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Weight gain pattern among pregnant women, associated factors, maternal and fetal outcomes in Nablus district

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Dedication

I would like to express my love and gratitude to my family and my husband for their support and to my endless love my little son.

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I would like also to thank An- Najah National University, and our faculty of graduate studies and the coordinator for the public health program .And my great thanks to my supervisor Dr. Mariam AlTell and Dr. Nihal Al-Natour for their assistance and guidance with this study.

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الاقرار

انا الموقعة ادناه مقدمة الرسالة التي تحمل العنوان:

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Declaration

The work provided in this thesis, unless otherwise referenced, is theresearcher's own work, and has not been submitted elsewhere for any otherdegree of qualification.

Student name: **اسم الطالبة**

Signature: **التوقيع**

Date: **التاريخ**

List of Content

List of Tables

List of Figure

List of Abbreviation

ANC	**Antenatal clinic**
A\S	**Apgar score**
BF	**Breast feeding**
BMI	**Body mass index**
CS	**Cesarean section**
GWG	**Gestational weight gain**
IGWG	**Inadequate gestational weight gain**
IOM	**Institution of medicine**
IOL	**Induction of labor**
IUGR	**Intrauterine growth restriction**
LGA	**large for gestational age**
LBW	**Low birth weight**
MOH	**Ministry of health**
NICU	**Neonatal intensive care unit**
PTL	**Preterm labor**
PPH	**Post-partum hemorrhage**
PIH	**Pregnancy induced hypertension**
SGA	**Small for gestational age**
UNRWA	**United nation refugee work agency**
WHO	**World health organization**

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Abstract

The gestational period determines the quality of human life and depends on the intra uterine condition. Healthy pregnant women with good nutritional status certainly improves the outcome of baby,During pregnancy period gaining weight is both required and expected in such critical period, weight gain occurred as a consequence for the rapid physiological changes.

The aim of the study: The study aimed at identifying the patterns of GWG among pregnant women in Nablus district, to determine the related associated factors and to find out maternal and fetal outcomes during the study period.

Method: A quantitative, cross sectional study approach was adopted to conduct the Study from MOH antenatal clinics in Nablus city. The sample consisted of (387) pregnant women, who were selected through random sampling.

Results: result showed that (43.7%) of pregnant women participate in the study gain IGWG , (36.1%) were with AGWG and (20.3%) were classified with EGWG,there were a significant relationship between BMI and total GWG (P-value 0.00)and women attitude regard how to eat (P-value

0.003),in addition to that women with IGWG were 1.7 times to have labor and postpartum complications (OR=1.658) ,occurrence of GDM ,PIH and pre-eclampsia were higher among women with EGWG .

Conclusion and recommendations: women pre pregnancy BMI, attitude regard how to eat affect women GWG which affect maternal and fetal complications, recommended weight assessment tool in MOH ANC may affect GWG and reduce the complications in addition to that empower the role of health care providers in ANC regard counseling, education and referral and provide educational classes about GWG will enhance the reproductive health in Palestine.

Chapter one
Introduction

1.1 Introduction

The gestational period determines the quality of human life and depends on the intra uterine condition. Healthy pregnant women with good nutritional status certainly improve the outcome of baby (Lumbanraja et al, 2013).

During pregnancy period gaining weight is both required and expected in such critical period, weight gain occurred as a consequence for the rapid physiological changes. The predominant components of gestational weight gain (GWG) are total body water, fat, placenta, fetus and amniotic fluid (IOM, 2009).

Pregnant women constitute an important subpopulation due to the elevated risk of obesity and overweight as a result of excessive gestational weight gain (EGWG) (Siega et al, 2009)

In 2018, according to the world health organization (WHO) the prevalence of obesity and overweight among women at reproductive age due to high pre pregnancy body mass index (BMI) and EGWGranged between 1.8 % and 25.3 % (WHO,2018).

In 1990 the institution of medicine (IOM) in United State of America (USA), developed new guideline regard weight gain during pregnancy period with primary goal of improving maternal and fetal \newborn

outcomes. The IOM new recommendations based mainly on the WHO BMI categorization and according to that the recommended weight gain ranges were: (28 -40) pounds for underweight women, (25-35) pounds for women with normal weight, (15-25) pounds for overweight women, while those classified as obese women gained at least (15) pounds during their pregnancy (IOM,2009).

Unfortunately some women vied that they have to increase the amount of food during pregnancy to have healthy baby and to maintain their health ignoring such evidence from both mothers and health care team in antenatal clinics (ANC) may lead to unhealthy weight gain which cause both maternal and fetal complications(Kavle et al, 2014).

EGWG increased the risk for gestational diabetes(GDM),hypertensive diseases, preterm labor(PTL), induction of labor (IOL), difficult birth and birth complications, increase in cesarean Birth (CS), postpartum hemorrhage (PPH), thromboembolism, breastfeeding problems, depression (Poston et al,2016, WHO,2018). in addition to that, fetal complication increased with the increased of gestational weight gain suchasprematurity, stillbirth, congenital anomalies, macrosomia, and childhood obesity(Stüber Et Al ,2015). While those who were with inadequate Gain Weight (IGWG) below the recommended guideline, were more risk for PTL, breastfeeding problem, deliversmall for gestational age babies (SGA) and admission to neonatal intensive care unit (NICU) (Schuster et al,2016).

1.2 Back ground

There is growing evidence that pregnancy is a critical time to establish lifelong health for the mother and her offspring (Beaglehole et al 2011) , the minimal amount of weight gain is essential to provide the nutritional support for fetal growth and the deposition of maternal energy as a preparing step for delivery ,post-partum period and lactation period (Despres ,2006) .

And according to the IOM weightgain guideline between 1990 and 2009 define GWG as the total amount of weight gained in pregnancy period from date of conception to the time of delivery is variable among pregnant women (Warsh, 2011, IOM 2009, IOM 1990).

Physiological and anatomical changes that occur during pregnancy period play main role in weight gain process , which is considered necessary for development of the fetus and prepare the mother for labor , post partum period (Priya et al ,2016) ,GWG is comprised mainly of the accretion of water ,protein (fat –free mass) and fat (fat mass)in the fetus as well as the placenta ,uterus ,amniotic fluid ,expansion of blood maternal volume ,mammary gland and maternal adipose tissue which can be both deposited into visceral (central) and in subcutaneous (peripheral) adipose tissue (Larciprete et al ,2003)

The recommended weight gain is distributed on the pregnancy components at term as per table (1) (Tse and Macones et al, 2009)

Table 1 - Typical components of pregnancy weight gained at term

Constituents	Weight gain –Kilos
Fetus	3.2-3.6
Placenta	.7
Amniotic fluid	.9
Fat stores	2.7-3.6
Increased blood volume	1.3-1.8
Increased fluid volume	.9 -1.3
Breast engorgement	.9 -1.3
Uterine hypertrophy	.9

1.2.1 Historical over review of IOM recommendations

Nowadays recommendation regarding GWG was changed dramatically, the beginning was in the world 1st war, when the health care providers advised women to limit their weight gain to less than 15 Ibs due to the declining in the food supply because of war, as a result to such limitation the incidence of preeclampsia was decreased with decrease weight gain (Warsh,2011).

In the 1971 Hyten and Leitch, published a review of studies from 1950s to 1960s , the report concluded that healthy pregnancy outcomes in terms of birth weight ,infant survival and incidence of preeclampsia ,was observed among those pregnant women with total gestational weight gain was 27.5 Ibs , the result was without any consideration to women pre pregnancy weight variation (Hytten et al ,1971) .

In 1972, The National Academy of Sciences Food and Nutrition Boards Committee on Maternal Nutrition and the American College of Obstetrics and Gynecology (ACOG) recommended that weight gain should be ranged from 20-25 Ibs (9.1-11.3 Kg) without regard to pre pregnancy

BMI (Scotland et al, 2010). In the 1980s ,the recommended weight gain doubled and women advised to gain 25-30Ibs (11-14 Kg) ,while by 1990 more individualized recommendation were given to pregnant women based on the women pre pregnancy weight , the new recommendations has good and healthy outcome on both mothers and fetus ,according to that the committee of the National Academy of Science with IOM made the new recommendations for weight gain based on WHO pre pregnancy BMI categorization (Olds et al ,2004).

In 2009, prevalence of overweight and obesity among women in reproductive age increasedworldwide, as a result, the previous recommendation were reconvened and revised. The IOM has developed a strong quality guideline that is referred to internationally, which provides guidance on the optimal amount and rate of weight gain during pregnancy, according to the women pre pregnancy BMI, the guideline intended for use by health care providers, local agencies, medical and public health organization as well as private voluntary agencies (IOM, 2009).

The 2009 guideline were revised to include the four classifications of pre conception BMI which based on WHO definitions ; underweight ,normal (ideal) weight ,overweight and obese and it provides weight gain recommendations as both total GWG with the rate of weight gain per week of gestation in table 2 (IOM & NRC, 2009)

Table 2 - IOM recommendation for weight gain during pregnancy (IOM & NRC, 2009).

Category	BMI	Weekly gain Ibs per week (range)	Weekly gain Gram per week (range)	Total weight gain Range
Under weight	<18.5	1 (1-1.3)	453 g (453 -589)	28-40 Ibs 12.5 -18kg
Ideal weight	18.5- 24.9	1 (.8 -1)	453g (362 -453)	25 -30 Ibs 11.5-16 kg
Over weight	25-29.9	.6 (.5 -.7)	276 g (226 -317)	15-25 Ibs 7-11.5 kg
Obese class 1,2 and 3	>30	.5 (.4 -.6)	226 g (181 -272)	11-20 Ibs 5-9 kg

Special populations were consider in the IOM recommendations with specific recommendation even though the committee was unable to identify sufficient evidence to support the guideline, the special populations were:

First

Short statures women whose height less than (157) cm are recommended to gain the lower end of the range that were recommended for pregnant women according to the pre pregnancy BMI.(IOM & NRC, 2009).

Second

Adolescent pregnant women: it is well known that adolescent pregnancy is complicated by the increased opportunity for complications for both mothers and birth outcomes (DeVader et al, 2007), in 1990 the IOM committee determined that pre pregnancy BMI could be adequately categorized in adolescent by using the WHO cutoff points for adult, and

those adolescent who follow the adult BMI cutoff will be likely be categorized in thin group and will be advised to gain more in pregnancy.

Third

Racial and ethnic groups, the committee concluded that the GWG recommendations should be applicable to the various racial and ethnic subgroups (IOM & NRC, 2009).

Forth

Women with multiple fetuses, data suggest that the weight gain for women with twins or multiple fetuses varies according to women pre pregnancy BMI, the same for those women with singleton fetus ,the committee offer the following guideline for weight gain which excluded for underweight women because of the insufficient evidence and information , for normal weight women should gain (17-25) Kg ,overweight women (14-23) kg while obese women (11-19) kg (Kathleen et al ,2009).

As a result for the IOM recommendations, GWG could be either within the recommendation, less than or more than what were recommended to gain during pregnancy, which result in IGWG which define as gain less than the lower limit of recommended and EGWG which mean to gain weight that exceeded the top limit of recommended GWG for the women pre pregnancy BMI (Salma et al, 2013). Pre pregnancy BMI is associated with both IGWG and EGWG, women who are overweight prior

to pregnancy more likely to report EGWG while those who are underweight are more likely to report IGWG (Jessica A, 2012).

United kingdom's National institute for health and clinical Excellence (NICE) suggested that beginning pregnancy with a healthy BMI, receiving counseling regard healthy lifestyle and encouraging loosing returned weight post-delivery affecting GWG (NICE ,2010).

Policies for preconception weight gain were reported in 22 countries, 42 % of them recommended achieving a healthy weight before beginning pregnancy, and seven national policies 13% reported guidelines for measuring or counseling on postpartum weight, while only four countries reported policy with guidelines aimed at promoting healthy weight before, during and after pregnancy (Villamor et al ,2006)

Table 3. The recommended gestational weight gains guidelines among different countries (Villamor et al, 2006)

Recommendations by pre pregnancy BMI category

Country	<18.5kg \m^2	18.5 – 24.9kg\m ^2	25-29.9kg\m ^2	30-34.9kg\m^2	35-39.9kg\ m^2	>40kg\m^2
USA	12.5 - 18	11.5-16	7-11.5	5-9	5-9	5-9
Bulgaria	12-18	11-16	7-11	5-9	5-8	5-8
Ghana	12.5-18	11.5-16	7-11.5	5-10	5-10	5-10
Italy	12.5-18	11.5-16	7-11.5	5-10	5-10	5-10
Canada	12.5-18	11.5-16	7-11.5	5-10	5-10	5-10
Nicaragua	12.7-18.1	11.3-15.9	6.8-11.3	5-9.1	None given	Non given
Denmark	13.18	10-15	8-10	6-9	6-9	6-9
Poland	12.5-18	11.4-15.9	6.5-11.4	7(upper limit)	7(upper limit)	7(upper limit)
Romaine	12.5-18	11.5-16	7-11.5	7-11.5	7-11.5	7-11.5
Switzerland	12.5-18	11.5-16	7-11.5	7(upper limit)	7(upper limit)	7(upper limit)

Brazil	12.5-18	11.5-16	7-11.5	7 (no range)	7 (no range)	7 (no range)
Paraguay	12.5-18	11.5-14	7-11.5	6-8	None given	None given
Iran	12.-18	9-14	7-11.5	6(no range)	6(no range)	6(no range)
China	14-15	12(no range	7-8	7-8	7-8	7-8
Croatia	14(upper limit)	12(upper limit)	10(upper limit)	8(lower limit)	6(lower limit)	4 (lower limit)
Cuba	9.45-17	8.6-15.9	7.5-14	5.4-12.9	5.4-12.9	5.4 -12.9

Recommendations by BMI at a specific gestational age chart

Argentina Guatemala	**Honduras Chile Ecuador Peru Uruguay Bolivia**
Other recommendations not based on body size	
Burma 1 kg per month from month 5 of gestation to term	**France Average gain around 12 kg**
India 10 - 12 kg	**Oman Client materials recommend gaining 9–15 kg**
Vietnam 9 - 12 kg	**South Africa Formal recommendation that women should not be given a guideline for weight gain in pregnancy**

1.2.2 Nutritional requirement during pregnancy

It is well known that energy requirements during pregnancy period increase above the level of preconception level by nearly 200,300 and 400 Kcal in the first, second and third trimester of pregnancy respectively (Butte et al 2004, Thomas et al 2012), on other hand energy intake during this period is consider one of the determinants for GWG during pregnancy period but the reported relationship is weak.

A study conducted by Gilmore et al., to support a healthy weight gain within the IOM guidelines, their calculations recommended an extra intake of 129 kcal/day during the first trimester, an additional 249 kcal/day

during the second trimester and an additional 108 kcal/day during the third trimester .They also found that weight gain above IOM's guidelines was due to an increased energy intake among the women in their study, rather than reduced or maintained energy expenditure(Gilmore et al.2016).

In order to obtain appropriate weight during conception women have to consume 4 serving of fruits ,5-6 servings of vegetables ,1.5 servings of meat product and 4-6 servings of cereal and grain products according to the Australian adults dietary guideline (NHMRC ,2003) , the type and the amount of food consumed as well as the frequency and regularity of eating meals is associated with effects on both mother and birth outcomes(Olafsdottir et al ,2006).

WHO and IOM recommended that the pregnant women to obtain a healthy weight gain need an essential nutrient, and need to consume 2-4 serving of protein daily ,54-85 g/day of fat ,240-360g/week from omega 3 .27 mg /day from iron ,80mg /day from vitamin C ,600 mcg of folic acid in 1st trimester ,1000mcg /day of calcium and 2-3 serving of caffeine <300mg /day, (WHO, IOM .2006)

1.2.3 Factors affecting GWG

The weight gain during pregnancy is influenced by several complex factors such as maternal behavioral, physiological, sociodemographic, and genetic factor (IOM, 2009). IGWG less than recommended associated with maternal characteristics such as : low family income ,women from black race ,young age women and those with low educational level ,while

EGWG were associated with cultural beliefs which contribute to GWG through different ideas regarding body shape during pregnancy (Gray et al ,2000) , in addition to that young age women ,black or Hispanic women (Gunderson EP et al ,2000) , In (1999) ,researcher indicated that women with low number of supportive individual consider as risk factor for EGWG (Harris et al ,1999).

From those demographic factors that may help to identify women predisposed to unhealthy GWG, nulliparous women who are more likely to exceed GWG recommendations compared with those women have had at least one child are more likely for IGWG (Brawarsky et al ,2005).

As for maternal age, women (≥ 30) years of age were more likely to gain less weight during pregnancy than younger women (Prysak et al ,1995), Perry et al. and Chu et al. both found that gaining excessively decreased with age (Perry et al 1995. and Chu et al 2009).

By looking to the educational level, the relationship with GWG still not clear, but women who did not complete high school were more likely to report IGWG (Olson, Strawderman,2003)and higher educational achievement was associated with greater adherence to the GWG guidelines (Di Pietro ,2003).

In the study conducted among Swedish women with a normal pre-pregnancy BMI, education was protective against gaining excessively during both first and second pregnancies (Holowko et al, 2015).

Psychological characteristics, including depression, stress and social support, could be important predictors of GWG but the relationship still need to be clarified (Webb et al, 2008).

Body image affecting weight gain pattern among pregnant women, that were observed with the negative body image and disordered eating are frequently observed during pregnancy (Skouteris et al ,2005) and some studies have indicated that this type of psychological distress is associated with poorer GWG and health consequences (Swann et al ,2009 and Mumford et al ,2008).

In addition to that physical activity also play role on weight gain pattern during pregnancy for that reason the federal guidelines recommend that pregnant women who are not already highly active or doing vigorous intensity activity should get at least 150 minutes of moderate intensity aerobic activity a week during pregnancy , despite the known safety of physical activity for most pregnant women and benefits for both fetus and mother (Michael et al ,2012) .Hegaard in 2007 ,found that exercise during pregnancy were associated with reduced risk of developing GDM and preeclampsia (Hegaard et al 2007).

The association between GWG and smoking still not clear ,early studies examining the association between decreasing GWG and the amount of reported smoking show inclusive result .Rush ,1974 found a strong relationship between amount of smoking and decreasing GWG, while Gran et al . 1979 found no association between smoking and non-smoking mothers and GWG, Haworth et al. 1980 found that women who smoked during pregnancy actually had higher mean caloric intakes with no difference in GWG; but a greater number of low birth weight (LBW) infants than nonsmokers. Similarly, Papoz et al. (1982) found higher mean caloric intake and lower birth weight in women who smoked during pregnancy. More recently, Furuno et al. (2004) found no significant difference in mean GWG between smoking and nonsmoking mothers but did find a slightly increased (1.3-fold) risk for low GWG among smokers.

1.2.4 GWG and maternal, fetal outcomes

Weight gain during pregnancy is associated with maternal, birth and infant health outcomes, gaining weight within the IOM recommended range is associated with improved maternal and neonatal outcomes compared to gain lower or higher than these recommended level (Oken et al, 2009), as for the mother gaining weight in excess to the IOM recommendations increase the risk for GDM (defined as glucose intolerance with onset during the second or third trimester), (Gilmartin et al, 2008).6

Those women with EGWG were more likely experience induction to labor (IOL),gestational hypertension and/or preeclampsia (defined as a persistent high blood pressure(BP) and protein in the urine developed during pregnancy) (Ruhstaller et al, 2016), (Doherty et al 2006).

Moreover, the rate of C.S delivery is more frequent in those women with EGWG (Rode et al, 2005). In a Canadian cohort study by Abenhaim, Kinch, Morin, Benjamin, and Usher, (2007), women with a BMI more than 25 kg/m2 were found to have shorter labor duration than those with a BMI less than 25 kg/m2. On the contrary, in a study of nulliparous women, cervical dilatation pace was inversely connected with maternal weight: the rate of dilatation decreased by 0.04 cm/hour for every 10 kg increase in weight. Likewise, the duration of labor was positively linked with maternal weight (Nuthalapaty et al., 2004).

Anesthesia management is another concern for obese women undergoing C.S. For instance, a Canadian study done on 140,000 pregnant women suggested a significant raise in anesthesia complications in women weighing over 120kg (Arendas et al., 2008).other complication that have been noted in the prenatal period was increased risk for postpartum hemorrhage (PPH)(Abenhaim et al ,2007).

In relation to effects on the child, EGWG has been found to be positively associated with increased birth weight (Siega-Riz et al ,2009) and/or being born large-for-gestational age (LGA) (>90th percentile for that gestational age) (Oken et al ,2009) as well as with more long-term

effects such as child and adult overweight and obesity (Schack-Nielsen et al .2010).Other neonatal outcomes were admission to neonatal intensive care units (NICU) however studies indicated that those infants born to women with EGWG were more likely need admission to NICU rather than other infants (Yogev et al ,2005) in addition to macrosomia, hyperbilirubinemia and hyperglycemia (Oken et al ,2009)

Comparing breastfeeding (BF) initiation between pregnant women who gain within the IOM recommendation and those with EGWG ,Morin and Reilly in(2007) ,found that those with EGWG are more likely to expressed poor BF and for short time post-delivery and that may had several explanations first ,it had been reported that EGWG may influence the delayed onset of lactogenesis ,also they experience less satisfaction with their appearance and their decision to not give BF any more (Morin et al ,2007).IGWG connected with fetal growth restriction, low birth weight (Razak et al, 2013) also SGA, LBW and preterm delivery (Chasan et al, 2008)

1.3 Problem statement

Pregnancy is a vulnerable stage for many women for various reasons, like changes that occur in her body shape due to weight gain during her pregnancy periods which may affect the body image to her, in addition, to that changes that occur in the dietary pattern. Numerous studies were conducted in different countries about GWG which explain the pattern of

GWG, factors and both maternal and neonatal outcomes from this point, it was worthy to study the weight gain pattern and effects,

There is no studies conducted in Palestine about GWG in addition to that there is no policy in MOH regard GWG policy and as noticed during my work experience as a midwife ,health care provider ignore weight gain in the care that provided to pregnant women .

1.4 Significance of study

This study can be utilized by health care practitioners to aid in examining the pattern of GWG and the necessary to follow the IOM recommendations as a guide to prevent maternal and neonatal adverse outcomes.

Thus the result of this study might assist the Palestinian ministry of health to modify policy regard weight gain which can be used by health care professionals in ANC clinics by both MOH and UNRWA clinics, which will ensure a holistic care provided to pregnant women.

1.5Aim of the study

The study aimed at identifying the patterns of GWG among pregnant women in Nablus district, to determine the related associated factors in addition to maternal and fetal outcomes during the study period.

1.6 Objectives of the study of this research were to

1. To determine the prevalence of obesity and overweight among pregnant women in Nablus district during the study period.
2. To determine the pattern of GWG among pregnant women.
3. To assess the associated factors that affects the GWG pattern.
4. To assess the effects of GWG on maternal outcomes.
5. To assess the effects of GWG on fetal outcomes.

1.7 Research questions

1. What is the prevalence of obesity and overweight among pregnant women in Nablus district?
2. What is the pattern of GWG?
3. What are the factors which associated with GWG?
4. What are the maternal outcomes associated with GWG?
5. What are the fetal outcomes associated with GWG?
6. Does Palestinian ANC policy follow the IOM recommendation?

1.8 Hypothesis

1. There is a relationship between GWG and number of gravidity.
2. There is a relationship between GWG and number of parity.
3. There is a relationship between GWG and mother outcomes (pre-eclampsia, post partum hemorrhage PPH, pregnancy induced hypertension (PIH), cervical or extended tear, mode of delivery, induction of labor, gestational diabetes mellitus (GDM) ,prolong labor and shoulder dystocia)
4. There is a relationship between GWG and fetal outcomes (birth weight, apgar score (A\S) , admission to neonatal intensive care unit (NICU), still birth, small for gestational age (SGA), large for gestational age (LGA), hypoglycemia, intra uterine growth restriction (IUGR), pre term delivery and respiratory distress syndrome).
5. There is a relationship between GWG pattern and smoking.
6. There is a relationship between GWG and physical activity.
7. There is a relationship between GWG and mother educational level.
8. There is a relationship between GWG and monthly family income.
9. There is a relationship between GWG and pre pregnancy BMI.

Chapter Two
Literature Review

2.1 Literature Review

2.2 Factors affecting GWG

This section reviewed the literature and studies related to the factors affecting GWG, the main factors which discussed in this section was physical activity, parity, dietary habits during pregnancy, in addition to the relation between GWG with the race ,genetic and socioeconomic status, studies about the woman attitude, knowledge ,and beliefs regard GWG were also reviewed in this section.

2. 2.1 GWG and physical activity

A cohort study conducted in Changzhou, Jiangsu Province, China by Jiang (2007), aimed to investigate the association between physical activity during pregnancy and the GWG among Chinese urban pregnant women between 2005 and 2007, result show that women who were physically active during 2nd and 3rd trimester had a lower risk of excessive GWG, around 50% of pregnant in 2nd trimester and above 60% in 3rd trimester show low level of physical activity.

A research were carried out by Ghodsi et al (2012) in Iran,which aimed to answer the question if exercise training during pregnancy affect both gestational age and GWG, a total of 250 women were divided to 2 groups (intervention group –exercise training and comparison group –non

exercise training).The results showed that physical activity had no relationship with gestational age,. The majority of people in intervention group 50%and comparison group 37.4% get gestational weight around 8 to 10 kg.

2.2.2 GWG and parity

A study conducted by Lumbanraja and Lutan in Pakistan (2013), aimed to describe maternal weight gain during all trimester of pregnancy and it is correlation with the birth weight They founded that maternal weight gain increased its peak point at the second and third trimester with overall total maternal weight gain ranged between 5-20 kg ,there is no statistically significance differences GWG with parity in each trimester ,on other hand, babies who were born at normal weight ranged at 2.500 -4 kg which mean that there is a weak correlation between GWG and baby birth weight.

A retrospective survey study in qualified health care centers in Riyadh which aimed to determine the prevalence of gestational weight gain and characteristics of Saudi women in Riyadh with AGWG, EGWG and IGWG was in 31.1 % and EGWG was in 36.1 %. Parity was determinant of EGWG, primigravida (PG) women were two and half times risk for EGWG in addition to that those women having hypertension in the past or in current pregnancy was risky for EGWG (Moawed et al ,2013).

2.2.3 GWG and dietary habits

According to study conducted in 2012 in Turkey, aimed to determine the effect of lifestyle interventions on improving dietary habits, ensuring GWG within recommended level and limiting postpartum weight retention (PWR). Aşcı et al found that 51.1 % of women in intervention group gained weight within the IOM guideline comparing with 28.9 % in control group, in addition to that lifestyle intervention had a significant effect on improving the lifestyle behaviors which will ensure appropriate GWG according to women pre pregnancy BMI but it had no effects on PWR.

A study was carried out in Denmark by Maslova et al 2015 , which aimed to examine the relation between the protein :carbohydrate (P\C) ratio and added sugar intake in pregnancy and GWG .they found that pregnant women with highest consumption of P\C ratio had a lower rate of GWG while those who consumed more protein gained less weight than those who consume less protein ,protein intake < 12 % of energy increase GWG and protein intake >20% of energy reduced GWG and the intake of added sugar in highest quintile (89 +_26 gram /day) had a higher GWG rate.

A study carried out by Rauh et al (2013) ,with focus on diet ,physical activity ,and weight monitoring counseling to prevents weight gain in excess of IOM recommendation in Munich, Germany ,counseling modules was provided for the intervention groups at 20^{th} and 30^{th} week and compromised the three main topics which was about nutrition ,physical

activity and GWG monitoring .the result showed that 60 % and 38 % of women in the control and intervention group respectively exceeded the IOM recommendations, overall ,there were no statistically differences in obstetric and neonatal outcomes among both groups ,the study conclude that lifestyle counseling reduced the proportion of pregnancies with excessive GWG. The same result was found among. Women who receive nutritional counseling gained weight according to recommendation compared to only 27 % of those who did not receive any professional counseling regard nutrition gained more weight (Naftali et al, 2017).

In Rio de Janeiro city, in cross sectional study by Fragaet al (2008), that aimed to assess factors that are associated with IGWG during third trimester of pregnancy, result show that women who were classified as obese gain less weight and nearly 50% of women gain EGWG than recommended, in addition to that factors such as low schooling, receive inadequate prenatal visits and did not receive any nutritional counseling regard GWG was associated with IGWG.

In prospective study carried out by Sartorelli et al (2014) in Brazil,which aimed mainly to test the association between fried food intake estimated by FFQ ,multiple 24 hr dietary recalls in relation to GWG at the 2^{nd} and 3^{rd} trimester and weight gain ratio .result showed that 16.7 % of those women who were with IGWG was tobacco use and 19 % was complain of daily nausea in 1^{st} trimester ,about the fried food intake which estimated by the 24 hrs recall and FFQ showed that were no relationship with weight gain during pregnancy ,on other hand when it was estimated by

multiple source method (MSM)fried food was associated with excessive weight gain .

While some women associated healthy weight gain and fetal growth with good nutrition and the amount of food consumed, many misunderstood the connection between nutrition and weight gain, when women asked about knowledge of foods in pregnancy, women described a prenatal diet must be rich in vitamins, protein and minerals and in their point of view Carbohydrate classified as not beneficial to be eat (Kavle et al, 2014)

2.2.4GWG and race, genetics and socioeconomic status

A conceptual model proposed to assess the factors affect the GWG , determinant of maternal stress include genetic ,health status ,race /ethnicity and chronic exposure to stress was associated with changes in biology and women behaviors which result in impairing the ability of state of equilibrium and as a result gaining excessive weight ,Post partum weight retention and obesity later life . In addition, depressive symptoms lower self esteem and body image dissatisfaction also associated with EGWG. Health care providers play role in improving weight gain in pregnancy if they were able to assess and address the psychological factors in pregnancy (Hill et al, 2011).

A study aimed to estimate the prevalence of GWG adequacy according to IOM recommendation in 2009 in USA and examine demographic, behavioral, psychosocial and medical characteristics

associated with IGWG and EGWG. founded that underweight women had a highest prevalence of IGWG while obese and overweight women with highest prevalence of EGWG, IGWG were associated positively among those women who were educated less than high school and non-Hispanic black, smoking cessation, education greater than high school, regular physical activity were associated positively with EGWG (Deputy et al ,2015).

In prospective cohort study conducted in USA by Herringet al (2012), aimed to assess the factors that influencing EGWG in pregnancy, 41 % of women with EGWG were more likely to be nulliparous, heavier pre pregnancy, watch at least 2 hrs of television per day, consume fried \fast food at least once per week, drank sugar –sweetened beverages at least 2-4 times per week and engage in physical activity less often.

A research conducted by Naftali et al (2017) at Rambam medical center, the study aimed at describing weight gain during pregnancy, and investigates the association between lifestyle factors and weight gain. Found that as the pre gestational BMI increased the proportion of women of women who gained weight as recommended decreased. GWG was associated with mother's age, women who were younger than 36 years gained more weight than recommended, those aged 28 years gained weight within recommended while those aged 18 years or less gained less weight. Smoking was related significantly with GWG, those who never smoked gained more weight than those who smoke, and GWG was not associated with alcohol consumption and exercise.

2.3Knowledge, attitude and beliefs regard weight gain

In research conducted among USA women by Tovar et al (2010) from all category (normal, underweight ,overweight and obese) which aimed to evaluate knowledge ,attitude and beliefs regarding weight gain in pregnancy, the study show that women received nutritional counseling from different professionals either women ,infant and children program nutritionist and less advice were received from their physician in addition to that women family members played an important role in providing advice about weight gain .

Knowledge regard weight gain were varied greatly among participants, those women who gain normal weight were more knowledge, while overweight and obese women often mentioned that they do not receive any advice about weight gain, the result show that the most common barriers to compliance with recommendations did not differ among women with normal and excessive weight gain and the most common were work, pressure from family members to eat, morning sickness, stress and hunger. The majority of women indicated little to no knowledge of the amount of weight to gain during pregnancy, and when asked to estimate the amount of healthy weight gain, they based their estimates on their experiences with previous pregnancies. Responses regarding the optimal amount of weight to gain during pregnancy varied widely, ranging from 2 kg to 50 kg during the course of pregnancy (Kavle et al, 2014).

In Egypt in order to provide structured contextual approach to explore behaviors, perceptions and cultural beliefs on maternal diet, weight gain during pregnancy, birth spacing and family planning. Reported that weight gain concept among Egyptian women was a consequence of carrying “additional person “as they mostly expressed (Kavle et al, 2014).

2.4 Maternal and fetal outcomes

This section review the literature and studies related to effects of both excessive and inadequate gestational weight gain on mother such as gestational diabetes mellitus , gestational hypertension , effect of GWG on mode of delivery , breast feeding initiation and duration ,in addition to GWG relation with fetus birth weight (LGA ,SGA) , admission to NICU .

2.4.1 GWG effect on gestational diabetes mellitus and hypertension

There is a relationship between GWG, pr- pregnancy BMI and pregnancy complications such as gestational hypertension and Gas was shown in study that GDM was performed in China and Morocco (Yang et al, 2017, Mochhoury et al, 2013)

In Dubai, a study conducted by Hussein et al (2013) aimed to assess the abnormal GWG on maternal and neonatal outcomes (mode of delivery, Apgarscore (A\S), pregnancy induced hypertension (PIH), GDM and birth weight). Study results showed that GWG was related significantly to women nationality (non Emirati, Other Arabs) (P –value <0.01) GDM and

PIH were significant among those who had GWG by BMI equal or more 30 (P-value <0.001)

In India , a total of 500 pregnant women in Mysore city were followed up for the period between 15 -20 days of conception till one week after delivery ,the study aimed to measure weight gain patterns from early pregnancy until delivery and to examine the relationship between prenatal weight gain and low birth weight .The result show that nearly 85.2 % of women did not meet the IOM recommendation regarding weight gain for their BMI , women with multipara and from high income gained weight higher than those women from middle income group ,and the total weight gain was associated with progressively decreasing birth weight. A significant associationwas found between mid-upper arm circumference and maternal weight at term, and birth weight (Shobeiri, et al, 2006).

In retrospective study which were conducted in Japan aimed to determine the optimal gestational weight gain among Japanese women, the result show that women who gain excessive weight were risk for CS delivery the rate was 37.9 % while 12.7 % of participants developed gestational hypertension and nearly 4.1% of women were preeclampsia (Hirooka et al 2013).

2.4.2 GWG and mode of delivery

A study conducted by Seligman et al (2006) ,which aimed to assess the association between pre-gestational obesity and weight gain with CS delivery and labor .BMI ,pre pregnancy weight and total GWG were

calculated to find that the relative risk for CS delivery was 1.8 among obese women compared with normal weight women ,in addition to that the lowest GWG was among obese women median weight gain was 9.1 kg and 14.7 kg for those who were classified as underweight pre conception ,with respect to obstetric procedure greater weight gain did not increase the risk of oxytocin or forceps delivery while greater GWG was associated with increased the risk of rupture amniotic fluid membrane for more than 12 hrs ,on other side the risk for CS delivery increased with greater GWG .

In research conducted in Australia by Mamun et al (2011) ,aimed at exploring the association between pre pregnancy BMI ,EGWG with adverse pregnancy outcomes and length of hospital stay .the result showed that 25 % of women with IGWG and 36 % with EGWG ,women who gained weight in excess were more risky for pregnancy complications as CS delivery (OR 1.29; 1.09, 1.54) ,higher birth weight differences (206.45 gm; 178.82, 234.08) ,greater placental weight and longer length stay at hospital ,while those with IGWG were more likely to lower pregnancy complications ,more risk for LBW and preterm delivery

2.4.3 GWG and breast feeding

In United states of America (USA), Hilson et al (2006), conducted a study which aimed at assessing the association between EGWG and termination of Breast feeding among white women, the result showed that obese women gained less weight and were less educated and less likely to have exclusive, both women who were with EGWG and IGWG failed to

initiate BF successfully. The predicted duration of BF for women with EGWG was 1 week while those obese women who gained weight less than IOM recommended were more likely to discontinue BF.

2.4.4 GWG and birth weight

A study carried out in united kingdom (UK) by Bonder et al (2010) aimed to explored association between the GWG and small for gestational age (SGA) births, large for gestational age (LGA) birth among obese women, the result showed that over all <20 % of all obese pregnant women gained weight within the IOM recommendation, and the adjusted risk of SGA declined as weight gain increased among class 1 obese mothers, in contrast, LGA increase with higher GWG. LBW and still birth were showed among these women who gain weight > 8 kg, macrosomia happened among women with >16 kg weight gain (Mochhoury et al, 2013).

Weight gain during the 2nd trimester of pregnancy was correlated positively with macrosomia on other hand weight gain during the 3rd trimester related positively with macrosomia and negatively with neonatal death, preterm birth (Yang et al, 2017). The same result was found in prospective multicenter study which was conducted in Italy by Albert et al 2014, aimed to evaluate the independent role of pre-pregnancy BMI, GWG and GDM on the risk of macrosomia. Showed that EGWG and DM were independent predictors for macrosomia.

A study was conducted by Ashwalet al in (2013), in Israel aimed mainly to assess the association between pre pregnancy BMI and GWG with pregnancy outcomes in non –diabetic mothers. The study included 4139 pregnant women with singleton pregnancy in Tel Aviv; GWG was assessed according to IOM recommendation. The result showed that obese women with high BMI at pre conception were at increased risk for LGA infants, CS delivery, shoulder dystopia, neonatal intensive care unit (NICU) admission, while those classified as underweight were at increased risk for SGA. In examining the effect of GWG according to IOM recommendation on outcomes they founded that EGWG was associated with LGA and birth weight was above 4 kg, on other hand, IGWG less than recommended range was associated with a higher risk for SGA infants.

Zhang et al (2015) , conducted a study in order to investigate the influence of gaining EGWG during pregnancy on both maternal and fetal outcomes , the result showed that women with EGWG were more risk for GDM , PIH and CSdelivery ,by examining neonatal outcomes macrosomia and LGA were more likely to occurred in pregnancy , on other hand women with IGWG were more risk for PTL and deliver babies with SGA.The following table (2.1) summarizes the most studies during years which study the maternal and fetal outcomes according to GWG

Table (2.1) –literature review of maternal and fetal outcomes

Author	Year	Country	Main finding
Feresu et al	2008-2010	India	The result shows that overweight and obese women are more likely to have induction of labor, post-delivery bleeding, prolong labor, vaginal tears and infections.
Choi et al	2011	Korea	The study showed that maternal complication such as incidence for pre term rupture of membrane (PPROM), placenta abruption and pre term delivery, among neonatal complications the rate of SGA low A\S, intrauterine fetal death (IUFD) and NICU admission were inversely proportional to gestational weight gain.
Hung ,et al	2016	Taiwan	For underweight women who gained weight less than the IOM recommendations the risk for SGA and LBW were higher on other hand gaining weight above the recommended made the rate for CS delivery, LGA and macrosomia higher
Nohr et al	2009	Denmark	The risk for preeclampsia, GDM, hypertension and emergency CS delivery were increased with increasing BMI and GWG, in addition to that, the risk of giving birth to an SGA infant decrease with increasing BMI
Zanardo et al	2016	Italy	Finding showed that underweight women gained more weight in pregnancy compared to normal and overweight women and GWG was significantly higher, finally underweight women who gained excess weight have shown halved rates of LGA, operative delivery and vacuum extractor in comparison with other.
Restall et al	2014	Australia	Found that the use of fertility treatment to conceive was associated with an approximate 40 % lower risk for EGWG. EGWG greater the risk of CS delivery, LGA infants and hypertensive disorders of pregnancy
Kiel et al	2007	USA	The result showed that the risk for preeclampsia, CS delivery, LGA and SGA were increased in obese women who gained weight above 15 Ibs and decrease with decrease weight gain.
Harper et al	201	UA	The incidence of LGA increased 2-2.5 fold among those women who gain weight above the recommended guideline and the risk for preeclampsia, CS delivery increased as GWG increased
Muktabhant et al	2014	UK	The risk for LBW, preterm birth, preeclampsia, need for labor induction, CS

			delivery and macrosomia increase with EGWG
Papazian et al	2016	Lebanon	The association between GWG and infants birth weight was significant (p-value <0.001), LBW was more frequent present among women with IGWG; whereas macrosomia observed among those women with EGWG, newborn height and head circumference were not affected with mothers.

2.5 Health care provider role in weight gain

In semi structured review in UK by Stengel et al in 2014, which try to assess how the health care providers counsel overweight and obese pregnant women on appropriate GWG. the result found that the majority of women were advised to gain 25 -35 pounds which is the recommended GWG range for normal weight women and since many women reported not being counseled about GWG, they developed opinion that their health care providers were not concerned about gaining too much and did not think that gaining a lot of weight was worrisome, about physical activity focus of the providers counseling was only on being cautious about exercise.

In January (2013) ,the committee on obstetric practice reaffirmed on weight gain during pregnancy ,that the health care providers who administer care to pregnant women on antenatal care centers (ANC) have a role in determine the woman's BMI at the initial visit in order to provide the appropriate advice about weight to gain ,nutrition and exercise ,in that way woman will be able to achieve the healthy pregnancy outcomes (ACOG ,2015) . Rodgers and Collins, pointed to the impact of maternal environment on child's lifelong, fetal development and the intrauterine environment that is shaped by maternal weight status during pregnancy

period which driven mainly by diet and physical activity (Rodgers et al ,2012).

GWG has multi factorial etiologies; thus no single factor is sufficient cause of any of the following outcomes for both fetus, child and mother, a given factor can be both a consequence of a factor that precedes it and a determinant of a factor that succeeds it gestational weight gain can be a consequence of energy intake during pregnancy and a determinant of fetal growth. Figure 1 explain the determinant, consequence and effect modifier (Washington, D.C. 1990)

2.6 ANC in Palestine MOH

Antenatal or prenatal care is the special care given to pregnant women ,it refers to the regular routine checkup recommended before and during normal pregnancy and if any complications develop ,then the midwives refer women to a doctor at the hospital .

Goals

1- Minimize the risks to mother and child

2- Prevent problems, if possible through health education, adequate nutrition, exercise, vitamin intake and appropriate medical and pharmaceutical intervention.

3- Detect potential problems early.

4- Provide safe delivery for mother and baby

Antenatal care should be administered for low risk clients:

- Every 4 weeks until 28 weeks.
- Every 2 weeks until 36 weeks
- Weekly after 36 weeks until delivery

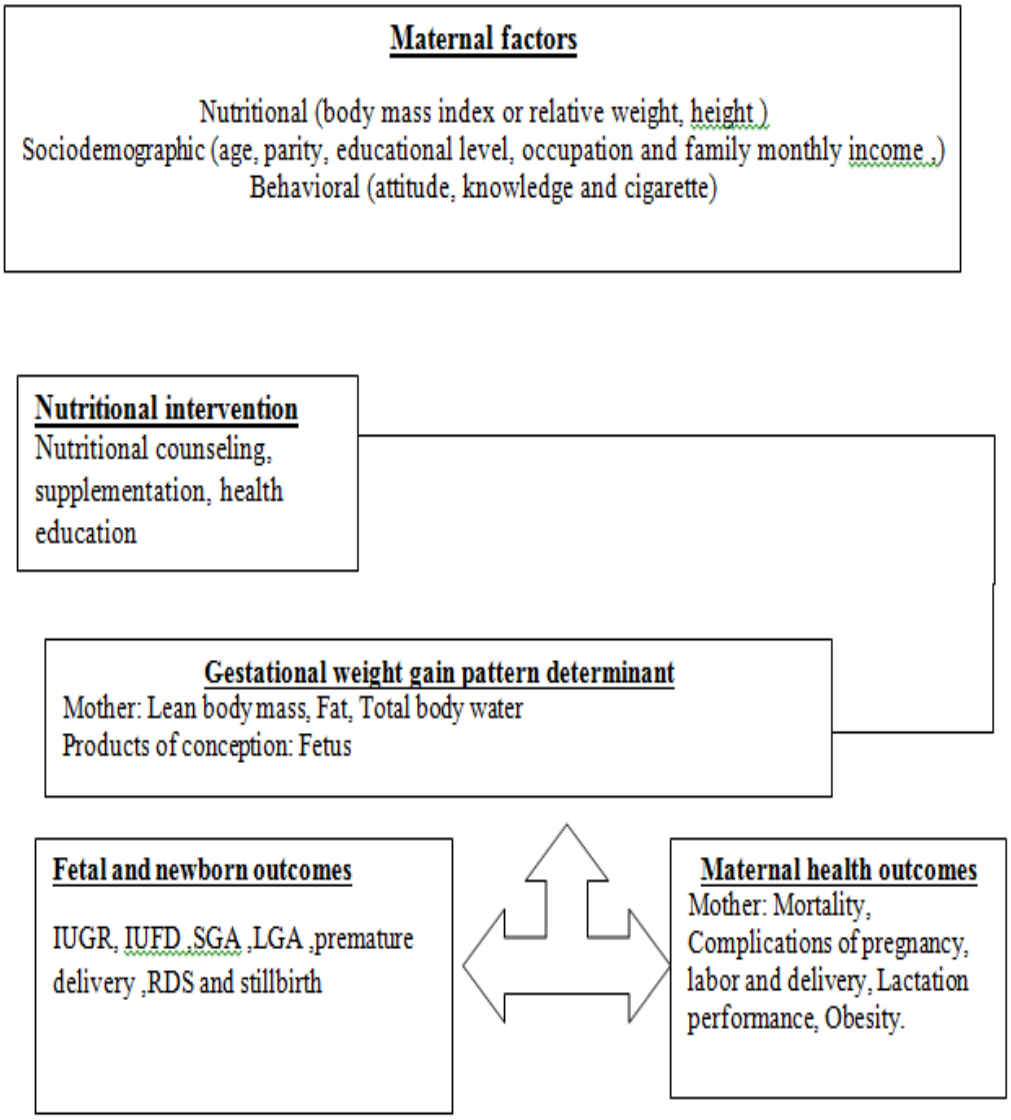

Figure 1: Determinants, consequences, and effect of GWG

Chapter Three
Methodology

3.1 Methodology

3.2 Introduction

This chapter describes the methods and techniques used by the researcher including: study design, description of the sample of the study and the formulation of the study tool, including validity and reliability measure. In addition, the chapter includes a description of the procedures used by the researcher in implementing the study and a discussion of the statistical management used in data analysis.

3.3 Study design

A quantitative, cross sectional study, analytic design was used to achieve the aim of study to determine the pattern of GWG among pregnant women, the related associated factors in addition to maternal and fetal outcomes during the study period in MOH ANCcenters in Nablus district.

3.4 Study site and setting

This study was conducted at MOH primary health care centers in Nablus district .the data was collected from the following four clinics; Balata clinic, Al markazia clinic, Al makhafia clinic and Raas alaein clinic, data were not collected from United Nation Relief and Work Agency (UNRWA) due to the rejection from the director to do any study in UNRWA centers.

3.5 Population and sample size

3.5.1 Study Population

The population of this study consisted of pregnant women who registered at MOH antenatal clinics in Nablus district in 2017. The total of pregnant women registered in all MOH antennal clinics in the four major clinics; Balata clinic, Al markazia clinic, Al makhafia clinic and Raasalaein clinic, was 896. According to registration and documentation of each clinic as per table 3.

Table (3.1): distribution of population number according to clinics

Area	Balata clinic	Al markazia clinic	Almakhafia clinic	RaasAlaein clinic	Total
No. of pregnant women	204	403	100	189	896
Sample size	89	174	43	81	387

3.5.2 Sample size and sampling method

The sample size was determined to be (387) according to the following equation with (95 %) confidence level and (5%) margin error and (50%) response distribution (www.surveysystem.com)

$$n = X2 * N * P * (1-P) / (ME2 * (N-1)) + (X2 * P * (1-P))$$

n = sample size

X2 =chi-square for the specified confidence level at 1 degree of freedom

N= Population size

P = population proportion (.50)

ME=desired Margin of Error (expressed as a proportion)

The stratified sampling method was applied utilizing the proportional method to determine the sample size for each clinic as per table (3.1) and the systemic random method (every other woman) was used to collect the data from each clinic.

3.6 Inclusion criteria

- Pregnant women within the age group seventeen years old and above
- Follow up at MOH clinics
- Spontaneous pregnancy
- Pregnant women at the 1st trimester of pregnancy

3.7 Exclusion criteria

- Women who diagnosed previously with diabetic mellitus or hypertension
- Multi fetuses pregnancy (twins and triplet pregnancy)
- Intrauterine fertilization (IVF) and intrauterine injection (IUI) pregnancy method.

3.8 Data collection tool

A self-administered questionnaire was used to collect the data, which composed of six sections (Annex1):

The first section consisted of five parts, which were developed based on a review of existing literature demographic data (age, place of residence, educational level, family monthly income and mother occupation status) (Watanabe et al.2009).

The second section utilized the women current obstetric history, which were developed based on a review of existing literature, this section contain (number of gravidity, parity number, abortion number and women last menstrual period) (Watanabe et al.2009).

The third section was about women pre pregnancy weight, height in order to calculate the women body mass index and classified women according to world health organization categories, in addition to that the section include gestational weight gain at each pregnancy trimester (1^{st}, 2nd and 3^{rd}) by adding the gestational weight gain at each trimester total gestational weight gain were calculated (Nohret al .2016).

The forth section utilized the health, smoking and physical activity this section consist of both self-developed and adopted questions which based on what had been studied in the previous conducted studies(Nohret al .2016).

The fifth section aimed to assess the women knowledge regard gestational weight gain, this section consists of developed and adopted questions which based on what had been studied in different studies conducted on the same topic (Leslie et al.2013).

The sixth section of the data collection tool which was developed according to the previous and existing studies and it includes two parts the first one aimed to assess the maternal outcomes (gestational age at delivery, mode of delivery, labor and post-partum complication and complications during pregnancy period.) on other hand the second part conducted in aim to assess the fetal /newborn complications regard the gestational weight gain this part consist of fetal sex, apgar score, birth weight, fetal complications and newborn complications (Yang et al ,2017 and Nohr et al ,2008).

3.9 Validity and Reliability

The data collection tool was designed in English so to ensure the content validity back translation was performed, and then it was reviewed by obstetrician and gynecology doctors and midwives who work at MOH and private antenatal care centers, those doctors and midwifes were Dr.Suliman Abu- Eideh and Dr. FatinaAlrabi at Specialized Arab hospital, Najwa Hanoun at Balata care center, Khaola Kassab at UNRWA care center, who provided no comments.

To ensure the reliability of tool and at the same time estimate the time and readability of the tool by participants piloting was conducted including 5% of the sample size which was excluded in the sample size, then cronbach alpha was calculated with a result of (0.90)

3.10 Pilot study

A pilot study was conducted on (5%) of the sample size, (n=19) of pregnant women in two ministry of health clinics in Nablus at Balata central health clinic and al markazia antenatal health clinic and those participants were excluded from sample size. It was conducted to determine the clarity of the data collection tool and to estimate the time necessary for data collection.

Alpha cronbach was computed, with a result of (0.90) and the Pearson Correlation Coefficients was computed to assess the validity of the scale .the correlation coefficient was (0.96) these values indicate that data collection tool acceptably valid .

3.11 Field work

After getting the approval from MOH, several visits were conducted in which aim and objectives of study were explained to the health care worker in antenatal clinics.

The data was collected over the span of 10 months from the end of September2017 to end of July, 2018 during the work days of MOH from Sunday to Thursday. Data was collected five times ,the first meeting was

at the beginning of pregnancy women with inclusion criteria were interview to explain the aim of study and after accepted participation both weight and height were taken in order to calculate the BMI ,the second visit was at the end of the 1st trimester in that visit weight were taken to estimate the weight gain (weight at the end of 1st trimester minus weight at the beginning of pregnancy) ,the third visit was at end of the 2nd trimester weight and GWG were calculated and the data collection tool were fill , the last visit to the ANC clinic was at the end of the 3rd trimester when weight was taken and the total GWG was calculated by weight at the beginning of pregnancy minus weight at the beginning of the pregnancy , finally maternal and fetal outcomes were collected from the birth registration at Nablus governmental and private hospitals (Specialized Arab hospital ,Nablus specialized hospital ,Alit had hospital ,St .Lukes hospital and Rafidia governmental hospital).

The purpose was clarify for the head nurses of each clinic and was explained by myself in the clinics for each pregnant women was fulfill the included criteria at the beginning of the study, each women consented to participate before starting fill the data collection tool . The data collection tool was distributed and taken by myself (researcher). A list of file number for each pregnant woman was written in separate paper and saved in order to avoid repeating the same pregnant women more than once.

3.12 Ethical considerations and accessibility

The study gained IRB approval from An – Najah National University (Annex 2). Permission to access the clinics and hospital from MOH was obtained from the MOH offices in Nablus district (Annex 3).

A consent form with data collection tool (Annex 4) was used to ensure the informed consent of pregnant women participating in the study after full verbal explanation of the study confidentially and their right to participate and withdraw at any time during the study.

3.13 Statistical method s and Data analysis

After completing data collection, the researcher digitally coded the data and begin conducted the data statistical analysis using the Statistical Package for Social Science (SPSS). The participants' responses were converted to the 4-Likert scale by recoding the answers to numeric values.

After calculating the total GWG coding were done according to the IOM recommendations and classified to IGWG , AGWG and EGWG , zero point were given to IGWG , one point was given to AGWG and two point were for EGWG .

Table (3.2) IOM recommendation for weight gain during pregnancy

Category	BMI	Weekly gain Ibs per week(range)	Weekly gain Gram per week (range)	Total weight gain Range
Under weight	<18.5	1 (1-1.3)	453 g (453 -589)	28-40 Ibs (12.5 -18kg)
Ideal weight	18.5-24.9	1(.8 -1)	453g(362 -453)	25 -30(Ibs11.5-16 kg)
Over weight	25-29.9	.6 (.5 -.7)	276 g(226 -317)	15-25 Ibs(7-11.5 kg)
Obese	>30	.5(.4 -.6)	226 g(181 -272)	11-20 Ibs (5-9 kg)

BMI were coding according to the WHO classified categories, BMI <18.5 given zero point, one point was given to BMI 18.5-24.9, two point given to 25-29.9 and three point to those pregnant women BMI >30.(www.who.int)Physical activities were coding zero point given to women who do physical activity, one point to women who don't do any physical exercise.

In binary logistic regression labor and post-partum complications and pregnancy complications were coding after scoring to zero point for yes (occurrence of complication) and one point for no (no complications occurred), the same was about fetal and newborn complications.

The statistical analyses were performed by the SPSS software and included:

1. Frequencies and Percentages to describe Qualitative Personal and Demographic Variables.

2. Chi Square test to study the existence of relationships between GWG and Demographic variables, Current Pregnancy History, Health

Information, and Information related to weight during pregnancy, Information related to Nutritional System, Maternal Outcomes, Fetal and Newborn Outcomes, and Physical activity.

3. Multinomial Logistic Regression to study the existence and the nature of relationships between GWG as dependent variable and (Maternal Outcomes, Fetal and Newborn Outcomes) as Independent, multinomial logistic regression to study the nature relationship between total gestational weight gain as dependent variable and (age, smoking, place of residence and anemia) as independent variable.

3.14 Independent Variables in the study

Age, monthly income, occupation, level of education, number of gravidity, number of parity, BMI, history of health problem , smoking, knowledge about GWG, women attitude regard nutrition during pregnancy, minor discomfort during pregnancy, number of meals during day, person who responsible to prepare meal and buying food stuff, physical activity, maternal outcomes and fetal /newborn outcomes.

3.15 Dependent Variable in the study

Gestational weight gains during pregnancy (GWG).

3.16 Conceptual Definitions of key terms

Pregnancy: The state of women who conceived and passed through the physiological state before Childbirth; and the period is divided into first, second and third trimesters (Cox et al,. 1987).

Antenatal care: Antenatal care is the routine health control of presumed healthy pregnant women without symptoms (screening), in order to diagnose diseases or complicating obstetric conditions without symptoms, and to provide information about lifestyle, pregnancy and delivery (NICE, 2010).

Gestational weight gain: Defined as the amount of weight gained between conception and just before the birth of the infant (IOM, 2009)

Table (3.3): Conceptual and operational definition

Variables	Conceptual definition	Operational definition
Body mass index (BMI)	Formerly called the Quetelet index ,is a measure for indicating nutritional status in adult .it is defined as a person s weight in kilograms divided by the square of the persons height in meters (kg /m2) (www.euro.who.int)	The category of BMI was : >18.5 underweight 18.5-24.9 normal weight 25-29.9 overweight >30 obesity
Gravidity	Gravid indicate the number of times a woman is or has been pregnant regardless of the pregnancy outcome .a current pregnancy, if any, is included in this account. (vocabulary dictionary)	One Two Three Four More than four
Parity	Parity, or "para" indicates the number of pregnancies reaching viable gestational age (including live births and stillbirths). The number of fetuses does not determine the parity. Twin pregnancy carried to viable gestational age is counted as one. ‖ (Gary, 2005)	No one 1-2 times 3-4 times 5 or more
Physical activity	any movement of the body that requires energy expenditure .this includes any motion person do through the day excluding sitting still or lying down (www.k-state .edu)	Do exercise Do not do
Trimester of pregnancy	Pregnancy has three trimesters, each of Which is marked by specific fetal developments A pregnancy is considered full-term at 40 weeks; ‖ (Cox et al.1987).	By calculating the gestational age from the LMP First Trimester (0-13Weeks), Second Trimester (14 to 26 Weeks) Third Trimester (27 to 40 Weeks)

Smoking	Smoking defines as the action or habit of inhaling and exhaling the smoke of tobacco or a drug. (vocabulary dictionary)	Yes smoke No (not smoke)
Gestational weight gain (GWG)	Defined as the amount of weight gained between conception and just before the birth of the infant (IOM ,2009)	According to IOM recommendation for weight gain : <18.5 12.5-18 kg 18.5-24.9 11.5-16 kg 25-29.9 7-11.5 kg >30 5-9 kg
Inadequate gestational weight gain (IGWG)	Defined as gaining weight from the beginning to the end of conception ,according to women pre pregnancy BMI (ACOG,2013)	This type of question were classified as : Under weight women gain <12.5kg Normal weight women gain <11.5 Overweight women gain <7kg Obese women gain <5 kg
Adequate gestational weight gain (AGWG)	Defined as gaining weight within the IOM recommendations ,according to women pre pregnancy BMI (ACOG,2013)	Under weight women gain 12.5–18.0 Normal weight women gain11.5–16.0kg Overweight women gain 7.0–11.5kg Obese women gain 5.0–9.0 kg
Excessive gestational weight gain (EGWG)	Defined as gaining weight above the IOM recommendations ,according to women pre pregnancy BMI (ACOG,2013)	Under weight women gain > 18 kg Normal weight women gain >16 kg Overweight women gain >11.5 kg Obese women gain > 9 kg
Induction of labor	Is the process or treatment that stimulate child birth and delivery ,inducing labor can be accomplished with pharmaceutical or non pharmaceutical methods (Myles textbook)	Yes (need induction) No
Prolong labor	Is the inability of a women to proceed with child birth upon going into labor ,prolong labor typically lasts over 20 hours for first time mothers and over 14 hours for women that have already children (Myles textbook).	Prolong labor >20hr Normal duration
Shoulder dystocia	Is when ,after delivery of the head ,the baby's anterior shoulder gets caught above the mothers pubic bone (Myles textbook).	Have shoulder dystocia Do not have
Post partum hemorrhage	Is often defined as the loss of more than 500ml or 1000 ml of blood within the first 24 hours following child birth (Myles textbook).	Yes occurred Not occurred
Cervical or extended tear	Vaginal and cervical tear occur when a baby's head or shoulders are too large to pass through the vaginal opening (www.healthline.com)	Yes occurred No occurred
Pre term labor pain	Is defined as regular contractions of the uterus resulting in changes in the cervix that start before 37 weeks of pregnancy (acog.org).	Yes No
Gestational diabetes	Is a condition in which a woman without diabetes develops high blood sugar levels during	Yes occurred No occurred

mellitus	pregnancy (Myles textbook).	
Pregnancy induced hypertension	Is the development on new hypertension (systolic above 145 or diastolic above 95 mmHg)in a pregnant women after 20 weeks gestation without the presence of protein in the urine or other signs of pre-eclampsia(Myles textbook).	The question was obtained BP reading .
Pre eclampsia	Is a disorder of pregnancy characterized by the onset of high blood pressure and often a significant amount of protein in the urine, the condition begins after 20 weeks of pregnancy (Myles textbook).	Yes occurred No occurred
Abortion	The deliberate termination of a human pregnancy ,most often performed during the first 24 weeks of pregnancy (dictionary).	Yes occurred No occurred
Large for gestational age	Is often defined as a weight ,length or head circumference that lies above the 90th percentile for that gestational age (Myles textbook).	Yes occurred No occurred
Intra uterine fetal death	Is the clinical term for stillbirth used to describe the death of a baby in the uterus ,the term is usually applied to losses at or after the 20th week of gestation (www.verywellfamily .com)	Yes occurred No
Small for gestational age	Is a term used to describe a baby who is smaller than the usual amount for the number of weeks of pregnancy below the 10th percentile for babies of the same gestational age (Myles textbook).	Yes occurred No
Intrauterine growth restriction	Refers to a condition in which an unborn baby is smaller than it should be because it is not growing at a normal rate inside the womb (webmd.com)	Yes occurred No
Respiratory distress syndrome	Is a syndrome in premature infants caused by developmental insufficiency of pulmonary surfactant production and structural immaturity in the lungs (Myles textbook).	Yes occurred No
Still birth	The definition recommended by the WHO for international comparison is a baby born with no sign of life at or after 28 weeks of gestation (who.int)	Yes occurred No
Apgar score	A measure of the physical condition of newborn infant ,it is obtained by adding points (2,1 or 0) for heart rate ,respiratory effort ,muscle tone ,response to stimulation and skin coloration (dictionary)	Apgar score at 1st minute and 5 minute taken

Chapter four

Results

Number of pregnant women participate in this study =380 pregnant women

The result show that 55%of participants, their age ranged (26-29) years and 4.2% were above 41, (n=16), and 50.2%of them were living in the city. According to women level of education 29.5% (n=112) of them were have Tawjihi certificate, 28.2% with bachelor's degree and only 1.3% had a degree higher than bachelors. About (1.1%), (n=4) of the family income of participant was less than 1000NIS, and the income of 65.5% ranged between (1000-4000 NIS). In addition, 77.1% of the participants were unemployed.

According to obstetric characteristics 28.7 % (n=109) of pregnant women had their first pregnancy in addition to that about 35.0% (n=133) had no children yet. Regarding to their BMI only 3.2% (n=12) classified as having underweight, while 26.2% (n=101) were having overweight and 18.2% (n=69) was of them considered as obese women.

Table (4.1): Distribution of percentage of pregnant women regarding to socio-demographic data

Variable	Category	No	%
Age	(17-25)	83	21.8
	(26-32)	209	55.0
	(33-41)	72	18.9
	(≥ 41)	16	4.2
	Total	380	100.0
Place of residence	Camp	16	4
	Village	120	45.6
	City	244	50.2
	Total	380	100
Gravidity number	First	109	28.7
	2	76	20.0
	3	54	14.2
	4	50	13.2
	>4	91	23.9
Body mass index	(>18.5	12	3.2
	(18.5-24.9)	198	52.1
	(25-29.9)	10	26.6
Smoking habits	Smoking cigarette	45	11.8
	Smoking bubbly	95	25.0
	Smoking both cigarette and bubbly	5	1.3
	Not smoking	235	61.8
Physical activity	Not active	212	55.8
	Active	168	44.2

The result in table (4.2) show that 36.9% of pregnant women suffer from anemia, 1.8% suffer from vitamin D deficiency and allergy to milk products respectively. Minor discomforts during first trimester of pregnancy were as the following 28.9% suffered from recurrent nausea and vomiting, 15.4% of pregnant women had stomachache and 20.4% were with heart burn.

Table (4.2): percentage of pregnant women according to health condition

Variables	Category	No	%
Health problem	Anemia	140	36.9
	Vitamin D deficiency	7	1.8
	White allergy	4	1.1
	Milk allergy	7	1.8
	No any complication	221	58.3
	Total	379	100.0
Minor discomforts affect eating	Stomachache	58	15.4
	Nausea and vomiting	109	28.9
	Diarrhea	9	2.4
	Constipation	8	2.1
	Heart burn	77	20.4
	No appetite	24	6.4
	No complain	92	24.4
	Total	377	100.0

Table (4.3) show that 84.8 % (n=317) of pregnant women think that nutrition is important during pregnancy, 32.3% (n=122) eat the same as they were eating in pre gestation and 46.4% (n=176) consume less than three meals. Regarding following any nutritional system 73.9% (n=280) reported that they did not follow any system. About how much weight should gain during pregnancy, 56.4% (n=202) thought that it should be less than 10 kg and 1.4% (n=5) thought it should be more than 20 kg.

Table (4.3): Distribution of percentage of women according to their knowledge and behavior regard nutrition during pregnancy.

Variables	Category	No	%
Importance of nutrition	Yes (it is important)	317	84.8
	No (it is not important)	57	15.2
	Total	374	100.0
Meaning of healthy eating during pregnancy	Eating excessive amount	102	26.9
	Increase the amount	96	25.3
	Following special diet program	59	15.6
	Keep the same as pre pregnancy	122	32.2
	Total	379	100.0
Number of serving consumption	Less than 3 meals	176	46.4
	3 basic meal	71	18.7
	More than 4	132	34.8
	Total	379	100.0
Following nutritional system	Yes	99	26.1
	No	280	73.9
	Total	379	100.0

The result regard the gestational weight gain, the result show that 43.7% of women gained IGWG , 36.1% of women were with AGWG and 20.3% gain EGWG.

Table (4.4) Distribution of percentages of pregnant women gestational weight gain

	Category	No	%
Total gestational weight gain	Inadequate	166	43.7
	Adequate	137	36.1
	Excessive	77	20.3
	Total	380	100.0

Table (4.5) show that 14.2% of pregnant women needed induction for delivery due to absent of natural labor pain ,8.9% of women had a prolong labor (over 12 hours) , during the delivery those women who suffered from shoulder dystocia were3.7% . And cervical or extended tear occurred

in about 7.6%,PPH occurred in 5.3% and those women who delivered before the 37 week 11.3% and 48.9%of the participants no complications had occurred during the labor and postpartum. In addition to that 7.9% of women developed GDM and PIH respectively, and 3.9% of women developed preeclampsia and only two cases had abortion in the second trimester of pregnancy, the remaining participants 79.7% did not develop any complications.

Table (4.5): Distribution of pregnant women percentages according to maternal outcomes

Variable	Category	No	%
Gestational age at delivery	<37 week	65	17.1
	37 -40 week	315	82.9
Mode of delivery	NVD	197	52.0
	instrumental delivery	69	18.2
	CS	113	29.8
Labor and post partum delivery	IOL	54	14.2
	Prolong labor	34	8.9
	Shoulder Dystocia	14	3.7
	PPH	20	5.3
	Cervical or extended tear	29	7.6
Pregnancy complication	PTL	43	11.3
	GDM	30	7.9
	PIH	30	7.9
	Preeclampsia	15	3.9
	Abortion	2	.5
	no any complications	303	79.7

Table (4.6) show that about 35.0% of delivered fetuses were female and 75.0% of newborns were with normal birth weight (2500-4000 grams) and those newborns with birth weight less than 2500 gram were 15.3%. It also shows that 72.1% of newborns had A/S<7, and after 5 minutes of birth 87.4%had score <7.

The table indicated that 11.6% of babies were delivered with LGA while 10.5% were SGA, and 2.1% were diagnosed with IUGR. Regarding the complications that the newborns developed after delivery, the result show that 6.6% of babies had RDS, and 24.2% needed admission to NICU.

Table (4.6): distribution percentage of pregnancy outcome according to fetal outcome

Variable	Category	No	%
Gender	Female	133	35.0
	Male	247	65.0
Birth weight	<2500	58	15.3
	2500-4	285	75.0
Apgar score At 1mints	>4	37	9.7
	<7	106	27.9
	>7	274	72.1
Fetal complication	LGA	44	11.6
	IUFD	6	1.6
	SGA	40	10.5
	IUGR	8	2.1
Newborn complications	NO complication	282	74.2
	RDS	25	6.6
	Hypoglycemia	4	1.1
	Admission to NICU	92	24.2
	Still birth	2	.5
	No complications	257	67.6

4.1 Hypothesis

Table (4.7) show that 50% of participant with IGWG were in their second pregnancy, 42.6%of AGWG of them were in their third pregnancy, with no statistical significant differences between the number of gravidity and total gestational weight gain among those women with IGWG, AGWG and EGWG as (*p-value 0.627*).

The result also indicated that number of parity was without any significant relation with gestational weight gain, pregnant women with more than 6 Para (50%) was with IGWG, 38.5%their parity between (1-3) gains AGWG and 29.1% gain EGWG have parity (4-6).

Table (4.7) Distribution of percentage of pregnant women according to gestational weight

gain in relation to pregnant women gravidity and parity Variables	Total gestational weight gain				Chi – square *P –value*
	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Gravidity	1	51(46.8%)	34(31.2%)	24(22%)	4.365; 0.627
	2	38(50%)	29(38.2%)	9(11.8%)	
	3	19(35.2%)	23(42.6%)	12(22.2%)	
	4	24(48%)	17(34%)	9(18%)	
	>4	34(37.4%)	34(37.4%)	23(25.3%)	
	Total	166	137	77	
Parity	Zero	63(47.4%)	45(33.8%)	25(18.8%)	4.245 0.602
	1-3	74(42.5%)	67(38.5%)	33(19%)	
	4-6	20(36.4%)	19(34.5%)	16(29.1%)	
	>6	9(50%)	6(33.3%)	3(16.7%)	
	Total	166	137	77	

Table (4.8) show that 75% of the participants who's monthly income was less than 1000Nis were having IGWG, 45.4% (n=113) of participants who have IGWG ,their income ranged between 1000-4000 NIS without statistical significant differences (*P-value 0.495*).

The result indicate that the educational level was not related to gestational weight gain since the (*P -value 0.548*), (48.6%) of those pregnant women with IGWG had bachelors level, 60 % of AGWG their educational level more than bachelors and 22.3%of those pregnant women with EGWG have diploma level.

Table (4.8) Distribution of percentages of pregnant women gestational weight gain in relation to family monthly income

Variable		Total gestational weight gain			Chi – square *P-value*
	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Family monthly income	less than 1000 shekels	3(75%)			3.405 0.492
	1000-4000 shekels	113(45.4%)	85(34.1%)	51(20.5%)	
	more than 4000 shekels	50(39.4%)	51(40.2%)	26(20.5%)	

Table (4.9) indicate that there is a significant relationship between pre-pregnancy BMI and the total gestational weight gain (*p-value 0.00*), 41.7% of participants who classified as having underweight pre-pregnancy, gained inadequate weight during pregnancy, and 33.3% of participants from the same category gained AGWG

Women who have ideal weight (their BMI = 18.5-24.9) (n= 198) gained weight as following; 62.6% of them gained IGWG and only 12.6% gained EGWG, women who have overweight (their BMI=25-29.9) gained weight as following ; 52.5% of them gained AGWG and 31.7% of participants from the same category gained EGWG. Obese women (BMI >30), gained weight as following; 30.4% gained IGWG, (44.9%) gained AGWG.

Table (4.9) Distribution of pregnant women total gestational weight gain in relation to body mass index (BMI) before pregnancy

Variable	Total gestational weight gain				Chi –square *P-value*
	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Pre-pregnancy BMI	<18.5	5(41.7%)	4(33.3%)	3(25%)	66.061 0.000
	18.5-24.9	124(62.6%)	49(24.7%)	25(12.6%)	
	25-29.9	16(15.8%)	53(52.5%)	32(31.7%)	
	>30	21(30.4%)	31(44.9%)	17(24.6%)	

Table (4.10) showed that there is positive significant relationship between pre-pregnancy BMI (18.5-24.9) and inadequate weight gain (*P-values (0.002, 0.013*). It also showed that there is significant negative relationship between pre-pregnancy BMI (25-29.9) and IGWG (P-values (0.024, 0.013) ≤0.05).

Women with pre-pregnancy BMI (18.5-24.9) were 3 times more likely to gain inadequate weight than to have normal weight gain (OR=3.13) ,while the (OR=1/0.389=2.571) means that its about 2.6 times more likely for women with BMI(25-29.9) to have normal total weight gain than to have IGWG . In addition to that the result show that there is significant positive relationship between place of residency(village) and EGWG (*P-value0.006*), it's about 2.5 times more likely for women reside in villages to have EGWG than to have normal total weight gain (OR =2.451)

The result show the relation between GWG and physical activity without any significant relation (*P-value 0.334*), 39.2% of IGWG women were not active 22.2% of EGWG women were also not active, 50% of women with sedentary life gain weight less than recommended while

32.5% with AGWG, women with IGWG, AGWG and EGWG (37.5%, 37.5% and 25%) respectively were living in active life.

Table (4.10) multinomial logistic regression between total gestational weight gain relation to demographic data.

Table (4.10): the result show that there is a significant statistical

Total Weight Gain*			**B**	S.E.	**sig**	**Exp(B) =(OR**	**95% C .I for Exp(B)**	
Inadequate and adequate gestational weight gain		Intercept	**-1.510-**	**0.767**	**0.049**		Lower Bound	Upper Bound
	Age	17-25	1.291	0.786	0.101	3.636	0.779	16.979
		26-32	1.119	0.763	0.142	3.063	0.687	13.656
		33-41	0.943	0.780	0.227	2.568	0.557	11.845
		above 41	0.000	.	.	.	.	.
	BMI	<18.5	0.510	0.754	0.499	1.665	0.380	7.293
		18.5-24.9	1.141	0.360	0.002	3.130	1.546	6.337
		25-29.9	-.944-	0.418	0.024	0.389	0.172	0.882
		>30	0.000	.	.	.	.	.
	place of residence	village	-.212-	0.307	0.489	0.809	0.443	1.476
		camp	0.459	0.420	0.274	1.583	0.695	3.604
		city	0.000	.	.	.	.	.
	Anemia	No	0.474	0.267	0.075	1.607	0.953	2.710
		Yes	0.000	.	.	.	.	.
	Smoking	No	-.223-	0.265	0.401	0.800	0.476	1.346
		Yes	0.000	.	.	.	.	.
Excessive		Intercept	**-.285-**	**0.635**	**0.653**			
	Age	17-25	-.030-	0.701	0.966	0.970	0.246	3.831
		26-32	-.221-	0.661	0.738	0.802	0.219	2.929
		33-41	-.852-	0.693	0.219	0.427	0.110	1.661
		above 41	0.000	.	.	.	.	.
	BMI	<18.5	-.045-	0.859	0.958	0.956	0.178	5.144
		18.5-24.9	-.391-	0.434	0.367	0.676	0.289	1.583
		25-29.9	-.109-	0.408	0.789	0.897	0.403	1.995
		>30	0.000	.	.	.	.	.
	place of residence	Village	0.896	0.324	0.006	2.451	1.298	4.625
		camp	-.389-	0.612	0.526	0.678	0.204	2.250
		city	0.000	.	.	.	.	.
	Anemia	No	-.131-	0.300	0.662	0.877	0.487	1.580
		Yes	0.000	.	.	.	.	.
	Smoking	No	-.002-	0.308	0.994	0.998	0.545	1.826
		Yes	0.000	.	.	.	.	.

relationship between gestational weight gain and women attitude regard how to eat (*P-value 0.003*), (40.2 %) of women who doubled their eating (eat for two) gained adequate weight, women who increase the main needs (44.8%) gained inadequate weight.

Table (4.11) Distribution of percentages of pregnant women according to gestational weight gains in relation their eating habits during pregnancy.

Women behavior regard eating during pregnancy	Total gestational weight gain						Chi-square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
Eating in excessive	31	30.4	41	40.2	30	29.4	19.678 0.003
Increase the main needs	43	44.8	32	33.3	21	21.9	
Follow special diet	30	50.8	16	27.1	13	22	
Keep the same as pre pregnancy	62	50.8	48	39.3	12	9.8	

The results of Binary Logistic Regression(table 4.12) show that there is significant negative relationship between inadequate gestational weight gain and Labor and Postpartum Complications (*P-value0.050*), also there is significant positive relationship between Anemia and Labor, Postpartum Complications (*P-value0.012*).Regarding total gestational weight gain, women with inadequate weight gain were 1.7 times to have labor and postpartum complications than women with adequate weight gain (OR =1.658), in addition to that anemic women were 1.8 times to have labor and postpartum complications (OR=1.761).

Table (4.12) Binary logistic regression between labor and postpartum complication in relation to women age, BMI ,total gestational weight gain, place of residence and smoking

Independent	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
Inadequate weight gain			0.041			
Adequate weight gain	-0.506	0.258	0.050	0.603	0.364	0.999
Excessive weight gain	0.164	0.311	0.598	1.178	0.64	2.168
Age 17-25			0.674			
26-32	-0.159	0.267	0.551	0.853	0.506	1.438
33-41	-0.365	0.345	0.290	0.694	0.353	1.365
above 41	0.177	0.608	0.771	1.194	0.362	3.934
BMI <18.5			0.320			
18.5-24.9	0.143	0.614	0.816	1.154	0.346	3.842
25-29.9	-0.021	0.632	0.973	0.979	0.284	3.38
>30	0.600	0.660	0.363	1.822	0.5	6.637
place of residence village			0.729			
camp	0.192	0.403	0.634	1.212	0.55	2.673
city	0.197	0.251	0.432	1.218	0.744	1.994
Anemia (Yes)	0.566	0.225	0.012	1.761	1.134	2.736
Smoking(Yes)	-0.076	0.222	0.732	0.927	0.6	1.432
Constant	-0.158	0.680	0.816	0.854		

Table (4.13) show that 44.4% of women with inadequate weight needed induction of delivery while 29.6% of women with EGWG needed IOL ,without any significant statistical relation between women gestational weight gain and risk for labor and postpartum complications (*P-value 0.383*). 41.2% of women with IGWG while 32.4% of those with EGWG have prolonged labor. And 42.9% of women either with IGWG and AGWG were at risk for shoulder dystocia, PPH was observed in high percentage 50% among women with IGWG. 48.3% of women who developed cervical or extended tear were among women with IGWG. 51.2% of women with IGWG developed preterm labor and delivery

Table (4.13) Distribution of percentages of pregnant women according to gestational weight gain in relation to labor and postpartum complications.

Labor and postpartum complications	Total gestational weight gain						Chi –square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
IOL	24	44.4	14	25.9	16	29.6	12.805 0.383
Prolong labor	14	41.2	9	26.5	11	32.4	
shoulder dystocia	6	42.9	6	42.9	2	14.3	
PPH	10	50	6	30	4	20	
cervical or extended tear	14	48.3	9	31	6	20.7	
PTL	22	51.2	15	34.9	6	14	
no any complication	76	40.9	78	41.9	32	17.2	

Table (4.14) show that the result indicate that there is a significant relation between gestational weight gain and occurring of complications during the pregnancy period (*P-value 0.008*) , occurrence of GDM were higher among women gain weight above recommendation 46.7% comparing with women with AGWG and IGWG ,in addition to that EGWG women were high risk to develop PIH and preeclampsia (36.7% ,46.7%) respectively ,two participatepregnant women 100% of IGWG women were get aborted at the beginning of fourth month of pregnancy.

Table (4.14) Distribution of percentages of women according to gestational weight gain relation to complications during pregnancy

Pregnancy complications	Total gestational weight gain						Chi – square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
GDM	8	26.7	8	26.7	14	46.7	6.926 0.008
PIH	9	30	10	33.3	11	36.7	
Preeclampsia	7	15.3	6	40	7	46.7	
No complications	136	46.5	106	35	56	18.5	

Table (4.15) show that 58.6% of newborn their weight less than 2500grams were delivered to women with IGWG and 31% to AGWG ,newborns with normal range of weight (2500-4000grams) were 43.5% ,34.7% and 21.8% to women with IGWG ,AGWG and EGWG women , 54.1%of EGWG women were delivered babies their weight above 4 kg with significant relation between GWG and newborn birth weight (*P-value 0.006*)

Table (4.15) Distribution of pregnant women percentages according to gestational weight gain in relation to newborn birth weight

Newborn birth weight	Total gestational weight gain						Chi-square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
<2.500 kg	34	58.6	18	31	6	10.3	14.384 0.006
2.500-4 kg	124	43.5	99	34.7	62	21.8	
>4 kg	8	21.6	9	24.3	20	54.1	

Table (4.16) show that there were a significant relationship between total GWG and occurrence of fetal complication since the (*P-value 0.004*) women with weight gain less than recommended about 60% of them deliver babies with SGA ,in addition to that the percentage for IUGR was higher among women with IGWG 87.5%.

Table (4.16) Distribution of percentages gestational weight gain in relation to fetal complications

Fetal complications	Total gestational weight gain						Chi – square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
LGA	10	22.7	20	45.5	14	31.8	22.270 0.004
IUFD	3	50	2	33.3	1	16.7	
SGA	24	60	14	35	7	5	
IUGR	7	87.5					
NO complication	122	43.3	101	35.8	54	20.9	

The binary logistic regression in table (4.17) show that that there is significant negative relationship between BMI category (25-29.9) and fetal complications (*P-value0.050),* also there is significant positive relationship between Anemia and fetal complications (*P-value0.041*). When women had a BMI (25-29.9) they were about 3.7 times more likely to develop fetal complications (OR =3.65) than when they had a BMI (>18.5) (OR =1/0.274), in addition to that anemic women were 1.7 times more likely to have fetal complications (OR= 1.672) than when they do not have anemia.

Table (4.17) Binary Logistic Regression Analysis between fetal complications in relation to BMI, age, total gestational weight gain, place of residence, Anemia and Smoking.

Independent		B	S.E.	Sig.	Exp(B)	95% C.I.for EXP(B)
Inadequate weight gain				0.829		
Normal weight gain		-0.104	0.294	0.724	0.902	(0.507 , 1.603)
Excessive weight gain		-0.218	0.360	0.545	0.804	(0.397 , 1.629)
Age	17-25			0.089		
	26-32	-0.097	0.317	0.760	0.908	(0.488 , 1.688)
	33-41	0.586	0.386	0.129	1.798	(0.843 , 3.832)
	above 41	1.035	0.629	0.100	2.815	(0.821 , 9.655)
BMI	<18.5			0.115		
	18.5-24.9	-0.791	0.625	0.206	0.454	(0.133 , 1.543)
	25-29.9	-1.293	0.660	0.050	0.274	(0.075 , 1)
>30		-0.561	0.673	0.404	0.571	(0.153 , 2.134)
place of residence	village			0.565		
	camp	-0.229	0.483	0.636	0.796	(0.309 , 2.05)
	city	0.184	0.297	0.536	1.202	(0.672 , 2.149)
Anemia (Yes)		0.514	0.252	0.041	1.672	(1.02 , 2.74)
Smoking (Yes)		-0.462	0.263	0.079	0.630	(0.377 , 1.054)
Constant		-0.400	0.715	0.576	0.670	

Table (4.18) indicated that there was no significant relationship between GWG and occurrence of newborn complications (*P-value 0.601*), 44% of RDS. Newborns who were delivered to mothers gain weight less than recommendation, hypoglycemia were observed among AGWG and EGWG women in equal percentages 50%, 40.2% of newborns admitted to intensive care unit were to women with IGWG , one newborn among IGWG and adequate weight gain women (50%) respectively were stillbirth.

Table (4.18) Distribution of pregnant women percentages according to gestational weight gain in relation to newborn complications

Newborn complications	Total gestational weight gain						Chi – square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
RDS	11	44	10	40	4	16	6.409 0.601
Hypoglycemia	0	0	2	50	2	50	
Admission to ICU	37	40.2	32	34.8	23	25	

The result show that there is significant negative relationship between women age (26-32) and new born complications (*P-value0.034*), also there is significant positive relationship between anemia and new born complications (*P-value0.027*).Women who aged (26-32) were about 1.8 times more likely to have newborn complications (OR =1.815) than women aged (17-25) (OR =1/0.551), in addition to that women with anemia were 1.7 times more likely to have newborn complications (OR =1.678) .

Table (4.19) Binary Logistic Regression Analysis between new born complications in relation to BMI, age, total gestational weight gain, place of residence, Anemia and Smoking.

Independent		B	S.E.	Sig.	Exp(B)	95% C.I.for EXP(B)
Inadequate weight gain				0.417		
Adequate weight gain		0.140	0.277	0.613	1.151	(0.668 , 1.982)
Excessive weight gain		0.431	0.327	0.188	1.538	(0.81 , 2.921)
Age	17-25			0.070		
	26-32	-0.596	0.281	0.034	0.551	(0.318 , 0.956)
	33-41	0.073	0.352	0.836	1.076	(0.539 , 2.146)
	> 41	-0.243	0.614	0.693	0.784	(0.235 , 2.615)
BMI	<18.5			0.238		
	18.5-24.9	-0.321	0.627	0.609	0.726	(0.212 , 2.479)
	25-29.9	-0.751	0.650	0.248	0.472	(0.132 , 1.687)
	>30	-0.086	0.670	0.898	0.917	(0.247 , 3.413)
Place of residence				0.280		
Village		-0.275	0.456	0.547	0.760	(0.311 , 1.856)
	Camp City	0.280	0.275	0.308	1.324	(0.772 , 2.269)
Anemia	(Yes)	0.518	0.235	0.027	1.678	(1.059 , 2.658)
Smoking	(Yes)	-0.058	0.237	0.808	0.944	(0.593 , 1.503)
Constant		-0.530	0.701	0.450	0.588	

4.2 Other result findings

Health problem during pregnancy have a significant statistical relation with total gestational weight gain as result show in table (4.20) (*P-value 0.00*), 36.4 % of anemic women have gain AGWG , three women 75%have wheat allergy gain EGWG and seven women 100% who had diagnosed previously with milk allergy gain AGWG .

Table (4.20) Distribution of percentages of pregnant women total gestational weight gain in relation to health problem

		Total gestational weight gain			Chi – square *P- value*
Variable	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Health problem	Anemia	51(36.4%)	57(40.7%)	32(22.9%)	30.591 0.000
	Vit.D deficiency	5(71.4%)	0(0%)	2(28.6%)	
	Wheat allergy			7(75%)	
	No complaining	110(49.8%)	72(32.6%)	35(17.6%)	

The result of the study indicate that there is a significant statistical relation between the presence of teeth problem during pregnancy and total gestational weight gain since that the teeth problem affect eating as table (4.21) show that (*P-value 0.037*), those women who have teeth problem 41.7% gain IGWG compared with those with adequate weight gain or excessive weight gain while those who do not have problem 46.3% gain less weight than recommended compared with those women who gain adequate and excessive weight gain

Table (4.21) Distribution of percentages of pregnant women total gestational weight gain in relation to presence of teeth problem

		Total gestational weight gain			Chi – square P-value
Variable	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Presence of teeth problem	Yes I have	90(41.7%)	89(41.2%)	37(17.1%)	6.575 0.037
	No I do not have	76(46.3%)	48(29.3%)	40(24.4%)	

Table (4.22) show that there is a significant statistical relationship between total GWG and suffering from minor discomforts during pregnancy (*P- value 0.001*), 40.8% of women who gained IGWG has complain from stomach pain during the first trimester compare, nausea and vomiting affect weight gain about 40.4%less than recommended while 16.5% gain excessive ,diarrhea do not affect weight gain among inadequate ,adequate and excessive (33.3%) respectively ,also heart burn and no appetite to eat affect women to gain less weight (61% ,70.8%) respectively comparing with women gain excessive weight (15.6% ,12.5%) respectively .**Table (4.22) Distribution of percentages of pregnant women total gestational weight gain in relation to mother minor discomforts**

		Total gestational weight gain			Chi-square *P-value*
Variable	Category	Inadequate N (%)	Adequate N (%)	Excessive N (%)	
Minor discomforts during pregnancy	Stomach Pain	26(44.8%)	22(37.9%)	10(17.2%)	32.604 0.001
	Nausea and Vomiting	44(40.4%)	47(43.1%)	18(16.5%)	
	Diarrhea	3(33.3%)	3(33.3%)	3(33.3%)	
	Constipation		5(62.5%)		
	Heart Burn	47(61%)	18(23.4%)	12(15.6%)	
	No Appetite	17(70.8%)	4(16.7%)	3(12.5%)	
	No Complain	27(29.3%)	37(40.2%)	28(30.4%)	

Table (4.23) show the result that GWG were related significantly to the person who were responsible for buying food stuff (*P-value 0.039*), women who gain weight less than recommended (50.7% and 40.2%) women herself and other family member were responsible for buying her food stuff respectively.

Table (4.23) Distribution of percentage of pregnant women gestational weight gain in relation to responsible person of buying food stuff in home

Responsible person of buying food stuff	Total gestational weight gain						Chi – square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
Women herself	77	50.7	52	34.2	23	15.1	4.276 0.039
Other family member	76	40.2	72	38.1	41	21.7	
Total	153	90.9	124	72.3	64	36.8	

Table (4.24) show that 43.8% of pregnant who answer that monthly income affect food quality gain less weight than recommended while those who answer that monthly income had no effect on food quality 42.9%gain weight in less ,without any significant relation (*P-value 0.274*).

Table (4.24) Distribution of percentages of pregnant women total gestational weight gain in relation to family monthly income effect on food quality

Family monthly income effect on food quality	Total gestational weight gain						Chi-square *P-value*
	Inadequate		Adequate		Excessive		
	No	%	No	%	No	%	
Yes its affect	85	43.8	64	33	45	23.2	2.586 0.274
No it doesn't affect	78	42.9	72	39.6	32	17.6	
Total	163	86.7	136	72.6	77	40.8	

Chapter Five
Discussion, conclusions, Recommendations

5.1 Discussion

The purpose of this chapter to discuss the findings presented chapter four in relation to the existing literature. Subsequently the strengths and limitations of this study and the implications of this research on midwifery practice, education, research, health service and policy will be presented.

The result (table 4.8) indicated that there were no significant relationship(P-value 0.627>0.05) between gravidity and parity in relation to women GWG and these results were in agreements with the study by (Mendez et al, 2016) which aimed to study examined whether neighborhood racial composition and neighborhood poverty was associated with weight before pregnancy and weight gain during pregnancy ,which revealed that nulliparous women gain weight in excessive than recommended also those women with one and two or more children were also gain excessive weight .In addition to that another study by Kinnunen et al., 2007 , Asbee et al., 2009 ,indicated nearly similar results to this study that revealed that Primi parity has been associated with an increased risk for gestational weight gain in excessive.

These findings were disagreements with the study by Tai-Ho Hung et al ,2015, and which aimed to investigate perinatal outcomes according to the 2009 Institute of Medicine (IOM) gestational weight gain (GWG) guidelines , the result indicate that primiparity women (62.0%) were more

risk to gain excessive weight compared with multipara women and since the P-value <0.001.

The findings regard gestational weight gain in relation to family monthly income (table 4.9), revealed that there were no statistical significant relationship between (P-value 0.495 >0.05) ,these result were in disagreements with the study conducted among Brazilian pregnant women which was conducted to assess the factors associated with inadequate weight. The result indicated that women in D+E economic status were at risk to gain excessive weight (P-value 0.081< 0.05) compared with women in class B+C(Fraga et al ,2008) . These differences in results might be due to different economic classifications , results were supported with study result by Sartorelliet al ,2014 , among Brazilian women which found that socioeconomic status were not related significantly to gestational weight gain (P-value 0.32>0.05)

Result(table 4.10) indicated that the educational level was not related to gestational weight gain since the (P -value =0.548>0.05),the results of the 2016 study by Mendez did not support study findings , and showed that women without diploma certificate and those with some collage gained excessive weight, a study conducted by Sartorelli et al, 2014, were support study result and found that educational background (years of schooling) were not significantly related to the gestational weight gain (P-value 0.44<0.05) the two above mention studies were differ from the conducted studies in the classification of the educational level .

The result in table (4.11) show the significant relationship between pregnant women pre pregnancy BMI and gestational weight gain according to the IOM recommendation (p-value 0.00<0.05), disagreements results were revealed in New Zealand in a study by Restall et al, 2014, which was aimed to identify early pregnancy factors associated with excessive GWG, findings show that overweight women at14–16 weeks' gestation were nearly three times as likely to exceed GWG ranges (95% CI 2.20, 3.82) compared to those with a normal BMI, while obese women were approximately2.5 times more at risk of excessive GWG (95% CI 1.79, 3.52) . While another studies by Hilson et al ,in 2006 and Hung et al in 2015 , the result indicated that there were a significant statistical relationship since the (P-value 0.01) ,in addition to that found that among Taiwanese women the pre pregnancy BMI were related positively to gestational weight gain (P-value <0.001)

All above studies in addition to the study were based on the world health organization BMI category and IOM weight gain recommendations.

The multinomial logistic regression between total gestational weight gain in relation to pre pregnancy BMI, age, place of residence, anemia and smoking in table (4.12) indicated that women having normal weight related positively to GWG ,since those women were about three times risk to gain less than recommended (OR=3.13) on other hand smoking ,place of residence ,age ,anemia and pre pregnancy BMI were not related to gestational weight gain less than recommended ,in addition to that EGWG were two and half times among those women live in village than those who

live in city or camps (OR =2.451). In the study conducted by Popa et al ,2014 among pregnant women in Romania to explore the relationship between pre-gestational body mass index(BMI), adequacy of prenatal care and weight gain during pregnancy , findings show that place of residence (urban and rural) were not related to gain weight less than recommended while it was related to higher weight gain (P-value 0.05) which support the study result , in addition to that women who were aged less than 18 years gained less weight (P-value 0.031)and that were not indicated in the study , by looking to the pre pregnancy BMI , BMI (25-29.9) were statistically related to lower weight gain (P-value 0.009) and those women BMI (>30) were gain higher weight than recommended (P-value 0.01), the study did not indicate variables such as anemia and smoking in relation to the gestational weight gain .

Another study carried by Restall et al, to identify early pregnancy factors associated with excessive GWG, the result show that Women aged less than 25 years and 25–29 years are almost twice as likely and women 30–34 years60% are more likely to gain above IOM guidelines compared to women aged 35 years or more. Women who quit smoking more likely to exceed 2009 IOM GWG guidelines compared to nonsmokers.

The result indicate that physical activity during pregnancy had no significant statistical relation with gestational weight gain (P-value 0.334>0.05), these results were supported by Ghodsi et al, 2012 ,which found that there is no meaningful relationship between pregnancy exercise and gestational weight gain .While another study by Olson&Strawderman,

2003 indicated disagreements result to this study, the result revealed that women who exceeded the GWG recommendations reported decreasing the level of physical activity during pregnancy while those women who reported inadequate weight gain reported increasing engaged in physical activity compared to their pre pregnancy behaviors ,the previous two studies were differ from the conducted studies in the classifications of physical activity .

The result in (table 4.14) show that women attitude regarding eating during pregnancy were not related significantly to GWG (P-value 0.003),in Egypt women during pregnancy were relate healthy weight gain and fetal growth with good nutrition and the amount of food consumed; many misunderstand the connection between nutrition and weight gain. Weight gain is viewed as carrying an "additional person." Also that woman had little to no knowledge of optimal weight gain during pregnancy (Kavle et al, 2014). the results were supported by a study conducted by Stotland et al ,2010 ,during the study Providers reported that family influences often undermined the advice they gave to patients by encouraging patients to ''eat for two'' and to be sedentary which can be summarized by the commonly used phrase "eating for two" were affect the women attitude regard weight gain (Kraschnewski et al ,2014)

All of previous studies focused on the role of health care provider to detect weight gain and how to prevent the excessive or inadequate weight gain and that was not reported on the current study because our health care

providers do not give importance to weight gain and there were no guideline for teaching and counseling in MOH system.

Result in table (4.15) indicated that there is significant negative relationship between inadequate gestational weight gain and Labor and Postpartum Complications (P-value0.050≤0.05) also there is significant positive relationship between anemia and labor, postpartum complications (P-value0.012≤0.05) and women with inadequate weight gain were one and seven times to times to have labor and postpartum complications than adequate weight gain women (OR =1.658), in addition to that anemic women were 1.8 times to have labor and postpartum complications (OR=1.761) ,and in table (4.16) the result show the occurrence of labor and post partum complications according to GWG , the results indicated that inadequate weight gain were not related to the mode of delivery (normal vaginal delivery ,instrumental delivery and cesarean section) which were supported by Mochhoury et al ,2013 and Hung et al ,2016, while those women with inadequate weight were three times risk for induction of labor more than women gain excessive weight , other complications as shoulder dystocia which was no affected by gestational weight gain as the result by Yang et al in 2017 , which indicated that shoulder dystocia not related with gestational weight gain (P-value 0.741) . OnMochhoury et al study perineal tear and trauma were likely to occur among women with higher weight gain (P-value 0.001) compared with the current study the risk for such as complications were more likely among inadequate weight gain women .

Table (4.17) show the occurrence of pregnancy complications among women regard weight gain, the findings show that pregnancy complications related significantly to GWG (P-value 0.008) ,women with excessive weight gain were more risk to develop Gestational diabetes mellitus (GDM) ,pregnancy induced hypertension and pre-eclampsia compare with women within and below the IOM recommendations , the findings were supported in study conducted by Mochhoury et al ,and Husseinet al ,2015 ,which found that PIH and GDM were more among excessive weight women (P-value 0.001) .

The result in(table 4.18) indicated that there a significant statistical correlation between birth weight in relation to GWG (P-value 0.006) , while another disagreements study by Yang et al and Mochhoury et al , the result revealed that birth weight not was related to GWG (P-value 0.07),(P-value 0.001) respectively .

Result in table (4.19) indicate that gestational weight gain related positively to the fetal complications occurrence (P-value 0.004) , complications such as large for gestational age which more likely among excessive weight gain women , small for gestational age ,intrauterine fetal death and intrauterine growth restriction higher among inadequate weight women than adequate and excessive weight gain women

Similar results were in the study conducted by Yang et al, the result indicated that LGA and LBW relate to GWG (P-value 0.02, 0.003) respectively also by Blomberg and by Mochhoury et al .

5.2 conclusions

(3.2%) of women participate in the study were classified as underweight women (BMI>18.5), (52.1%) of women were with normal weight (BMI18.5-24.9) ,the prevalence of overweight (BMI 25-29.9) was (26.6%) and the obesity prevalence (≤30) was (18.2%).

(43.7%) of pregnant women participate in the study were inadequate weight gain, (36.1%) were with adequate weight gain and (20.3%) were classified as excessive weight gain according to the IOM recommendations.

5.3 Recommendations

- Develop assessment tool for pregnant women to detect the gestational weight gain during the three pregnancy trimester and to take measure immediately to be able to take further management.
- Make regular health education classes and programs for pregnant women about all their needs to help pregnant in her pregnancy.
- Provide a guideline in the ministry of health regard the gestational weight gain which based mainly on the IOM recommendations.
- Empower the role of health care providers in the antenatal care centers regard counseling, education and referral to other centers in the cases needed.

- More researches about gestational weight gain in more details and in different centers.

5.4 Strength of the study

- Study topic related to my work as a midwife worked with pregnant women and chooses this topic from my experience with them.
- Data collection was simple random.
- Data collection tool reviewed by experts.
- Important and interesting study topic.
- Clear research question and hypothesis.

5.5 limitations of the study

- A study required a lot of time due to large study sample and the data obtained.
- Rejection from the UNRWA to collect data makes the comparison between two main health care provider centers impossible.

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Annex 1

An-Najah National University

Faculty of graduate studies

Questionnaire form

Prepared by: Arwa Abo-Alrob

Supervisor: - Dr. Mariam Al –Tell

Dr .Nihal Al-Nator

جامعة النجاح الوطنية

كلية الدراسات العليا 2017

استبيان حول "نمط زيادة الوزن لدى النساء الحوامل والنتائج المترتبة على الام والطفل في محافظة نابلس "

عزيزتي :

السلام عليكم ورحمة الله وبركاته .....

أنا الطالبة أروى عمر مصطفى أبو الرب في برنامج الصحة العامة جامعة النجاح الوطنية ،اقوم بعمل دراسة تهدف الى دراسة نمط زيادة الوزن العوامل الؤثرة والنتائج المترتبة على تللك الزيادة بين النساء الحوامل في محافظة نابلس ، باشراف الدكتورة مريم الطل ،اذا وافقتي عل المشاركة سوف يطلب منك تكملة هذا الاستبيان بالاضافة الى اخذ بياناتك من الوزن بالكيلو غرام كل ثلاثة اشهر والطول بالسنتيميتر لحساب مؤشر كتلة الجسم الخاص بك ،هذا الاستقصاء سوف ياخذ من وقتك حوالي 15 دقيقة

مشاركتك في هذا الاستقصاء تطوعية (يمكنك الرفض او التوقف في اي وقت عن المشاركة دون اي عواقب)

المزايا والعيوب : من المحتمل ان تشعري بعدم الراحة نتيجة لسؤالك عن عاداتك الغذائية ،ولكن مشاركتك سوف تساعد الباحثين على دراسة نمط زيادة الوزن بين النساء الحوامل مما يعني القاء الضوء على مشكلة اضطرابات زيادة الوزن خلال فترة الحمل والنتائج المترتبة على الزيادة في المجتمع الفلسطيني .

السرية : نتائج هذا الاستقصاء ستكون متاحة للباحث فقط لا غير ،في حالة النشر لن يتم الاقصاح عن اي معلومات شخصية .

توقيع موافقة المشاركة .....

شاكرين لكم حسن تعاونكم

Data collection tool

Part one : Demographic data (this part will fulfill by the researcher)

Name initial	
Age	a- 17-25 b- 26-32 c-33-41 d- above 41
Place of residence	a- Village b- camp c- city
Educational level	a- Less than tawjihi b- Tawjihi c- Diploma d- Bachelors e- More than bachelors
Occupation	a- Work b- do not work
Income (monthly)	a- Less than 1000 shekels b- 1000-4000 shekels c- More than 4000 shekels
Telephone or mobile number	

Part two : current pregnancy history (this part will fulfill by the researcher)

Gravid a- first one
b- 2
c- 3
d- 4
e- More than 4 pregnancies

Para a- no one
b- 1-2
c- 4-6
d- More than 6

Abortion a- zero
b- 1
c- 2
d- More than 2

Last Menstrual period (LMP) :
Expected Date of Delivery (EDD):

Prepregnancy weight in Kg	Height in cm	Body mass index (BMI)

	Weight	GWG
Weight at the end of 1st trimester		
Weight at the end of 2nd trimester		
Weight at the end of 3rd trimester		

Total gestational weight gain (TGWG) : ……

Part three : Health

عزيزتي المشاركة : نود ان نعلمك ان جميع المعلومات التي سوف تقومين بالادلاء بها في هذا الجزء من الاستبيان سوف تبقى سرية ولن يتم استخدامها الا لاغراض علمية من اجل تطوير وتقديم الخدمات الافضل لك ولاسرتك .

Please circle for the following

	Health	
1-	do you suffer from one of the following	a- anemia b-vitamin D deficiency c- celiac disease d- sensitivity of milk e- no health problem
2-	Are you smoking	a- cigarette smoker b- bubbly smoker c- both cigarette and bubbly smoker e- do not smoke

Knowledge and attitude		
1-	Do you think that healthy diet affect mother and fetus health?	a- yes b- no
2-	Healthy diet during pregnancy mean	a- eating for two b- increase the main nutrients c- follow special diet system d- keeping the same as pre pregnancy

3-	What is the rate of weight gain during pregnancy ?	
4-	During pregnancy what are the symptoms that have affected the nature of eating ?	a- stomachache b- nausea and vomiting c- diarrhea d- constipation e- heart burn f- no appetite g- nothing
5-	Do you follow any special diet ?	a- yes b- no
6-	How many meals you eat during the day ?	a- less than three meals b- three meals c- more than four meals
7-	Who is responsible for preparing food at home?	a- the women herself b- another person
8-	Who is the person responsible for buying food items at home ?	
9-	Does the family monthly income affect the quality of food ?	a- yes b-no
10-	What are the average sleep hours?	a- 5-6 hours b- more than 6 hours

Part four: maternal and prenatal outcomes

Maternal outcomes	
Gestational age at delivery	
Mode of delivery	a- Normal vaginal delivery b- Instrumental delivery (forceps ,vacuum) c- Cesarean section
and postpartum complications	a- induction of labor b- Prolong labor c- Shoulder dystocia d- Post partum hemorrhage e- Cervical or extended tear f- Pre term labor pain (PTL) g- No any complication
Pregnancy complications	a- Gestational diabetic mellitus b- Pregnancy induced hypertension c- Pre-eclampsia d- Abortion e- No any complication

Fetal and newborn outcomes	
Fetal sex	a- Female b- Male
Birth weight	
Apgar score	At 1st minute At 5 minute
Fetal complications	a- large for gestational age b- Intra uterine fetal death c- Small for gestational age

Newborn complication	d- Intra uterine growth restriction e- No any complication a-Respiratory distress syndrome b- Hypoglycemia c- Admission to NICU d- Premature e-Still birth f- No any complication

جامعة النجاح الوطنية

كلية الدراسات العليا

ماجستير الصحة العامة

عزيزتي :

السلام عليكم ورحمة الله وبركاته .....

أنا الطالبة أروى عمر مصطفى أبو الرب في برنامج الصحة العامة جامعة النجاح الوطنية ،اقوم بعمل دراسة تهدف الى دراسة نمط زيادة الوزن العوامل الؤثرة والنتائج المترتبة على تللك الزيادة بين النساء الحوامل في محافظة نابلس ، باشراف الدكتورة مريم الطل ،اذا وافقتي عل المشاركة سوف يطلب منك تكملة هذا الاستبيان بالاضافة الى اخذ بياناتك من الوزن بالكيلو غرام كل ثلاثة اشهر والطول بالسنتيميتر لحساب مؤشر كتلة الجسم الخاص بك ،هذا الاستقصاء سوف ياخذ من وقتك حوالي 15 دقيقة

مشاركتك في هذا الاستقصاء تطوعية (يمكنك الرفض او التوقف في اي وقت عن المشاركة دون اي عواقب)

المزايا والعيوب : من المحتمل ان تشعري بعدم الراحة نتيجة لسؤالك عن عاداتك الغذائية ،ولكن مشاركتك سوف تساعد الباحثين على دراسة نمط زيادة الوزن بين النساء الحوامل مما يعني القاء الضوء على مشكلة اضطرابات زيادة الوزن خلال فترة الحمل والنتائج المترتبة على الزيادة في المجتمع الفلسطيني .

السرية : نتائج هذا الاستقصاء ستكون متاحة للباحث فقط لا غير ،في حالة النشر لن يتم الاقصاح عن اي معلومات شخصية .

توقيع موافقة المشاركة .....

ادوات القياس جمع المعلومات

1- المعلومات الديموغرافية الاجتماعية

الاسم الاول	
العمر بالسنوات	ا- 17-25 ب- 26-32 ت- 33-41 ث- 41 سنة او اكثر
مكان الاقامة	ا- قرية ب- مخيم ت- مدينة
المستوى التعليمي	ا- اقل من توجيهي ب- توجيهي ت- دبلوم ث- بكالوريس ج- اعلى من بكالوريس
دخل الاسرة خلال الشهر الواحد	ا-اقل من 1000شيكل ب- 1000-4000 شيكل ت- اكثر من 4000 شيكل
الوظيفة	ا- تعمل ب- لا تعمل
رقم الهاتف /الجوال	

II. الخصائص النسائية

عدد الاحمال	ا- 1 ب- 2 ت- 3 ث- 4 ج- اكثر من اربعة احمال
عدد الولادات	ا- لا يوجد ب- 1-2 ت- 4-6 ث- اكثر من 6
عدد الاجهاضات	ا- لا يوجد ب- 1 ت- 2 ث- اكثر من 2
من فضلك كتابة تاريخ اخر دورة ك شهرية لديك التاريخ المتوقع للولادة	

الوزن قبل الحمل (كغم)	الطول (سم)	مؤشر كتلة الجسم

	الوزن	الوزن المكتسب
الوزن خلال الثلث الاول من الحمل		
الوزن خلال الثلث الثاني من الحمل		
الوزن خلال الثلث الاخير من الحمل		

مجموع زيادة الوزن .....

III.الصحة

عزيزتي المشاركة : نود ان نعلمك ان جميع المعلومات التي سوف تقومين بالادلاء بها في هذا الجزء من الاستبيان سوف تبقى سرية ولن يتم استخدامها الا لاغراض علمية من اجل تطوير وتقديم الخدمات الافضل لك ولاسرتك .

نرجو الاجابة على جميع الاسئلة التالية بوضع اشارة√ او ملء الفراغات في الاماكن المناسبة :

	معلومات تتعلق بالصحة	
1-	هل تعانين من ؟	ا- الانيميا او فقر الدم ب- نقص فيتامين د ت- حساسية القمح ث- حساسية الحليب ج- لا شئ مما ذكر
	التدخين	
1-	هل انت مدخنة ؟	ا- ادخن السجائر ب- ادخن الارجيلة ت- ادخن السجائر والارجيلة ث- لا ادخن

	معلومات تتعلق بالوزن خلال فترة الحمل	
-1	هل تعتقدين ان التغذية الصحية خلال فترة الحمل من الامور المهمة لصحتك وصحة جنينك ؟	ا- نعم ب- لا
-2	مفهوم التغذيةالسليمةخلال فترة الحمل يتمثل في ؟	ا- الاكل بشكل مضاعف ب- زيادة الاحتياجات الاساسية فقط ت- اتباع حمية غذائية معينة ث-الابقاء على نظام الاكل المعتاد ما قبل الحمل
-3	ما هو معدل زيادة الوزن خلال الحمل ؟	
-1	خلال الحمل هل كنت تعانين من ايا من الاعراض المذكورة كانت تؤثر على تناولك للطعام ؟	ا- الم في المعدة ب- الغثيان والقئت- الاسهال ث- الامساك ج – حرقة المعدة ح- عدم وجود شهية خ- لا اعاني من وجود اي اعرض
-2	هل تتبعين نوع معين من الانظمة الغذائية خلال فترة الحمل (مثل : تناول صنف من طعام معين ،انظمة غذائية خاصة بانقاص او زيادة الوزن ،نظام غذائي نباتي)	ا- نعم ب- لا
-3	كم عدد الوجبات التي تقومين بتناولها خلال اليوم ؟	ا- اقل من ثلاث وجبات ب-ثلاث وجبات رئيسية ت-اكثر من اربع وجبات
-4	من الشخص المسؤول عن اعداد الطعام في البيت ؟	ا- انا بنفسي ب- شخص اخر
-5	من الشخص المسؤل عن شراء مستلزمات الطعام في البيت ؟	
-6	هل يؤثر الدخل الشهري للاسرة عل نوعية الطعام الذي يتم شرائه ؟	ا- نعم ب- لا
-7	ما هو معدل ساعات النوم خلال اليوم ؟	ا-5-6 ساعات ب- اكثر من 6 ساعات

IV.النتائج المترتبة على صحة الام والطفل

عمر الحمل بالاسابيع	
طريقة الولادة	ا- ولادة طبيعية ب- ولاده مهبلية باستخدام عناصر مساعدة (الملقط او جهاز شفط الجنين) ت- عملية قيصرية
المضاعفات اثناء وبعد الولادة	ا- الولادة باستخدام المحفزات ت-عسر ولادة الكتف ث-نزيف ما بعد الولادة ج- تمزق عنق الرحم ح- الولادة المبكرة خ- لم تحدث اي مضاعفات

المضاعفات خلال فترة الحمل	ا- سكري الحمل ب- ارتفاع ضغط الدم ت- تسمم الحمل ث- الاجهاض ج- لم تحدث اي مضاعفات

جنس المولود	ا- انثى	ب- ذكر
الوزن عند الولادة		
Apgar score	ا- الدقيقة الاولى	ب- بعد 7 دقائق
المضاعفات المتوقع حدوثها للجنين	ا- كبير بالنسبة لعمر الحمل ب- وفاة الحنين داخل الرحم ت- صغير بالنسبة لعمر الحمل ث- تقييد النمو داخل الرحم ج- لا يوجد	
المضاعفات المتوقعحدوثهاللمولود	ا- متلازمة ضيق التنفس ب- نقص السكر بالدم ت- مولودقبلالاوان (خدج) ث- وفاةالمولود بعد الولادة ج- لا يوجد	

جامعة النجاح الوطنية

كلية الدراسات العليا

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اعداد

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د. نهال الناطور

قدمت هذه الاطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في برنامج الصحة العامة، بكلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس – فلسطين.

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الملخص

تعتبر فترة الحمل من المحددات لنوعية حياة الانسان وتعتمد بشكل اساسي على وضع الجنين داخل الرحم ،فترة الحمل الصحية بالإضافة الى التغذية السليمة تقوم بتحسن النتائج الصحية للمولود ،تعتبر زيادة الوزن من الامور المطلوبة والمتوقعة خلال هذه الفترة الحرجة من حياة المرأة الحامل وذلك نتيجة للتغيرات الفسيولوجية التي تمر بها.

وكان الهدف من الدراسة هو معرفة نمط زيادة الوزن بين النساء الحوامل في محافظة نابلس بالإضافة الى تحديد العوامل المؤثرة على زيادة الوزن والنتائج المترتبة على صحة الام والطفل.

المنهج البحثي

تم اعتماد منهج الدراسة الكمية لجمع البيانات من مراكز الصحة الاولية التابعة لوزارة الصحة الفلسطينية في محافظة نابلس، وتم اختيار 387 من الحوامل واللواتي تم اخد العينات بشكل عشوائي من مراكز الصحة

النتائج

اشارت النتائج الى ان حوالي 43.7% من النساء الحوامل المشاركات بالدراسة كانت زيادة الوزن لديهن اقل من التوصيات المطلوبة من قبل المؤسسة الطبية بينما بلغت نسبة النساء اللواتي كانت زيادة الوزن لديهن ضمن توصيات المؤسسة الطبية 36.1% واظهرت النتائج انه 20.3% من النساء كان زيادة الوزن فوق الحد المسموح به، وتشير النتائج انه يوجد علاقة ايجابية بين مؤشر

كتلة الجسم و معدل زيادة الوزن كما ان النساء اللواتي كانت زيادة الوزن بصورة اقل من المعدل المطلوب كانوا اكثر عرضة لحدوث المضاعفات ما بعد الولادة.

الاستنتاج

يعتبر مؤشر كتلة الجسم من العوامل المؤثرة بشكل واضح على نمط زيادة الوزن خلال فترة الحمل والتي بدورها تؤثر على صحة الام والمولود ومن الضروري ان يتوفر متابعة يشكل مستمر لزيادة الوزن في مراكز الصحة الاولية التابعة لوزارة الصحة الفلسطينية والتي من الممكن ان تقوم بالحد من المضاعفات السلبية لمتوقع حدوثها للام والجنين بالإضافة لتعزيز دور مقدم الصحة الاولية من خلال تقديم التعليم المستمر وتقديم النصيحة للام الحامل حول زيادة الوزن والتغذية السليمة.