant statistical association with other options, as shown in Table 9.

**Table (9):** Relationship between pregnant women’s knowledge toward obesity and gestational weight gain and their BMI.

Options	BMI				P. value	
	< 18.5	18.5-24.9	25-29.9	≥30		
Having problems with normal vaginal delivery	Yes	1	21	6	5	0.040
	No	1	97	67	62	
	I do not know	5	67	29	39	
Giving birth to a large baby	Yes	1	54	24	40	0.006
	No	6	76	59	48	
	I do not know	0	55	19	18	

## DISCUSSION

This study was undertaken in the Duhok city, to assess pregnant women’s knowledge toward obesity and GWG, the risks of excess WG in pregnancy, and the best prevention and management of them.

The prevalence of overweight and obese women have increased nowadays (Beyerlein *et al*, 2012). This problem is considered by the WHO as

a major health challenges in the twenty first century. It is important to put maternal weight and BMI into consideration in pre-pregnancy, during pregnancy and after labor, to avoid the complications of obesity (WHO, 2012). The results of this study confirm a lack of pregnant women’s knowledge about guidelines of appropriate GWG and the practical details of dietary guidelines, about (62.5%) of pregnant

didn't know the best amount of weight gain during pregnancy.

**1. Pregnant women's characteristics:** The findings of this study related to the mean and median age of the 400 participants agreed with the results of studies were conducted: in Rafsanjan City, Iran (Ebrahimi *et al*, 2015), in Moroccan (Mochhoury *et al*, 2013), in Australia (Shub *et al*, 2013), in all of them, the median age was (26-35) years. But were not agree with the findings of other studies as in North American by (Jennifer *et al*, 2012), in African American (Webb, 2009), and in Baghdad (Al-Kubaisy *et al*, 2014), which revealed the majority of their samples were from age group (20-30) years. In addition to the reported results by (Bookari *et al* 2016) in Australia, that the majority of their sample were in age group of (30-39 years).

Regarding to gravidity of this sample's study, the primigravida were (41.8%) and multigravida were (58.2%), compared to the studies that were done: in Canada (Gaudet *et al*, 2011), the primiparous was (50%), in Australia (Shub *et al*, 2013), (48.4%) of the women were nulliparous, and in United State (African women) (48%) were nulliparous (Webb *et al*, 2009).

Concerning pregnant women occupation, the highest percentage (72.5%) of participants were housewives. This result was nearby to the results of the studies were done in Erbil city by (Mikha, 2013; Sabir, 2010) which showed (71.4%, 76%) of sample respectively were housewives and to the study was done in Australia (Bookari *et al*, 2016) which revealed that (67.5%) of sample were housewives.

About the level of education, two third of the study sample were from primary and secondary schools graduates

(62.8%), this finding coincided with results of the study done in India by (Sarode, 2010) which showed that the majority of pregnant women were from secondary and primary schools graduated, and was supported by another study conducted in Erbil city by (Mikha, 2013). But was not similar to the results were reported in Australia by (Shub *et al*, 2013) that (51.6%) of the women were a tertiary education and in African American by (Webb, 2009) that (59%) were a college education. The percentage of the illiterate in Duhok was (50.5%) according to (UNICEF, 2012).

**2. Regarding BMI and the perception toward it** : In the present study, pre pregnancy BMI of most

participants (46.3%) was within normal range (18.5-24.9). This result was in agreement with the study was done in Duhok city by (Elias, 2015) which reported that the (51.8%) of the sample were of normal BMI, compared with a rate of (93.8%) in Canada (Gaudet *et al*, 2011) and (66.4%) in Norway reported by (Haugen *et al*, 2014) which disagreed with this study.

The perception of pregnant women about weight and BMI is commonly poor, particularly among overweight and obese women. The inaccurate classification of pregnant women's own weight indicates may not percept how overweight or obese they are to take care of their GWG during pregnancy or for the future pregnancies. In the present study found that (25.5%) of its sample was overweight, and (26.5%) of them had obesity, these findings were going with (44.3%) as overweight or obese reported by (Elias, 2015). On the other hand, (58.8%) of pregnant women in this study believed that they had a healthy weight or normal, compared with a rate of (68.6%) by (Elias, 2015), and (46.6%) of study by (Bookari *et al*, 2016) in Australia. And (32.8%) of the current sample women believed that they were overweight and (4%) accepted themselves as obese, these findings were nearly to (27.1%) which reported by (Elias, 2015), (30%) of study by (Thompson *et al*, 2011) in Australia, and (35%) by (Callaway *et al*, 2009) in Canberra.

The majority of obese women considered themselves to be overweight and those women were the most likely to underestimate their own BMI category, with only (24%) identifying themselves as very overweight (Shub *et al*, 2013). Women who entered pregnancy as being overweight and obese were substantially (12 and 13 times) more likely to report recommended GWG above the IOM recommendations than those who were within the healthy weight range (Bookari *et al*, 2016). Post *et al*. (2011) concluded in their study that awareness of true health risk associated with increased weight was poor in people who underestimate their own weight. In addition, this may lead to a decrease in the desire to seek education on the associated with GWG, and to join in healthy behaviors such as physical activity, to decrease the risk of excess GWG. They concluded in their study, that overweight and obese women who underestimated their BMI had a four times rise in the chance of excess GWG compared with overweight and obese women who correctly percept their own weight.

There was an alarming lack of knowledge regarding GWG guidelines in the current study sample, many pregnant women in this study were unaware of the weight gain during pregnancy; about (62.5%) of pregnant didn't know the best weight gain during pregnancy and (20.3%) believed that the best amount of weight gain during pregnancy is (10-15 Kg.), and (5-10 Kg.) in (14.8%) of them. A New Zealand survey by (Hooker, 2013) found that over two-third of pregnant women (69.4%) incorrectly identified suitable weight gain for pregnancy compared to recommendations (IOM and NRC, 2009). Women's knowledge of the specific risks associated with excess GWG or maternal obesity was poor, also they reported many incorrect beliefs about safe weight management in pregnancy (Shub *et al*, 2013).

The majority of the study sample (86.5%) had knowledge that they should steadily gain weight during pregnancy within healthy limits, and (11.5%) of them believed that it does not matter how much weight will gain. On the other hand, only (2%) believed that the pregnant women should not gain any weight during pregnancy. Compared with (Elias, 2015) who found that nearly (69.5%) of the sample chose the steady gain. (15.5%) of them believed that it does not matter how much they gain, and (15%) believed not to gain any weight during pregnancy. Lack of knowledge about appropriate GWG may arise the problem that if pregnant women do not have or seek access to accurate information about the GWG recommendations or already aware of such information, this may help to explain the high rate of non-compliance with the GWG recommendations (Bookari *et al* 2016).

**3. The Gestational weight gain:** Average weight gain of study population during pregnancy (difference between first and third trimester) was (10.66 Kg.), the group who gained (10- <11Kg.) was the largest one (13%), while the group who gained (2-< 3Kgs) was the smallest one (0.3%). In Iraq, in a study by (Al-Kubaisy, 2014) the weight gain during pregnancy was (12.5 Kg), in Rafsanjan city, Iran (Ebrahimi, 2015) the women gained an average of (12.9 kg.) during pregnancy, and in Viet Nam by (Ota *et al*, 2011), they reported that GWG among their pregnant women was (12.2 kg.). Regarding gestational weight changes, participants gained an average of (15.1 kg) and (64.2%) gained in excess of clinical guidelines in African American confirmed by

(Webb, 2009), in Morocco, the weight gain was (16 kg) ( Mochhoury *et al*, 2013).

**4. The Perceptions about effects of excess weight gain:** The results of current study revealed that the plurality of studied population thought that the excess weight gain during pregnancy do not affect all the outcomes of pregnancy like: 'The need for Caesarean Section in (50%) of the sample , baby dies before delivery in (44.3%) of them etc. Compared with (Elias, 2015) who found that the lowest perception was to the risk of spinal bifida in (46%) of the sample, and the highest perception was to the risk of shoulder dystocia (90%). In Iraq, Al-Kubaisy (2014) reported that the need for Caesarean Section was in 38% of his studied sample compared with (17.1% ) in the study done by (Hooker, 2013) in New Zealand who found also that many pregnant women were conscious of the complications of excess GWG, but the majority were not aware of the extent of risks, as (64%) of them thought that there is a high risk for a small Gestational age (SGA) in obese women, and only (26.5%) identified the risks for shoulder dystocia.

Improving pregnant women's perception about knowledge in the maternal and fetal complications of overweight/obesity and excess GWG during the premarital period and during pregnancy may motivate women to manage and avoid excessive GWG, and increases health outcomes.

**5. The Perceptions about ways that may prevent from gaining an excess weight:** The majority of studied population (91.3%) agreed that the advices about physical activities are the main way that prevent them from gaining excess weight and (41.3%) agreed that using internet for any information about weight during pregnancy may help, while only(1.3%) of them thought that the best way is the attending a class in the ANCs about healthy eating during pregnancy, Findings on the relationship between physical activity and gestational weight gain have been somewhat inconsistent in study by (Ebrahimi, 2015). A systematic review by (Siega-Riz *et al*, 2009) found that women who continued endurance exercise at or near pre-pregnancy stages gained less weight than those who stopped exercise. Being active during pregnancy may help women gain a suitable amount of weigh, and it may make it easier for them to accept the physical changes that go during pregnancy. Additionally, it help women maintain muscular and cardiovascular fitness, reduce the risk of gestational diabetes or

pre-eclampsia, and decrease physical complaints like back pain( IOM, 2009 ; Stuebe *et al*, 2009).

Health professionals play an important role in encouraging healthy women with uncomplicated pregnancies to build physical activity into their daily life, without major risks to themselves or to their unborn child. Sui *et al*, (2013) found in their study that the highest women agreement was with physical activity and health eating as associated with improved health during pregnancy. Also, Mottola, (2009) found that one of the most important methods for preventing complications of excessive GWG is maternal access to physical activity and that is useful to both the mother and fetus. Thangaratinam *et al*, (2012), mentioned the two ways to encourage the women to have a standard BMI, either by typical interventions based on physical activity included light intensity resistance training, weight bearing exercises, and walking for 30 minutes. Or by interventions in the mixed approach included counseling sessions, education concerning the potential benefit of diet and physical activity. Some women might also believe that physical activity during pregnancy is risky; however, physical activity is safe and recommended for most pregnant women and might reduce some pregnancy-related complications.

The IOM in the USA provides guidelines for healthcare providers to use when counseling pregnant women on nutrition and physical activity to promote healthy GWG (IOM and NRC, 2009). Pregnancy was a period where pregnant women seek for more information about healthy dietary and lifestyle. Dietary and lifestyle interventions in pregnancy are effective in reducing GWG without any adverse effect. Compared with physical activity and a mixed approach, dietary-interventions were associated with the greatest reduction in weight gain in pregnancy (Thangaratinam *et al*, 2012).

Strength of the study: it is the first study in Duhok city and Kurdistan Region about the knowledge of pregnant women towards obesity and gestational weight gain guidelines, their perceptions toward complications of excessive GWG and the ways of management and prevention. Limitation of the study, pre-pregnancy weight was based on weights in the prenatal records, it is likely to be underestimated or overestimated. Nevertheless, there was a high correlation between the recorded weights and pre-pregnancy weights as reported by mothers. And

only the urban pregnant women were included in the study.

## CONCLUSIONS

Obesity and excessive GWG are increasing problems in the obstetric population. Lack of knowledge of personal BMI, GWG targets limits and appropriate weight management strategies may limit the ability of women to address these issues successfully during their pregnancy. So supporting the knowledge gap is an important step towards improving the pregnancy outcomes for all pregnant women, especially those who enter pregnancy overweight or obese. The health education programs must conduct for all pregnant women in the ANC units at PHCCs regarding information about overweight/obesity, GWG guidelines and of specific dietary recommendations for pregnancy.

## REFERENCES

- AL-Kubaisy W, AL-Rubaey M, AL-Naggar R, Karim B and Mohd Noor N (2014). Maternal obesity and its relation with the cesarean section. A hospital based cross sectional study. *BioMed Central, BMC pregnancy and child birth*; 14:235. Doi: 10.1186/1471-2393-14-235.
- Beyerlein A, Nehring I, Rzehak P, Heinrich J, Muller MJ, and Plachta-Danielzik S, (2012). Gestational weight gain and body mass index in children results from three German cohort studies.(PLOS). *Public library of Sciences Medicine*; 7(3): 33205. Doi: 10.1371/journal.pone.0033205.
- Bookari K, Yeatman H & Williamson M (2016). Australian pregnant women's awareness of gestational weight gain and dietary guidelines: opportunity for action. *Journal of Pregnancy*; 16 (8):405-19. Doi.org/10.1155/216/8162645.
- Callaway LK, O'Callaghan MJ, McIntyre HD (2009). Barriers to addressing overweight and obesity before conception. *Medical Journal of Australia*; (8): 425-28. Doi.org/10.5694/j.1326-537.2009.tb02876.
- Cochran, Williams G, .Sampling Techniques.1977. Third Edition. 442 Pages. 001.4'222. 77-728.[ Cited by 25609 - Related articles] 1st electronic book, July 2011.
- Dodd JM, Grivell RM, Nguyen AM, Chan A, Robinson JS (2011). Maternal and perinatal health outcomes by body mass index category *Australian and New Zealand Journal of*

- Obstetrics and Gynaecology*;51(2):136-40.Doi: 10.1111/j.1479-828X.2010.01272.
- Downs DS, Savage JS, and Rauff EL, (2014). Falling short of guidelines? Nutrition and weight gain knowledge in pregnancy. *Journal of Women's Health Care*; 3 : article 184. Doi: 10.4172/2167-0420.1000184.
- Ebrahimi F, MohdShariff ZM, Tabatabaei SZ, Fathollahi MS, Mun Cy, and Nazari M, (2015).Relationship between Sociodemographics, Dietary Intake, and Physical Activity with Gestational Weight Gain among Pregnant Women in Rafsanjan City, Iran ;*Journal Health population Nutrition* ; 33(1): 168–76. PMC4438660.
- Elias FS, (2015). Premarital women's perception of overweight/obesity and gestational weight gain. MSc. thesis, Duhok University, Duhok 39-40.
- Flegal KM, Carroll MD, Kit BK, Ogden CL (2012). Prevalence of obesity and trends in the distribution of body mass index among US adults,1999 -2010. *JAMA/ Journal American Medical Association*; 307(5):491-7. Doi:10.1001/jama.2012.39.
- Gaudet LM , Gruslin A and Magee LA (2011) .Weight in pregnancy and its implications: what women report. *Journal of Obstetrics and Gynaecology Canada*; 33 (3):227-34. Doi.org/10.1016/S1701-2163 (16)34823-X.
- Haugen M, Brantsaeter AL, Winkvist A, Lissner L, Alexander J, Oftedal B, *et al* (2014). Associations of -pre-pregnancy body mass index and gestational weight gain with pregnancy outcome and postpartum weight retention: a prospective observational cohort study .*BMC/Bio Med Central pregnancy & childbirth*; 14:201. Doi: 10.1186/1471-2393-14-201.
- Hedderson MM, Gunderson EP, Ferrara A (2010).Gestational weight gain and risk of gestational diabetes mellitus. *Obstetrics and Gynecology* ; 115 (3):597–604. Doi: 10.1097/AOG.0b013e3181cfce4f.
- Hooker EM (2013). Women's knowledge and perceptions of the risks of excess weight in pregnancy. MSc thesis. Dunedin, New Zealand: University of Otago.
- IOM- Institute of Medicine and (NRC) National Research Council (2009).*Weight Gain during Pregnancy: Reexamining the Guidelines*. Washington, DC, USA: The National Academies Press. (accessed on February 2012).
- Jennifer B, Webb 1, Anna M, Siega-Riz 2, 3 ,4 and Nancy Dole 4 (2012). North American Association for the Study of Obesity (NAASO); 17(2):300–9.
- Margerison Zilko, C. E., Rehkopf, D. Abrams, B. (2010). Association of maternal gestational weight gain with short- and long-term maternal and child health outcomes. *AMJ. American Journal of Obstetrics and Gynaecology* ; 202 (6) : 574.e1-8.
- McDonald SD, Han Z, Beyene J,Mulla S, Knowledge Synthesis group (2010) .Overweight and obesity in mothers and risk of preterm birth and low birth weight infants: systematic Review and meta analysis. *BMJ. British Medical Journal* ; 341: 3428. doi:10.1136/bmj.c3428.
- Mcphe S, Skouteris H , Hill B, and Hayden M (2015).Understanding gestational weight gain: the role of weight-related expectations and knowledge; *Australian and New Zealand Journal of Obstetrics and Gynaecology*.55 (1): 21–6. doi: 10.1111/ajo.12265.
- Mikha R (2013).Risk factors among pregnant women attending primary health care centers in Erbil city.*M.Sc.Thesis*:52-53.
- Mochhouryb L , Razine R ,Kasouati J , Kabiri M and Barkat A , (2013). Body Mass Index, Gestational Weight Gain and Obstetric Complication in Moroccan Population. *Journal of pregnancy*; ID 379461: 6 pages. Doi.org/10.1155/2013/37946.
- Mottola, M. F. (2009) . Exercise prescription for overweight and obese women. *Pregnancy and postpartum. Obstet Gynecol Clin North Am*; 36 (2) :301-16.
- National Audit Office (NAO) (Press Feb. 2001).*Tackling obesity in England*. Stationery Office. ISBN: 0102814015. Progress in making as efficiency savings/ NHS (Dec.2012).
- National Health and Medical Research Council(NHMRC) (Mar.2013).*Eat for Health:Healthy Eating during Pregnancy or Breastfeeding*. Canberra, Australia: Commonwealth of Australia.
- Ota E, Haruna M, Suzuki M, Anh DD, Thole H, Tam NT, *et al* (2011).Maternal body mass index and gestational weight gain their association with perinatal outcomes in Viet Nam. *Bull World Health Organ*; 89 (2):127–36.
- Post R, Arch G,Seth H,Michele E,VanessaA,Sonia(2011).The influence of physician acknowledgment of patientsweight status on patient perceptions of overweight and obesity in the United States. *Arch Intern Med* ; 171(4); 316-21.

- Ramachendran J, Bradford J, McLean M (2008). Maternal obesity and pregnancy complications: a review. *Australian and New Zealand Journal of Obstetrics and Gynaecology*; 48 (3):228-35. doi: 10.1111/j.1479-828X.2008.00860.
- Sabir J.M (2010). Women s' satisfaction about MCH care services provided to pregnant attends antenatal care unit in Erbil city. *Zanco Journal of medical sciences*; 14(1):16-21.
- Sarode VM (2010). Does illiteracy influence pregnancy among women in the slums of greater Mumbai? *International Journal of sociology and Anthropology*. [cited 2012 November 8], 2 (5): 82-94.
- Shub A, Huning EY, Campbell KJ ,McCarthy EA,(2013).Pregnant women's knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BioMed Central Research Notes*;6: 278. doi.org/10.1186/1756-0500-6-278.
- Siega-Riz AM, Viswanathan M, Moos MK, Deierlein A,Mumford S, Knaack J, et l (2009). A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birth weight, fetal growth, and postpartum weight retention; *AJOG/American Journal of Obstetrics Gynecology*:201(4):339,1–14.
- Stuebe AM, Oken E, Gillman MW (2009). Associations of diet and physical activity during pregnancy with risk for excessive gestational weight gain.(*AMJ ) American Medical Journal. Obstetrics and Gynecology*; 201(1):58.e1-58.e8. Doi: 10.1016/j.ajog.2009.02.025.
- Sui Z, Turnbull DA and Dodd JM (2013).Overweight and obese women's perceptions about making health change during pregnancy: A mixed method study. *Maternal child Health J*, 17(10):1879-1887. Doi: 10.1007/s10995-012-1211-8.
- Thangaratinam S, Jolly K (2010). Obesity in pregnancy: a review of reviews on the effectiveness of interventions. *British International Journal of Obstetrics and Gynecology*; 117 (11):1309-1Doi.org/10.1111/j.14710528.2010.02670.
- Thangaratinam S., Rogozińska E., Jolly K., et al (2012). Effects of interventions in pregnancy on maternal weight and obstetric outcomes: *Meta-analysis of randomized evidence*; 344. Doi: 10.1136/bmj.e2088.e2088.
- Thompson MW, Nassar N, Robertson M, Shand AW (2011). Pregnant women's knowledge of obesity and ideal weight gain in pregnancy, and health behaviours of pregnant women and their partners. *Australian and New Zealand Journal of Obstetrics and Gynaecology* ;51: 460–3. Doi: 10.1111/j.1479-828X.2011.01328.x.
- UNICEF (2012).Iraq Multiple Indicator Cluster Survey 4(MICS 4), 2011.Baghdad, Iraq: United Nation Children's Fund.
- Webb JB, Siega-Riz AM , and Dole N (2009). Psychosocial determinants of adequacy of gestational weight gain. *Obesity (sliver spring)* ;] 17(2) :300-9. Doi:10.1038/oby.2008.490.
- WHO (2012).Obesity and overweight. Fact sheet number 311.WHO, Global Database on Body Mass Index: BMI Classification, World Health Organization, Geneva, Switzerland.

## زانباریت ئا فره تیت دوو کیان ل هه مبه ری قه له وی و زیده بونا کیشی ل ده می دوو زیانیدا ل بازیرا دهوکی

پوخته

تیشه کی و ئارمانج : به ربه لافبونا کیشا زیده و قه له وی ل نک ئا فره تیت دوو کیان و زنان ل ته مه نئ  
زاوژی جهی دوو دلیه کا زیده بو ته ندورستی کشتی ل وه لاتین که شسه ندنا پیشکه فتی .وزبره نکه کی کشتی  
کیما سیه ک ل زه کولینیت به لافگری ل ئاستی زانباری بو ئا فره تا دوو زیان هه یه , لدور کیشا زیده و قه له  
وی یان ریکیت لی کرتنی . ئامانج ز فی خاندنی هه لسه نکاندنا زانباریا ئا فره تیت دوو کیان لدور قه له  
وی و کیشا زیده لده می دوو کیانی , زیده باری پیزانینیت وان ل دور خو ژئ دور ئیخستنئ و سه ره ده ریئ  
د که ل دا.

ریکیت فه کولینئ : بریکا خاندنه کا سالوخه تی و که رتی بو 400 ئا فره ت دوو کیان یت کو ئاماده ه بوی ل یه  
کا ( جافد پریا دایکا دوو کیان ) ل هه شت زبنکه هیئ جافدیریا ته ندورستی یا دهستیکی ل بازیری دهوک  
هاته کرن لده می کومکرنا داتا هه ر روزا ئیکه م ل هه یف ئاب تا کو بیستنئ هه یف جریا ئیکه م لسا 2016  
بریکا جافیکیه فتنا ئیکسه ر دکه ل دا و پرکرنا فورما پیزانینا بو وه رکرنا زانباریا لدور بابه تی قه له وی  
و کیشا زیده و ئه نجامیت پیدا بوی لده می دوو کیان یئ و جه وان یا خو زی پاراستنی .

ئه نجام : بینجی و دوو زسه دی ز پشکه دارا ل خاندنی توشی کیشا زیده یان قه له وی بون . جل و شه ش  
بوینت سی زسه دی کیش ل له شی وان دسنورئ سروشتی بون , جوداهی ل زیده بونا کیشی دناف به را سی  
یکا ئیکه م و سی یکا دوماهیکه م (10.7 کغم) بو . ونیزیکی شیست زسه دی ز ئا فره تیت دوو کیان دوی  
هزریدانه که کیشا وان نمونه یی یه و دناف سنورئ سروشتی دا نه بو پیکه را فه بارا جه سته ی و دیار بو  
که نوت و دوو زسه دی ل ئا فره تیت دوو کیان هزرده که ن بکارئینانا فالاکیا و پیفیری ب شیره تا لدور  
بزا فیتجه سته یی \ ئه وه ریکا سه ره کی یاکو وان دور دئخن ز کیشا زیده .

ده رئه نجام : زوربه ی ئا فره تیت دوو کیان پیزانینه کا کیم ز جه ندیا کیشا ری پیدای لده می دوو کیانی و ئه  
نجامیت وی و ریکیت خو پاراستنی هه یه , هوشیاریا راکه هاندنی و ریخستننا به رنامیت تایبه ت و کوربه  
ندا و به شداریا پسپوریت جافدیریا ته ندورستی ز کاریت کرنک دهینه هژمارتن ل باشکرنا ئاستی زانباری ل  
نک ئا فره تا دوو کیان لدور قه له وی و کیشا زیه و زبو خو پاراستنی و خورزکارکن ز ئه نجامیت وی

## معلومات و مفاهيم النساء الحوامل في ما يخص السمنة و زيادة الوزن المكتسب أثناء فترة الحمل في مدينة دهوك

### الخلاصة

الخلفية والاهداف: أن أنتشار زيادة الوزن والبدانة بين النساء الحوامل والنساء أثناء سن الإنجاب يعتبر مصدر قلق متزايد للصحة العامة في البلدان المتقدمة النمو. وبصورة عامة هناك نقص في الأبحاث المنشورة حول مستوى المعرفة للمرأة الحامل فيما يخص زيادة الوزن والسمنة او طرق منعها . تهدف هذه الدراسة تقييم معرفة النساء الحوامل في ما يخص السمنة وزيادة الوزن اثناء فترة الحمل ، بالاضافة الى معلوماتهم حول تجنبها والتعامل معها .

طرق البحث:عبر دراسة وصفية مقطعية أجريت بين 400 من النساء الحوامل اللواتي حضرن وحدة "العناية بالام الحامل " في ثمانية من مراكز الرعاية الصحية الأولية في مدينة دهوك, في وقت جمع البيانات من الاول من شهر آب لغاية العشرين من شهر تشرين الاول لسنة 2016, من خلال مقابلة مباشرة معهم وملئ استمارة استبيان للحصول على معلوماتهم حول موضوع السمنة وزيادة الوزن والمضاعفات الناتجة عن حصوله اثناء الحمل وكيفية الوقاية منها..

النتائج: اثنان وخمسون بالمئة من المشاركين في الدراسة كانوا يعانون من زيادة الوزن أو السمنة, وأن ( 46.3 % ) منهن كانت قياس كتلة الجسم لديهم ضمن الحدود الطبيعية , ولكن (58.8 %) منهن يعتقدن بأن وزنهن هو ضمن الحدود الطبيعية وليس لديهن أية سمنة . الفرق في زيادة الوزن بين الثلث الأول والثلث الاخير من الحمل هو ( 10.7 كغم). وأتضح أن ( 91.3 %) منهن يعتقدن أن ممارسة الفعاليات الرياضية واتباع النصائح في ما يتعلق بالأنشطة البدنية هي الطريقة الرئيسية التي تمنعهم من الوزن الزائد. الاستنتاجات: معظم النساء الحوامل كانت لديهم معرفة قليلة حول مقدار زيادة الوزن المسموح بها اثناء الحمل ومضاعفاته وطرق تفاديه,تعتبر التوعية الاعلامية وتنظيم برامج خاصة واجراء الندوات و مساهمة أخصائيي الرعاية الصحية في تحسين مستوى المعرفة لدى المرأة الحامل فيما يخص السمنة وزيادة الوزن من الامور المهمة لتجنب حدوثها والتخلص من مضاعفاتها.