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# Determinants of Obesity among Married Women Attended Mother and Child Health Clinics - Gaza

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# Determinants of Obesity among Married Women Attended Mother and Child Health Clinics - Gaza


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# *Dedication*

*To all Palestinians women who sacrifice every day for their children and family lives*

***I dedicate this study***

**To my parents……,**

**To my sisters……,**

**To my brothers…….,**

*Who taught me that education is power and woman's greatest protection. Without their support this work could not have been done*

***Jamalt Al-Majdalawi***

## Declaration

*I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.*

Signed: ……..

***Jamalt Yousef Al-Majdalawi***

Date: April-2008

## Acknowledgement

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*Jamalat Al- Majdalawi*

## Abstract

*Universally, obesity is a rapidly increasing concern among women and men particularly in the Middle East countries. It has serious effects on the development and evolution of the non-communicable diseases. This cross-sectional study was carried out to assess the prevalence of obesity and to identify its potential associated factors among women attending Mother Child Health Services in Gaza Strip in order to provide basis for future interventions. The widely recommended-World Health Organization Body Mass Index was used as a standard for defining obesity.*

*The largest clinics in each governorate were selected (total 10 clinics), and proportional systematic random sample from women attending the United Nations and Relief Agency and the Ministry of Health clinics was taken. A sum of 350 women were included with a response rate of 96.8%. Data collected through a self-constructed, face to face interviewed-questionnaire. Additionally, standardized measurements of women height and weight were taken.*

*The study illustrates that the prevalence of obesity is 31.9 % among women surveyed. The prevalence of obesity seems to be higher among refugee's women (33.6%) than their non-refugee counterparts (27.2%). The highest prevalence was reported in Middle Zone (46%) and the lowest in Gaza City (22.6%). This could be related to the demographic characteristics of the women surveyed. It is worth noting that about 33% of the obese women were not aware about the concerned problem.*

*The findings reveal no statistically significant associations between obesity and mothers' nutritional knowledge. On the other hand, women who eat more when they are stressed, are more at risk for developing obesity than others. Obesity was positively associated with the age of women, number of pregnancies, number of deliveries, the length of the interval period between pregnancies and being non-lactated women. Furthermore, strong positive relationships between the presence of family history of obesity and the development of obesity was revealed. In contrary, there is an inverse relationship between obesity and the level of mothers' education.*

*Additionally, the presence of chronic diseases and taking relevant medications are positively associated with obesity. Surprisingly, positive associations were found between obesity and physical activities. This finding necessitates further in-depth enquiry.*

*This study provides first-hand data on the prevalence of obesity in Gaza Strip among women and its associated factors. The researcher recommends further larger sample community-based studies.*

## ملخص الدراسة

السمنة هي من أهم أمراض العصر الحالي والمنتشرة حالياً بشكل واضح والتي قد تكون سبباً واضح لحدوث كثير من الأمراض الغير معدية والوفاة منها. تهدف هذه الدراسة إلى معرفة العوامل المصاحبة للسمنة ووضع التوصيات اللازمة

**أهداف الدراسة الخاصة:**

- معرفة معدل انتشار السمنة بين السيدات المتزوجات
- فحص العلاقة بين حدوث السمنة والظروف الاقتصادية والاجتماعية
- فحص العلاقة بين تاريخ الصحة الإنجابية وعلاقتها بحدوث السمنة
- فحص العلاقة بين النشاط الجسماني وعلاقته بحدوث السمنة
- فحص المعرفة والتوجهات والممارسات التغذوية ودورها في حدوث السمنة
- استخلاص التوصيات المناسبة للحد من انتشار السمنة

**عينة الدراسة:**

تم اختيار عينة نسبية لتحديد عدد السيدات من كل محافظة، واختار الباحث العيادات المركزية في مراكز الرعاية الأولية التابعة لوزارة الصحة ووكالة غوث وتشغيل اللاجئين في كل محافظة، وتم استخدام عينة عشوائية منظمة لاختيار السيدات من كل عيادة. شملت الدراسة 350 سيدة وكانت نسبة الاستجابة حوالي 96.8 %.

**جمع المعلومات:**

جمعت الاستبانة بطريقتين، الأولى من خلال تعبئة الاستبانة المخصصة لهدا الغرض، والثانية هي قياس الوزن والطول لكل سيدة في الدراسة. استخدم الباحث كتلة الجسم لتعريف السمنة بين السيدات

**تحليل البيانات:**

تم استخدام البرنامج الإحصائي " SPSS" لمعالجة البيانات إحصائيا وتم اختبار النتائج باستخدام Chi- sequre واختبار T- test و اختبار معامل تحليل التباين أحادي الجانب "ANOVA" لفحص العلاقة بين المتغيرات.

**نتائج الدراسة:**

بينت نتائج هده الدراسة وجود معدل انتشار واسع للسمنة بين السيدات في قطاع غزة يصل إلى 31,9% ، وكانت نسبة السمنة أعلى بين السيدات اللاجئات, وكذلك أوضحت النتائج أن أعلى معدل للسمنة كان في المحافظة الوسطى (46%)، وأقل معدل كان في مدينة غزة (22,6%).

في هده الدراسة تم التعرف على العديد من العوامل التي تساعد على حدوث السمنة والتي كان لها دلالة إحصائية عالية:

- أظهرت الدراسة أن زيادة عمر السيدة له علاقة ايجابية ومباشرة بحدوث السمنة فكلما زاد العمر كلما زادت نسبة السمنة.
- كما أظهرت أن زيادة عدد مرات ا لحمل والولادة له علاقة ايجابية بحدوث السمنة وكذلك طول الفترة الزمنية بين الحمولات.
- أظهرت الدراسة أن معدل انتشار السمنة كان أعلى بين السيدات الغير مرضعات.
- كما أظهرت الدراسة أن وجود أقرباء يعانون من السمنة من العوامل التي لها علاقة مباشرة وذات دلالة إحصائية بحدوث السمنة، كما أن السيدات اللواتي يعانين من الأمراض المزمنة عرضة أكثر لزيادة الوزن و السمنة.
- تبين من خلال الدراسة أن 33% من السيدات اللواتي يعانين من السمنة غير مدركات لهذه المشكلة ، وتبين أيضا أنه لا توجد علاقة ذات دلالة احصائية بين المعرفة التغذوية وحدوث السمنة. ومن بين الممارسات التغذوية تبين أن السيدات اللواتي يأكلن في حالة التوتر النفسي أكثر عرضة للسمنة.
- أظهرت الدراسة أيضاً أن النشاط الجسماني له علاقة ايجابية ومباشرة بحدوث السمنة، وهذا قد يعود إلى أن غالبية السيدات يمارسن الرياضة بعد حدوث السمنة.

**التوصيات:**

**توصيات عامة:**

تعزيز التثقيف الصحي ونشر الوعي التغذوي بين السيدات ـ التعريف بالسمنة وأثرها على الوضع الصحي، بالإضافة إلى تدريب السيدات على طرق قياس السمنة وتحديدها ومتابعة ذلك باستمرار، وأوصى الباحث على أهمية تشجيع النشاط الجسماني ومحاولة التجهيز و توفير الأماكن اللازمة لذلك

**توصيات بحثية:**

اجراء دراسة أخرى بعينة أكبر وأشمل (Community based study) لتوثيق نتائج هذه الدراسة، بالإضافة إلى إجراء دراسات مستقلة تهدف لدراسة تأثير بعض المتغيرات في السمنة خاصة النشاط الجسماني و علاقة المعرفة والتوجهات والممارسات التغذوية بالسمنة.

## Table of Contents

# List of Tables

# List of Figures

# List of Annexes

# Abbreviations

| | |
|---|---|
| **ANOVA** | Analysis of Variance |
| **BMI** | Body Mass Index |
| **CDC** | Center of Disease Control and Prevention |
| **CHD** | Cardiac Heart Diseases |
| **CI** | Confidence Interval |
| **CM** | Centimeters |
| **DALY** | Disability adjusted life years |
| **DM** | Diabetes Mellitus |
| **EMRO** | Eastern Mediterranean Region Office |
| **Epi-info** | Epidemiological Information program |
| **GDP** | Gross Domestic Product |
| **GNP** | Gross National Product |
| **ICN** | International Center of Nursing |
| **IMR** | Infant Mortality Rate |
| **IUD** | Intra Uterine Device |
| **KG** | kilogram |
| **LBW** | Low Birth Weight |
| **MCH** | Mother and Child Health |
| **MOH** | Ministry Of Health |
| **NGOs** | Non Governmental Organizations |
| **NIS** | New Israeli Sheqalim |
| **OA** | Osteoarthritis |
| **OR** | Odds Ratio |
| **PCBS** | Palestinian Center Bureau Of Statistics |
| **PHC** | Primary Health Center |
| **SD** | Standard Deviation |
| **SES** | Socio-economic status |
| **SPSS** | Statistical Package for Social Science |
| **TV** | Television |
| **UNRWA** | United Nation Relief And Work Agency |

| | |
|---|---|
| **WHO** | World Health Organization |

**Definition of terms:**

**Women**

Women in this study referees to the married lady who are not pregnant, utilize MOH and UNRWA mother and child health clinics and filled questionnaire.

**Poverty line:**

Palestinian Central Bureau of Statistics (PCBS) estimated the poverty line for the year 2006 to be 2,143 New Israeli Sheqalim (NIS) for a household composed of two adults and four children (PCBS, 2006).

**Socioeconomic status:**

A term referring to prestige-based measures of socioeconomic position, as determined by rankings in a social hierarchy, Measures of SES are typically a composite of occupation, education, income, location of residence

**Body mass index**

Define as A measurement of the relative percentages of fat and muscle mass in the human body, in which mass in kilograms is divided by height in meters squared and the result used as an index of obesity (WHO, 2002)

**Classification of BMI According to World Health Organization (WHO):**

**Underweight:** <18.5 BMI (kg/m2)

**Normal weight**: 18.5 - 24.9 BMI (kg/m2)

**Overweight:** 25 - 29.9 BMI (kg/m2)

**Obesity:** ≥ 30 BMI (kg/m2)

**Morbid obesity:** > 40.0 BMI (kg/m2)

**Disability adjusted life years:**

According to World Health Organization, D ALYs for disease are the sum of the years of life lost due to premature mortality in the population and the years lost due to disability for incident cases of the health conditions.

**Level of education**

The researcher classified the educational level into three categories

**Low educational level**:

This level includes any women not complete more than 9 years of education

**Medium education level**:

This level includes any women completed between 9-12 years of education

**High educational level**:

This level includes any women completed more than 12 years of education

**Level of nutritional knowledge**

The researcher classified nutritional knowledge into two categories

**Low nutritional level:**

This level includes any women have correct answer for less than 70% of question related to nutritional knowledge.

**High nutritional level:**

This level includes any women have correct answer for more than 70% of question related to nutritional knowledge.

## Chapter (1)

## Introduction

The World Health Organization (WHO) reports that, Obesity now is replacing more traditional problem, such as under nutrition and infectious diseases as the most significant causes of ill health (WHO, 2000). Obesity poses one of the greatest public health challenges for the 21st century, with particularly alarming trends in several parts of the world; although the numbers of those obese (BMI over 30) are rising everywhere. For instance, globally, there are more than 1 billion overweight adults, at least 300 million of whom are obese (Tawil, et al, 2007). According to International Council of Nursing (ICN), the WHO estimated that obesity affect 18% of the global population, with 50% increasing over the past seven years (ICN, 2007).

Obesity is prevalent in both developing and industrialized countries; in 1999 to 2000, a total of 64% of the United States (US) adults were found to be overweight or obese, an increase of 8 percentage points from 1988 to 1994 (Frank, 2006). In 2002, 39 states had prevalence of obesity more than 20% (Todd, 2005). In European region, currently almost 400 million adults in the region are estimated to be overweight and about 130 million to be obese, the prevalence in the region range from 5% to 20% in men and up to 30% in women (WHO, 2005). Approximately 14% of Australians over the age of 15 are obese (Darby, et al, 2007). Overweight and obesity is becoming a common condition in the Eastern Mediterranean Region (EMRO). The proportion of overweight and obesity among men ranged from 30% - 60%, while among women it ranged from 35% - 75% ( Musaiger, 2004). Obesity have reached epidemic proportions in Arabic countries; the prevalence of obesity among women was 20.2% in Saudi Arabia (Malki, et al, 2003), 49.7% in Jordan (32.7% in males and 59.8%

in females) (Ajlouni, et al, 1998), 23.5% among adult Kuwaitis, was higher among women (30%) than among men (17.5%) (Olusi, et al, 2003).

As the prevalence of obesity has increased, concern about health and economic consequences has also grown; obesity substantially increases morbidity and impairs quality of life, almost 300,000 deaths each year, and $117 billion in direct and indirect annual cost in the UN (Juhee, et al, 2006), and its accounts for 2-6% of total health care cost in several developed countries; some estimation put the figure as more. The true costs are undoubtedly much greater as not all obesity related conditions are included in these calculations (Nani, et al, 2006).

Overweight and obese adult are more likely than those of normal weight to have diabetes, asthma, arthritis, high blood pressure, high cholesterol, and fair or poor health status especially with those of obesity class 3 (Todd, 2005). Several factors, such as change in dietary habits, socioeconomic factors, inactivity and multiparty determine obesity (Musaiger, 2004).

The problem threatens Palestinian population as all Mediterranean and world Region, women obesity estimated to be 37.5% among women in West Bank Villages (Stene, et al, 2001), regarding to the prevalence of obesity among Palestinian people in the Gaza Strip there is no available literature on hand, so this study aims towards estimation of the prevalence of obesity among Palestinian women in the Gaza Strip. Additionally the contributing factor of obesity varied from region to another and from culture to another, which stressed the researcher to study contributing factors in our country in this study.

## 1.1 Problem statement

As aforementioned obesity has increased in prevalence worldwide, and poses a major risk for serious diet related diseases. The health impact and financial burden of obesity have been well documented in literature, an understanding of the modifiable determinant of obesity is important for the design of effective preventive public health strategies to combats the rise in non communicable diseases associated with obesity, such as diabetes and cardiovascular diseases No such information existed in the adult Palestinian in Gaza Strip population before this study, therefore, this study answers the question about the prevalence of obesity and its associated factors.

## 1.2 Justification of the study

Obesity has become an epidemic problem worldwide, and in the Eastern Mediterranean Region of overweight has reached an alarming level (Musaiger, 2004). According to literature this may be due to increased consumption of more energy-dense food; nutrient poor food with high level of sugar and saturated fats, in addition to reduced physical activity, through increasing usage of automated transport, and advanced technology at home led to marked increase of obesity rate.

In the past, health experts and others believed that having a large percentage of the population being overweight was a health issue confined chiefly to wealthier countries such as US, England, German, and Japan (David, 2004). While in fact overweight and obesity play a major role in both increase risk factors for health problem, which ultimately led to increase mortality to 280,000 deaths per day are attributable to obesity (Mangnani, et al, 2001). Diet is one of the major risks for chronic disease, as diabetes, cardiovascular disease, hypertension,

stroke, arthritis and musculoskeletal problem. Obesity increases the risk of several major cancers in women, especially postmenopausal breast cancer and endometrial cancer (He, et al, 2004).

The effect of obesity for women was duplicated at pregnancy and negatively affects quality and quantity of their life because there is strong correlation between women obesity and pregnancy complication compared with normal weight women, in the same time the baby for obese mother have chance to start their life with certain disease and other congenital anomalies (Tosson, et al, 2005).

Prevention and early treatment of obesity as early as possible can ensure a healthy population of women of all ages, and prevent the occurrence of multiple health problems. These health problem consider as a real burden for any health care system, take into account that 2-6% of total health expenditure for many countries going to treat obesity or health problem related to diseases caused by or associated with obesity (Park, et al, 2006). Although, obesity becomes one of the major health problems, there is no strategy to prevent and control obesity in the health plan of most Mediterranean region, and lack of research study on obesity and factor contributing it (Muusaiger, 2004).

In Gaza Strip there is no research conducted to estimate women obesity; this study is carried out to estimate the prevalence rate of obesity among married women and investigate the relationship between obesity and other variables such as socioeconomic status, life style, and parity to draw attention of policy maker and public health community to take appropriate action in order to increase awareness about the benefit of obesity prevention.

### 1.3 Overall goal

The overall goal of this study is to identify potential risk factors associated with obesity among married women in the Gaza Strip to provide basis for further intervention by health provider.

### 1.4 Objectives

1. To analyze the prevalence of obesity and its association with socio demographic factors among married women in the Gaza Strip
2. To investigate the relationship between obesity and life style among married women in the Gaza Strip.
3. To investigate the relationship between obesity and nutritional KAP among married women in the Gaza Strip.
4. To investigate the relationship between obesity and Reproductive health history profile among married women in the Gaza Strip.
5. To make recommendation on the way forward regarding intervention to prevent and control obesity

### 1.5 Research questions:

1. What is the prevalence of obesity among married women in Gaza Strip?
2. Is there a relationship between obesity and age among married women in Gaza Strip?
3. Is there a relationship between obesity and level of education among married women in Gaza Strip?

4. Is there a relationship between obesity and residential status among married women in Gaza Strip?
5. Is there a relationship between obesity and economic status among married women in Gaza Strip?
6. Is there a relationship between obesity and reproductive health history among married women in Gaza Strip?
7. Is there a relationship between obesity and pattern of physical activity among married women in Gaza Strip?
8. Is there a relationship between obesity and nutritional knowledge among married women in Gaza Strip?
9. Is there a relationship between obesity and nutritional attitude among married women in Gaza Strip?
10. Is there a relationship between obesity and nutritional practice among married women in Gaza Strip?

## 1.6 Context of the study

### 1.6.1 Demographics context:

Palestine has an important geographic and strategic location. According to Ministry of Health (MOH) report, it is situated on the eastern coast of the Mediterranean Sea, in the Middle East. It is bordered by Lebanon on the north, by Syria and Jordan on the East, the Gulf of Aqaba on the south and by Egypt and the Mediterranean Sea on the West (MOH, 1999 a). The territory of Palestine covers around 10,435 square miles out of this territory; there are

10,163 square miles of land area. The rest is water, half of the area of the Dead Sea (Annex 1).

West Bank lies within the area of 5,800 km2 west of the Jordan River; it has been under Israeli military occupation, together with east Jerusalem since June 1967. West Bank divided into four geographical regions: The northern includes the district of Nablus, Jenin, and Tulkarem. The center includes the district of Ramallah and Jerusalem where the southern is includes include Bethlehem, Alkalil district and Jericho (MOH, 2006).

Gaza Strip is a narrow piece of land lying on the coast of the Mediterranean Sea, its position on the cross roads from Africa to Asia made it a target for occupies and conquerors over the centuries (Annex 2).

According to Palestinian Center Bureau Of Statistics (PCBS), the total number of Palestinian people at the end of 2006 is estimated to 10.1 million, of which 3.95 million have usual residence in the Palestinian Territory, Gaza Strip and West Bank including Jerusalem, (39.2%), 1.1 million (11.2%) live in Israel, 2.8 million (27.7%) in Jordan, 1.6 million (16.2%) in other Arab states, and 573 (5.7%) thousands live in other countries The population of the Palestinian Territory is estimated to about 4 million at the end of 2006, out of them 2.5 million (63%) in the West Bank and 1.5 million (37%) in Gaza Strip.

Gaza Strip is very crowded place with an area of 365 km2; which considered one of the highest worldwide, with population density of 3,808 inhabitants/ km2.Gaza Strip constitutes 6.1% of total are of Palestinian territory land. The population size in the Gaza Strip, has been estimated to be 1,443,814 (37.1 % of total population), Around 19.3% of the population

resides in the North Gaza, 35% in the Gaza city, 14.5 in Mid Zone, 19.4% in Khanyounis, and 11% in Rafah district (PCBS, 2006).

According to United Nation Relief and Work Agency (UNRWA) registration statistics, the total registered refugee's population in Gaza Strip was 986,034 in the year 2005, which constituted 68% of total population (UNRWA, 2005).

The majority of population is young where the percentage of those less than 15 years old is 48.8% and only 2.6% above 65 years (Annex 3). Dependency ratio still considered high in Gaza Strip around 1.07%.

The crude birth rate in Gaza Strip was 33.7 per 1000, while the crude death rate drooped to 3.1 per 1000. Total fertility rate still high in Gaza Strip compared with other countries (5.8 births per women), all affected the natural increase which reach 3% in the year 2005 (MOH, 2006).

**1.6.2 Economic context:**

Unstable political situation negatively affected the socio-economic status in Palestine, According to World Bank, 67% of Palestinian households are living below the poverty line; percentage of people who live in deep poverty had been steadily increased to reach 35% in Gaza Strip and 15% in West Bank, also the unemployment rate is sharply increased to reach 28% in West Bank and 39% in Gaza Strip (World Bank, 2007).

The general dependency ratio reaches in Palestine about 0.96% (1.07 % in Gaza Strip and 0.9% in West Bank), that's mean more than half of population dependant on others.

According to Ministry of Finance, The Palestinian Gross National Product (GNP) in Palestine decreased to 4,709 million US$ in the year 2005, Gross Domestic production (GDP) also decrease to 4,201 US$ in the same period.

### 1.6.3 Health system context:

Prior to being occupied by Israel in 1967, Gaza was administered by Egypt, while the West Bank and East Jerusalem were administered by Jordan, Gaza followed Egyptian protocols for medical licensing, and While West Bank followed Jordan protocols. Between 1967 and 1994, these areas were both administered by Israeli defense ministry and continue to follow different protocols in certain health policy areas. Since 1948, UNRWA has been charged with providing basic health services to registered Palestinian refugees in both areas. Following the Oslo agreement in 1993, responsibility of health services and health policy was transferred from Israeli administration to the newly formed Palestinian Authority (PA). The PA assumed health sector responsibility of Gaza Strip and West Bank (Schoenbaum, et al, 2005).

The Palestinian health care system is commonly described as consisting of four sectors: the governmental sector, led by the MOH; the privet sector; the Non Governmental Organization sectors (NGOs); and the sector run by the UNRWA.

The MOH serves as regulatory body for the Palestinian health system, The MOH manages public health services and delivery of primary, secondary, and tertiary care in government facilities. MOH operates 416 primary health centers (PHC) constituted 64.3% from the total PHC: 56 PHC in Gaza Strip and 360 PHC in West Bank, out of them 355 PHC provides mother and child health services. MOH responsible for significant portion of the secondary

health care, operates 22 hospitals (10 in Gaza Strip and 12 in West Bank) furnished with 2,815 beds (1,499 in Gaza Strip and 1,316 in West Bank) (MOH, 2006).

UNRWA owned and supervised 53 PHC centers distributed as 35 PHC centers in West Bank and 18 PHC centers in Gaza Strip, an operates only one hospital in West Bank furnished with 63 beds. Regarding to NGOs, have 185 PHC distributed as 130 in West bank and 55 in Gaza Strip, additionally NGOs owned 30 hospitals, out of them 20 in West Bank and 10 in Gaza Strip. Finally, a private sector owned and operates 21 hospitals in West Bank and only 2 hospitals in Gaza Strip (MOH, 2006).

**1.6.4 Health indicators:**

Low birth weight an indicator of maternal under nutrition. Around 5.3% of total live births in Gaza Strip reported as Low birth weight (LBW) (< 2,500 gm) with total number of 2,257births (MOH, 2004)

Infant mortality rate (IMR) is one of the main health indicators reflect the health status in the country. IMR has been declined over the past two decades from 150/ 1,000 live births prior to 1967 to 20.8 / 1,000 live births in 2005

Mortality from infectious diseases constituted 10 % of total deaths in Palestine (MOH, 2006), that means, MOH succeeded in preventing and controlling many of infectious disease threaten the population life. MOH controls and prevents this type of diseases by good health education and successful of immunization program, where vaccination coverage reaches more than 95% for most vaccinations.

On other hand, non communicable diseases are considered the most causes of deaths in Palestine. Cardiovascular diseases, heart diseases, hypertension, neoplasm, all was included in the top ten leading causes of death for population (MOH, 2006). According to the literature one of the common risk factor for non communicable diseases was overweight and obesity. This stressed the researcher to assess the magnitude of the problem in Gaza Strip and investigate the related factors.

Additionally, congenital malformation is also one of the top leading causes of deaths among infants in Palestine; this could be due to complication or birth outcome for obese women (Valerrian, 2006).

However, In comparison with other Arabian and EMRO countries, Palestinian population has good health status.

**1.6.5 Overview of Palestinian women and their health context:**

Palestinian women are strong, empowered and have the potential to take decision in all life matters, regardless to political and socioeconomic obstacles facing them (MOH, 1999 b).

According to PCBS (2006) female constitute 49.4% of total population, women in the reproductive age (15-49) constitute 21% of all population, while they constitute 43.4% of all female population. Female are younger than 15 years constitutes 48.5% of total females, 8% are ≥50 years and 3% are ≥ 65years (PCBS, 2006 a). Literacy rate among females was 88.9%, out of them 5.8% have bachelor degree and above (PCBS, 2006 b).

MOH shows such theses women have a fundamental right to enjoy the highest possible levels of health and quality of care (MOH, 1999 b). Fore that the MOH works together with

UNRWA and NGO toward the improvement of health and quality of the women's life during all stages of their life span. Female still have the higher average life expectancy at birth, is 73 years. The percentage of women (15-49) years old who reported using any family planning methods was 41.7% in Gaza Strip, pills was the most method used constituted 44.9% of total methods. More than 96.5% of pregnant women received antenatal care, with average 6.5 visits paid by pregnant women. Prevalence of anemia among pregnant women registered in MOH was 27.2%, while among those registered in UNRWA was 35.7%. The vast majority of labor takes place in health services either in hospitals or in primary health care clinic with percentage of 96.9% of total deliveries. Maternal mortality rate in Gaza Strip was 15.4 per 100,000 live births.

The first Leading causes of death among female was heart disease, followed by neoplasm, where the cancer breast is the first leading cause of cancer mortality (MOH, 2006; PCBS, 2006 a).

## Chapter (2)

## Literature Review

Obesity poses one of the greatest public health challenges for the 21st century, with particularly alarming trends in several part of the world, including the Mediterranean region.

In this chapter, definition are presented, classification and consequences of obesity, Then prevalence of obesity; internationally, regional and locally are discussed. Moreover the risk factors associated with obesity are explored based on several literature related to this concern.

### 2.1 Definition of obesity

The historical roots of obesity can be traced back to 25,000 years ago. Where Stone age artifacts of corpulent women have been found in several sites across Europe **(**Caro, 2002), that's mean obesity is not recent phenomena**.**

There is consensus among the researcher regarding to definition of obesity over the years, which congruently with WHO definition as "a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired" (WHO, 2000). Recently, WHO defined obesity based on Body Mass Index (BMI) equal or more than 30, furthermore, recommendation for treatment of obesity are based on BMI.

There is general agreement among researchers, the BMI is recommended way to estimate body fat for populations and are widely used in epidemiological studies for their simplicity. The BMI is the preferred method for assessing the body weight of children, adolescents, and adults. The BMI formula evaluates body weight relative to height. It is a useful, indirect measure of body composition, because in most people it correlates highly with body fat. BMI correlated well with estimates of body composition from three methods -- body density, total body water, and total body potassium (Wells, et al, 2002). Concluding that, BMI is a convenient and reliable indicator for obesity. BMI, which is calculated by dividing weight in kilograms (kg) by height in meters (m) squared (height x height). The BMI values are age-independent and the same for both sexes; however BMI may not correspond to the same degree of fatness across different populations due, to different body proportions. Therefore ideally, additional tools, such as waist circumference and waist-hip ratio, should also be used to assess obesity (WHO, 2007).

**2.2 Classification of obesity:**

Obesity and overweight classified according to BMI after consultation of groups of WHO expert in this field in the year 1997 (WHO, 1988). This classification considered obesity with BMI 30 or more, overweight from 25 – 29.9 BMI, normal weight from 18.5 – 24.9 BMI, and less than 18.5 BMI considered as underweight (Annex 4).

**2.3 Health consequence of obesity**

"Sudden deaths is more common in those who are naturally fat than in the lean" (Chadwick, et al, 1952), this statement revealed that, the association of obesity with other serious condition not recent phenomena, and it's recognized since ancient times. Obesity is a complex condition, with serious social and psychological dimensions, affecting virtually all ages and socio-economic groups and poses a major risk for serious diet-related chronic diseases. Furthermore recently is considered major contributor to the global burden of chronic diseases and disability (Nani, et al, 2006).

According to the literature the health consequences of obesity are many and varied, ranging from increased risk of premature death to several non fatal but have an adverse effect on quality of life. According to analysis carried out by WHO in the year 1997 showed that, approximately 58% of diabetes mellitus, 21% of ischemic heart diseases and 8- 42 % of certain cancer were attributable to high BMI, and 8-15% of death in Europe and America was attributable also to high BMI (Alice, 2005). In more recent study Park et al (2006), estimate the burden of disease attributable to overweight and obesity. Parak found the disease burden attributable to overweight was 827.1 person years (PYs) overall, 732.6 for men, 922.9 for women per 100 000 persons. The disease burden attributable to obesity was 260.0 PYs overall, 144.2 for men, 377.3 for women. The disease burden attributable to overweight was 3.2 times higher than that attributable to obesity (Park, et al, 2006).

In US, obesity was recently estimated to be responsible for almost 300,000 deaths each year and annual health care costs of $117 billion, that's mean, more than 17% of all deaths in the United States in the year 2000, were attributable to overweight and obesity; only tobacco use accounted for more deaths (Janice, et al, 2007).

Obesity has been related to increased morbidity and mortality rate due to coronary diseases, neoplasm, digestive diseases; type II diabetes mellitus, arthritis, arteriosclerosis and many other causes of chronic morbidity and mortality (Hazemi, et al, 2000).

Furthermore, Khatib (2004) reported that Overweight and obesity can lead to adverse metabolic changes, including increases in blood pressure, unfavorable cholesterol levels and increased insulin resistance. They raise the risk of coronary heart disease, stroke, type 2 diabetes, atherosclerosis, gall bladder disease, hypertension, kidney failure and many forms of cancer, particularly breast cancer (Khatib, 2004). Moreover, obesity is also associated with pregnancy complications, stress incontinence and increased surgical risks (Tawil, et al, 2007).

In conclusion, the continuing epidemic of obesity can be expected to be associated with further reduction in life expectancy and large increases in the number of unhealthy life years.

**2.3.1 Cardiovascular disorders:**

Obesity is associated with some of the major risk factor for the cardiovascular diseases, such as hypertension and low concentration of HDL cholesterol, but it is also associated with small particle sized LDL cholesterol. The relative risk of cardiovascular diseases in obese versus normal weight individual are 1.5-2.5 (WHO, 2007).

Several studies have shown that, overweight and obesity and excess abdominal fat are directly related to cardiovascular risk factors. Abdelmonem (2000) reported that overweight and obesity are associated with increased morbidity and mortality from Cardiac Heart Diseases (CHD) and the risk of myocardial infarction increase with increasing level of BMI

(Abdelmonem, 2000). Furthermore in Korea, obesity considered the second obesity attributable disease burden overall population (Park, et al, 2006).

In addition, obese CHD patients are younger and hospitalized more frequently during the first 10 years of their illness than the non obese patients (Abdelmonem, 2000). According to James W etal (2001) obesity is a major risk factor for CHD. Young women or men with higher than average BMI values have increases in CHD risk that are similar in magnitude to those associated with dyslipidemia, hypertension, and cigarette smoking). For example, for every 1% that a young person exceeds a desirable BMI value, there is an increase in CHD risk of 3.3% for women and 3.6% for men. Weight gain after 18 years of age for women or 21 years of age for men also significantly increases CHD risk. For example, for every 1 kg of weight gain after high school, the risk for CHD increases 5.7% for women and 3.1% for men (James, et al, 2001).

Onat, et al (1995), examine the relationship between obesity and other risk factor among Turkish aged 20 years or more and found that, obesity interacted with a variety of risk factors. The relation between BMI and plasma total cholesterol was significant in young (20–39 years), and that plasma triglyceride in young and middle-aged participants. Both the systolic and diastolic blood pressure rose significantly, with a rise in BMI in women and in young (20–29 years) men (Onat, et al, 1995). Similar to this finding in Palestine according to community based study in rural Palestinian village, obesity seemed to be more important correlate of blood pressure and serum triglycerides level (Stene, et al, 2001).

**2.3.2 Diabetes mellitus (DM):**

The association between the body weight and the prevalence of non-insulin-dependent diabetes has been observed in several studies worldwide. Doctors and researchers have found that obesity and diabetes are connected. Persons who are obese are at high risk for developing Type 2 diabetes, particularly if a close family member is affected with diabetes (Pollock, et al, 2007).

Similarity, Hazmi, et al (2000), reported that diabetic patients are often obese, while on the other, obese individuals frequently develop diabetes (Hazmi, et al 2000). Furthermore, the severity of obesity is a more important determinant of the risk for developing diabetes, where the risk for diabetes has been reported to be about twofold in mildly obese, fivefold in moderately obese, and 10-fold in severely obese persons (Xavier, 1993). That means, the risk of diabetes increased steeply as obesity became more sever. According to cross sectional study conducted in Lebanon among aged 30 years and over revealed that, obesity responsible risk factor for diabetic with 55% among males and 67% among females (Salti, et al, 1997). While in Korea Diabetes attributable to overweight and obesity is an account for highest burden among other diseases in both genders ((Park, et al, 2006).

According to literature, there were significant differences in the prevalence of obesity and overweight in diabetic and non diabetic individuals. Hazemi, et al found that, the prevalence of obesity among diabetic patients (30%) was approximately double the prevalence among non diabetic patient (15.8%), while the overweight among non diabetic was 25.2% and 33.3% among diabetic patients (Hazmi, et al, 2000).

**2.3.3 Obesity and cancer:**

People are often surprised by the connection between obesity and cancer, may be due to the mechanism of the link between body weight and cancer is still not clear, but some researchers suspect a hormonal connection The researchers, from International Agency for Research on Cancer (IARC), found that obesity increased the risk of breast, colon, kidney and oesophageal cancer and cancer of the womb lining. They estimate that 40% of womb lining cancers, up to 25% of kidney cancers and about 10% of breast and colon cancers would not develop if people avoided putting on excess weight (BBC, 2002).

According to prospective study among 900,000 Americans adult who have higher level of BMI at the start of study. The finding was revealed dramatic increase risk for some cancer among study population such as kidney and uterus for women and liver for men. The risk of cancer death was 52% higher in men and 62% higher in women when compared with normal weight adults (Wider, 2003).

Galloway (2005), mentioned that, at least in the United States, obesity is responsible for 20% of all cancer deaths in women and 14% in men. Further estimation found that 90,000 people each year are dying from obesity-related cancers (Galloway, 2005)

**2.3.4 Obesity and osteoarthritis (OA):**

Being overweight is a clear risk factor for developing OA. Possible factors underlying the relationship between obesity and osteoarthritis include mechanical stresses related to the increased load carried by the obese, metabolic changes associated with increased fatness and dietary elements (WHO, 2000). Population-based studies have consistently shown a link between overweight or obesity and knee OA. Estimating prevalence across populations is difficult since definitions for obesity and knee OA vary among investigators. The link

between obesity and OA not recent phenomena, data from the National Health and Nutrition Examination Survey conducted since 20 years ago indicated that obese women had nearly 4 times the risk of knee OA as compared with non-obese women; for obese men, the risk was nearly 5 times greater (Anderson, et al, 1988). In the same context Cicuttini, et al (1996) found that, Obesity is an important risk factor for development of OA at the tibiofemoral and patellofemoral joints of the knee and CMC joints of the hands, with significant increases of 9-13% in risk of OA per kg increase in body weight. This emphasizes the potential importance of even minor weight reduction as a preventive health measure for OA (Cicuttini, et al, 1996).

More recent study conducted in England by Coggon, et al (2001) found that, the risk of knee OA increased progressively from 0.1 for normal weight to 13.6 for BMI of 36 or higher(Coggon, et al, 2001). Similarity, case control study conducted in Finland to examine the effect of weight changes between 20 and 50 years of age on the risk of severe knee osteoarthritis. The finding explain that, weight gain was associated with a higher relative risk of knee OA requiring arthroplasty than persistent overweight from 20–50 years of age, compared with those with normal relative weight during the corresponding age period (Manninen, et al, 2004).

**2.4 The Economic costs of obesity**

Obesity is not only a health but also an economic phenomenon, where it is considered as an independent risk factor for a variety of chronic diseases and is therefore a potential source of avoidable excess health care expenditures. Determining the economic cost of obesity is an important activity which can highlight the true impact of the obesity problem for policy-

makers in a language they understand-money. According to WHO criteria The costs of obesity are usually divided into three components (WHO, 2000):

i. Direct costs: health care resources for the management of obesity and related illness

ii. Indirect costs: loss of economic activity due to illness and premature death associated with obesity;

iii. Intangible costs: the cost to individual arising from the impact of obesity on quality of life generally and on health specifically.

Several studies have directly estimated annual health care costs associated with overweight and obesity, most of these studies concentrate on direct economic costs, and provide rough estimates that don't allow for comparable breakdown of expenditures on certain type of care Quesenberry, et al (1998) found that overweight individuals had 25% higher health care costs than normal-weight individuals and the extremely obese had 44% higher costs than normal-weight individuals (Quesenberry, et al, 1998). Similarly, Thompson et al (2001) reported that overweight individuals had 10% higher costs than normal-weight individuals; obese individuals had 36% higher costs than normal-weight individuals (Thompson, et al, 2001). Sturm estimated that obesity was associated with 36% higher inpatient and outpatient costs in a national survey of adults aged 18 to 65 (Strum, 2002). Recently, Finkelstein et al (2003) used individual-level national survey data and regression techniques to estimate that 9.1% of total U.S. medical expenditures can be attributed to overweight and obesity (Finkelstein, et al, 2003).

Disability adjusted life years (DALY), reflect the number of years of healthy life lost due to early death, disability or disease. James et al (2001) calculated DALYs in people aged 30 years and over worldwide that could be attributed to BMI over 21 kg/m2 due to premature death and those spent suffering disability, the result showed that, the excess body weight causes the loss of nearly 12 million years of healthy life in adults each year (James, et al, 2001).

**2.5 Prevalence of obesity**

In the 1990s, the World Health Organization began sounding the alarm about a worldwide epidemic of obesity. In 1995, there were an estimated 200 million obese adults worldwide; by 2000, the total had risen to 300 million (David, 2005). Until now the prevalence of overweight and obesity are increasing in prevalence in nations all over the world. As inferred from the literate there are great differences in prevalence rate of obesity, where the proportion of prevalence varies from country to country and between geographical areas within the same country. This may be due to many medical condition involved in the development of obesity may confuse the effect of obesity it self.

**2.5.1 Global prevalence of obesity:**

Obesity is progressively increasing in all the more industrialized western nations. Over one billion adults are overweight and at least 300 million of them are clinically obese (Naini, et al, 2006). The levels of obesity range from below 5% in china, Japan and certain African nations to over 75% in urban Samoa, but even in relatively low prevalence country like China, rates are almost 20% in some cities (ÓÓWHO, 2003).

Cihangir, (2004), mentioned that, prevalence of obesity in adults is 10% to 25% in most countries of Western Europe and 20% to 25% in some countries in the Americas. This figure rises to 40% for women in eastern European and Mediterranean countries and for black women in the United States, but it is up to 80% in the island of Nauru in the South Pacific (Cihangir, et al, 2004).

The obesity epidemic in the United States worsens with each passing years. From 1991 to 2002, the prevalence of obesity has increased more than 89%, representing more than 43 million adults in 2002. In 1991, no state in the nation had an obesity prevalence at or above 20%, but in 2002 there were 39 states with this characteristic (Todd, 2005). More recent study performed in 2006 illustrates that prevalence rate of obesity has risen by approximately 110% from the period 1976- 198 to 1999-2000 (Janice, et al, 2007). According to Parak et al, (2006) recently obesity more in male than female in American countries; according to study performed in Korea, which illustrated that, the prevalence of obesity was increased to 3.9% in 2001 from 1.7% in 1998 among the male population and to 3.4% from 3% among the female population during the same period (Parak, et al, 2006).

Similarity alarming trend of obesity are arising in the WHO European region, the world health report 2002, revealed that Europe now has one of the highest average BMI of all WHO region nearly 26.5. Obesity affects up to a third of the adult population in the Region (WHO, 2002). According to ICN, in the past 10 years the prevalence of obesity has increased by 10-40% in the majority of European countries (ICN, 2007).

Data about obesity prevalence is nearly limited in Africa compared with other world region. However, the obesity more in South Africa, where one in three men and more than one in two

adult women are overweight and obese. In Morocco 40% of the population are overweight, while in Kenya it is 12%. In Nigeria it is estimated that between 6% and 8% of people are obese (Ania, 2004).

### 2.5.2 Obesity prevalence in EMRO countries:

Obesity become serious medical problem not only in developed nations, developing countries like in Mediterranean region has become epidemic of obesity like other region worldwide. Unlike in Europe and North America, obesity is more prevalent in women, this result according to study conducted in Mediterranean region. Matroell (2000), reported that women in Egypt and Turkey have the highest proportion of obesity (31.7% for both), as well as the highest proportion of obesity (20.1% for Egypt and 18.6% for Turkey) (Martoell, 2000). The prevalence of overweight and obesity for males and females in a number of countries of the Region is shown that, among males, the prevalence ranges from 10.5% in Pakistan to 64.0% in Saudi Arabia, while for females it ranges from 21.7% in Morocco to 79.0% in Bahrain. The regional adjusted mean for overweight and obesity is 54.2% for women compared to 31.4% among males (Khatib, 2004). More recent study highlights the current situation of obesity in the region found that, in adulthood, women showed high prevalence of obesity range from 35%-75% while men have prevalence rate range of 30%--60%. (.Musaiger, 2005).

There is consistency in literature regarding to high obesity prevalence rate in EMRO countries, and multi cross sectional studies performed to estimate its prevalence in population from Arab countries in the region, indicate that the prevalence of obesity is higher than in most other counties of the world. In Jordan population the prevalence of obesity was very high (49.7%). Female more likely to be obese (59.8%) than Male (32.7%) (Ajlouni, et al, 1998). Among

adult Kuwaitis the prevalence was 23.5%; was higher among women (30%) than among men (17.5%) the total prevalence of obesity and overweight in the population was 58.5 (63.4% among women and 53% among men) (Olusi, et al, 2003). Similarity, Bahraini women of various age groups has high prevalence represented by 31.4% for women aged 20-65 years, and among women 50-79 years old, half of whom have been reported to be obese (Hamdan, 2000). More recently, 37% among Iragi women was obese; out of them 32% was morbid obesity (Tawil, et al, 2007).

As inferred from the literature, obesity now represents a serious problem in EMRO countries and continues to rise at alarming rate in Mediterranean Region, more so in women. At long last obesity a major health hazard in the region and associated with several relatively common disease

**2.5.3 Obesity in palestine:**

There is limited information on obesity in Palestine. However, there is constant in the surveys result in alarmingly high levels of obesity in Palestine especially among women; the first community based study was conducted in Jerusalem revealed high prevalence of overweight and obesity in 1986, and increased prevalence of obesity were found in 1986 than 1970 in both sex; 33% in women and 16% in men (Gofin, et al, 1996). Another survey was carried out in semi-rural Palestinians village in the central West Bank only and included adults aged 30-65 years, the prevalence of obesity was 37.5% among women and 18.8% among men. The prevalence of abdominal obesity was 62.5% among women and 14.8% among men. This survey found that obesity was associated with older age and residence in urban areas (Stene, et al, 2001). In comparison between rural and urban population, Abdel Rahim, et al (2003)

found the prevalence of obesity was 36.8% and 18.1% in rural women and men, respectively, compard with 49.1% and 30.6% in urban women and men respectively (Abdel Raim, et al, 2003). More recent survey was carried out by Rizhallah among women aged 40-65 years in Palestinian refugee camps in the West Bank and found a prevalence of obesity in this group of 70 percent (MOH, 2005). According to cross sectional study conducted by Abu dayya (2003) at preparatory school in Gaza city and North Gaza 2003; the prevalence of overweight was 12.8%, obesity was 5.5% among adolescent aged 12-15 years (Abu Dayya, 2003). Though there is no information available on trends in obesity, it is possible that obesity is on the increase especially among older adults.

### 2.6 Contributing risk factor for obesity

#### 2.6.1 Socio-economic status (SES):

There is inconsistency within the literature regarding to the relationship between obesity and socioeconomic status as social class, education, and marital status.

An exhaustive review conducted by Carlos, et al, (2004), for several studies conducted in multi countries. First data surveys conducted between 1987 and 1996 in national samples of non pregnant women aged 15-49 years from 32 developing countries analyzed from 38 published prior to 1989 that provided information on socioeconomic status and obesity. Data set covered five developing regions (Central Eastern Europe, Latin America and Caribbean, Middle-East and North Africa, South Asia and sub- Saharan Africa). The result showed that, a lower risk of obesity among the group of low SES in 24 surveys, no statistically significant differences in 11 surveys, and higher risk of obesity among groups with low SES in three surveys (Carlos, et al, 2004). The second multi country on non pregnant women of

reproductive age (20-49 years) was conducted also by Carlos et al (2004). Data analyzed from 37 surveys conducted between 1992 and 2000. The data set used in this study covered seven developing regions; South-east Asia and East Asia in addition to 5 mentioned in the previous review. This second multi country study found a lower risk of obesity among the lower SES group in 26 countries, not statistically difference in three countries and a higher risk of obesity among the lower SES groups in eight countries. As inferred from the review, obesity was significantly more common among women of higher SES in all low income economies and more common among women of lower SES in all upper and middle income economies (Carlos, et al, 2004).

**2.6.1.1 Level of education:**

Ajlouni, et al, found that; obesity more common among illiterate people, where obesity was 27.5% for illiterate people, 27.3% for whom educated 1-12 years, and 26% for < 12 years education (Aljouni, et al, 1998). Similarity Martinez et al, noted that inverse relationship between obesity and level of education (Martinez et al, 2001). Also Gujic found obesity more frequency in lower level of educated people (Grujic, et al, 2005). Recently Gillum, et al, also found lower educated papules have higher obesity than high educated (Gillum, et al, 2006). This was consistent with the result found among Palestinian women in West Bank (Abdul-Rahim, et al, 2003).

In contradictory to that, Janice, et al, mentioned that people with less than high school education were less likely to be obese more than those with more than college education (Janice, et al, 2007). Also Tawil, et al, found no significant relationship between educational level of the women and their BMI (Tawil, et al, 2007).

**2.6.1.2 Obesity and age:**

Obesity increased with advanced age, approximately there was consistent among literature regarding to that. Martinez, et al (2001) found an increase is observed in the percentage of obese persons with age. The 8% prevalence of obesity observed in the 18 – 29 y age group rises to 38.1% in the 50 – 65 y age group. On comparing the prevalence of obese persons by sex and age group we see a greater prevalence in men up to the age of 30 y, after which it becomes greater in women. Despite the greater prevalence of obesity among women (Martinez, et al, 2001)

Malik, et al, (2003) examine the relation ship between obesity and age, the result found, provenance of obesity was 8% for age group 16-20 years, 12.4% for 21-25 years, 25% for 25-30 years, 34% for 31-35 years, 42.8% for 36-40 years, and 60.9% for 41-45 year; and the result revealed morbid obesity was highest (10.7%) in the 36-45 years age group (Malik, et al, 2003). In Palestine the result was similar; the prevalence of obesity among women was 37.5%, and it is increased markedly from the 30 - 39 age groups to the 40 - 49 age groups. Among women aged 40 -59, the prevalence of obesity was more than 50%. Among men, the total prevalence of obesity was 18.8%. There was a steady increase in the prevalence of obesity from the 30 - 39 age groups to the 50 - 59 age groups (Stene, et al, 2001).

**2.6.1.3 Marital status:**

The Literature shows obesity rates varied by marital status for women, but not for men. In Canada about a quarter of married men and women aged 25 or older were obese. The rate was significantly higher among women who were widowed (30.0%). By contrast, the percentages of married, separated/divorced, widowed and never-married men who were obese were not

significantly different (Tjepkema, M, 2005). Similarity among Korean population, people who never been married had a lower risk of being overweight and obese than people who were married (Juhee, et al, 2006).

Marital status was an important factor affecting BMI among the population in both developed and developing countries; Study was conducted in Saudi Arabia to assess obesity of women at childbearing age indicated significantly high prevalence of overweight and obesity was observed in the married women compared to the single females. Regarding to age the same study revealed obesity prevalence significantly higher in the married females in the 16-20 y and 26-30 y age group, while in the other age groups the prevalence of obesity was either the same, or greater in the single females. Morbid obesity was more prevalent among the married females more than 31 y old (Malki, et al, 2003).

### 2.6.2 Parity:

Reproductive factors, especially parity, have been positively associated with weight gain and the onset of obesity in population-based studies in developed countries, the extent of this relationship and the pathways leading to the parity-associated weight gain in the different populations are, yet to be understood (Wolf, et al, 1997).

Weng et al (2004) explain the several mechanisms have been proposed the association of number of children and obesity among women, such as insulin resistance associated with pregnancy, hormonal alterations secondary to fewer ovulatory cycles, increased glucocorticoid activity, and the excess deposit of fat tissue that accumulates, preferentially in the femoral area, during pregnancy. Many of these physiological changes associated with pregnancy have been shown to persist for years after childbearing (Weng, et al, 2004).

Weight change associated to reproduction was highly dependent on BMI previous to pregnancy, this conclusion from survey conducted in Brazilin 1996 measured women's height and weight in the household and data on weight prior to the first pregnancy, The result shows. The prevalence of overweight and obesity increased from 11.5% and 1.7% before the first pregnancy to 25.2% and 9.3%, respectively. Overall mean weight gain after first pregnancy for the period of 8 years since first pregnancy and the interview was 0.9 kg per year (Coitinlo, et al, 2001).

Recent study reveals the risk of obesity increased significantly by 9% with each additional parity. Cross sectional study was conducted aimed to determine the relationship between reproductive factors and the risk of obesity, the result illustrates the direct relationship between prevalence of obesity and number of parity, while prevalence of obesity was 10% for nulliparous women, 12.9% for para 1-2 times, 40.7% for para 3-4 times, and reach 43.1% for multifarious with 5 or more birth (Hajian, et al, 2007).

Similar result found in Arabic countries, where the fertility rate of the women in these countries is very high and the spacing between pregnancies is short. In Saudi Arabia, the mean BMI increases significantly with parity in Saudi women. It was 25.1% in nulliparous women, increasing to 27.1, 29.8 and 31.7% with parity 1-2, 3-4 and more than 4 respectively (Musaiger, 2004).

**2.6.3 Psychological factors:**

According to WHO report (2002), the most common consequence of obesity in children in industrialized countries is poor psychological functioning. Preadolescent children associate the shape of an overweight body with poor social functioning, impaired academic success and

reduced fitness and health (WHO, 2002). Recently also Deborah found that, heavier children reported more psychological and weight-related distress. Black children reported more anxiety and body size dissatisfaction than white children, despite equivalent weights (Hyman, et al, 2006).

Similarly, among women the vast majority of obese women demonstrated body image dissatisfaction related to their obesity, with almost half reporting the greatest dissatisfaction with their waist or abdomen. On average, they reported significantly more body image dissatisfaction than non obese (Sarwer, et al, 1998).

Poor body image evaluation and negative self schemas relate to depression in obese people Lasia, et al, also reported that obese women tend to have greater body image dissatisfaction compared with non obese women. Obese women tend to have lower body self –esteem and poorer mental health than normal weight women; additionally obese mothers are more likely to have post partum depression **(**Amir, et al, 2007**).**

Women with obesity had significantly higher levels of dietary restraint, eating concern, weight concern, and shape concern, compared to other women in the community. Darby A etal reported that, Levels of eating disordered in young women with obesity is high, these problems have a negative impact on psychological status as depression and anxiety. Furthermore, the women with obesity were more likely to have experienced objective and subjective bulimic episodes (Darby, et al, 2007).

Regarding to depression, association between obesity and depression, anti-depression drug treatment not clear and requires careful monitoring and follow-up. Negative social attitudes towards obese people can promote psychological distress and increase the risk of the morbidly

obese person developing a depression. Alternatively, the social stigma attached to morbid obesity can lead to increased overeating as well as substance abuse, and Health studies indicate that anti-depression medications lead to weight gain (Collins, 2007).

**2.6.4 Genetics factor:**

The development of obesity depends largely on genetic factors. An inherited predisposition to obesity is widespread in the population. In genetically predisposed individuals, lifestyle factors (such as diet and exercise) and social, behavioral, cultural and community factors determine whether obesity develops (WHO, 2005).Genes and behavior may both be needed for a person to be overweight or obese. According to Center of Disease Control and Prevention (CDC), in some cases multiple genes may increase one's susceptibility for obesity and require outside factors; such as abundant food supply or little physical activity (CDC, 2007). Similarity, Kopelman (2000) reported the global epidemic of obesity results from a combination of genetic susceptibility, increased availability of high-energy foods and decreased requirement for physical activity in modern society (Kopelman, 2000). Obesity tends to run in families, suggesting a genetic link. Yet families also share common dietary, physical exercise, attitude and lifestyle habits that may also contribute to obesity. Separating these from purely genetic factors is not an easy statistical or diagnostic task. Lyon, et al (2005) found that, people whom having obese relatives increases one's risk for obesity, even if the family members do not live together or shares the same patterns of exercise and food intake, and the hereditary playing a strong causal role in obesity (Lyon, et al, 2005). However, there was constant among literature that common forms of obesity have a strong hereditary component, while until now genetic pathways that contribute to obesity have not yet been elucidated. Slawik, et al (2006) mentioned that obesity results from a genetic make-up

favoring weight gain in an "obesigenic" environment the elucidation of the underlying molecular mechanisms might be translated in novel therapeutic options in the future (Slawik, et al, 2006).

**2.6.5 Drugs:**

A number of drugs are capable of changing bodyweight as an adverse effect of their therapeutic action. Bodyweight gain is more of a problem than bodyweight loss. As bodyweight gain during drug treatment for any kind of disease may be the reflection of improvement of the disease itself, Pijl, et al, (1996) try to separate these effects from those due to drug-induced alterations of the mechanisms regulating bodyweight, the result showed that most drugs that are capable of changing bodyweight interfere with these neurotransmitter systems. The increment is dependent on the type and dose of the drug concerned (Pijl, et al, 1996).

Because weight gain is a common side effect of certain medications, a history of medication use is an important aspect of the initial evaluation; Loria, et al, (2000) noted a list of medication associated with weight gain as Psychotropic agents, Anticonvulsant agents, Steroid hormones, and Insulin and most oral hypoglycemic agents (Lori, et al, 2000).

**2.6.6 Physical activity:**

"The real tragedy is that over weight and obesity, and their related chronic, are largely preventable" said Dr Report (WHO, 2005), which revealed by the a consensus in the literature, that sedentary life style contributes to increased body weight, with the availability of advanced technology, increase in electrical home appliances and pattern of practicing exercise has

diminished steeply in most countries. Nearly about 60% of world population doesn't do enough physical activity (Abdesslam, et al, 2005).

Prospective follow up study carried out in Finland to evaluate how change in the level of physical activity from adolescence into adulthood. Becoming inactive during the transition from adolescence to adulthood was associated with overall overweight in males (OR 1.49, CI 1.18-1.89), overall obesity in males (OR 1.53, CI 0.99-2.37) and females (OR 1.51, CI 0.94-2.44), and with severe abdominal obesity in females (OR 1.80, CI 1.13-2.86). Being persistently inactive from adolescence to adulthood was associated with mild abdominal obesity in males (OR 1.83, CI 1.13-2.95). (Tammelin, et al, 2004). Another prospective study examined the associations between physical activity and weight change after age 45 years. Obese women and men who participated in 75-100 minute per week of fast walking gained 9 and 5 pound less than non walkers, respectively, and lesser amounts in normal weight and overweight women and men (Littman, et al, 2005). 30-year follow-up twin study in Finland from 1975-2005, in order to determine the associations between long-term leisure-time physical activity and weight gain, the result showed, In the 42 twin pairs discordant for physical activity at all time points during the 30-year period, the mean weight gain from 1975 through 2005 was 5.4 kg less in the active compared to inactive co-twins. In 2005, the mean waist circumference was 8.4 cm less in the active compared with inactive co-twins. These trends were similar for both monozygotic and dizygotic twin pairs. While the differences in weight gain and waist circumferences were not seen in the 47 twin pairs, who were not consistently discordant for physical activity (Waller et al, 2007). As inferred from literature, the result congruent what Philips James reported; the widely recommended 30 minutes a day of moderate exercise was suggested originally as a minimum to help inactive people make the

first step towards an active healthy life style, and to avoid significant amount of weight gain people nee to be exercising at least an hour to an hour and half each day (WHO, 2002).

## 2.7 Nutritional KAP

### 2.7.1 Dietary practice:

In the twenty one century, people depend on quick meal and high dense energy. Many studies support the value of dietary pattern analysis and some focus on the relationship of overall dietary patterns to health risk. So many researchers stressed the importance of diet pattern to prevent many diseases and control obesity. According to WHO, people not eating enough fruits and vegetables, a recent survey in the European region indicated that, only 30% of boys and 37% of girls age 13-15 years ate fruit every day (WHO, 2006). In spite of increasing intake of fruit and vegetables may reduce long term risk of obesity and weight gain, this conclusion from prospective study conducted in USA to examine the relationship between vegetable intake and obesity, the result showed, women with the largest increase in fruit and vegetables intake had 24% of lower risk of becoming obese compared with those who had the largest decrease in intake (He, et al, 2004).

Case control study was conducted aimed to assess the relationship between obesity and food habits among primary school children revealed that, obese children commonly ate blanched steamed foods as well as spicy foods. While sugar consumption was the same between the two groups, oil consumption was higher among the obese children. Compared with control children, obese children had more snakes before breakfast, and ate leafy vegetable and fried foods than normal children (Naini, et al, 2006).

In contrast to that, Tawil, etal, (2007) found in his cross sectional study among women; no association between overweight and obesity with dietary habits as drink tea and coffee (Tawil, et al, 2007).

### 2.7.2 Nutritional knowledge:

Nutritional knowledge as a target for health education campaigns aimed at promoting healthy eating, were some researcher found knowledge was significantly associated with healthy eating (Wardle, et al, 2000). Cross-section study was carried out in England, looking at knowledge relating to sources of nutrients, healthy food choices and diet–disease links. The result shows much confusion over the relationship between diet and disease. With significant differences in knowledge between socio-demographic groups were found, with men having poorer knowledge than women, and knowledge declining with lower educational level and socio-economic status (Parmenter, et al, 2000). Inconsistency regarding to sex shows in literature where Kim (2003) found that nutritional knowledge was higher in females than in males (Kim, 2003).

Education in nutrition not limited for specific group in community. It should be essential part in continuing medical education. Study was conducted to assess the nutrition knowledge of primary care physicians working in Riyadh, The results indicate that physicians are generally aware of information which has been publicized in the medical press: nutrient which helps prevent thrombosis (omega-3 fat); the preventive action of fruit and vegetables against cancer; which nutrients are antioxidants; the nutrient associated with the prevention of neural tube defects (folate). By contrast they have a poor knowledge of other important topics in nutrition: the major type of fat in olive oil; hydrogenated fats; source of vitamin B Substance

raises the blood HDL-cholesterol level (Alcohol); the association 12; between excess protein intake and calcium loss; the type of dietary fiber helpful in lowering the blood cholesterol level (soluble fiber) and Nutrient is protective against hypertension. (Numair, 2004).

Good nutrition and health care knowledge is not necessarily related to good weight control. Fowles (2003), found that no differences were noted between pregnant had adequate nutritional knowledge and did not had in total weight gain during pregnancy (Fowles, 2002).

Recent Studies of the relationship between nutritional knowledge and body weight have been mostly undertaken among adults and the majority of studies have not found a strong relationship between these two variables (Odea, et al, 2006). A study of obese and non-obese children and adolescents aged 8–15 years found no relationship between the degree of overweight and the children's nutrition knowledge and concluded that the 'similar nutritional knowledge of obese and non obese children points to genesis of obesity in childhood not caused by lack of knowledge (Reinehr, 2003). Furthermore Kim (2003), found that inverse relationship between BMI and nutritional knowledge; the body mass index increased and the nutritional knowledge level was low (Kim, 2003)

**2.7.3 Nutritional attitude:**

Nutritional attitudes reflect people opinion about nutrition, their body weight, and can predict food consumption pattern. Limited studies in this context found

Regarding to attitude, Naini, et al (2006) assess the children attitude toward their body weight compared with their actual weight found, 2.8% of obese children show their self at good shape, 11.1% show their weight as overweight and 86.1% of Actual obese children show their

self as obese (Naini, et al, 2006). Regarding to women attitude toward their weight, Tawil, etal (2007) assess Iraqi women for this purpose found the majority of women who thought that they were overweight or obese really were so, while 47% of women who did not think that they were overweight or obese were found to be so ( Tawil, et al, 2007).

## Chapter (3)

## Conceptual Framework

### 3. 1 Conceptual Framework for Determinants of obesity among women

After reviewing the literature the researcher described the most common factors that could be associated with obesity, and select some of these factors in this study which may affect on obesity in our community such as, socio-demographic and socioeconomic factors, medical factors, obstetric factors, physical activities, and nutritional KAP.

#### 3.1.1 Socio-demographic factors:

Some studies have explored the association of various socio-demographic factors with obesity. These factors include age, sex, and employment, area of residency, family size, and income (Isa, 1999).

An exhaustive review of published studies that provided information on socioeconomic status and obesity identified strong positive relationship between socioeconomic status and obesity among men, women, and children in nearly 90% of all studies conducted in developing societies (carlos, et al, 2004).

#### 3.1.2 Medical history:

Obesity substantially increases morbidity and impairs quality of life. This association of obesity with other serious condition has been well recognized since ancient times. Several studies has been established that obesity is associated with an increased prevalence of coronary artery diseases, hypertension, diabetes mellitus, arteriosclerosis, arthritis, hyperlipidaemias, biliary tract disease, cancer, gout, and several other diseases (Hazmi, et al, 2000).

**3.1.3 Reproductive profile:**

The available information comes from studies designed to study the relation between pregnancy-parity and the development of obesity suggested that Reproductive factors have been positively associated with weight gain and the onset of obesity. Weng, et al (2004), noted that having children is frequently cited by women as a cause of obesity (Weng, et al, 2004). Further more Several studies have reported that women who lactate longer and more intensively lose weight more rapidly between 3 and 6 months postpartum than women who exclusively bottle- feed or those who lactate less fully or for a shorter duration (Haiek, et al, 2001).

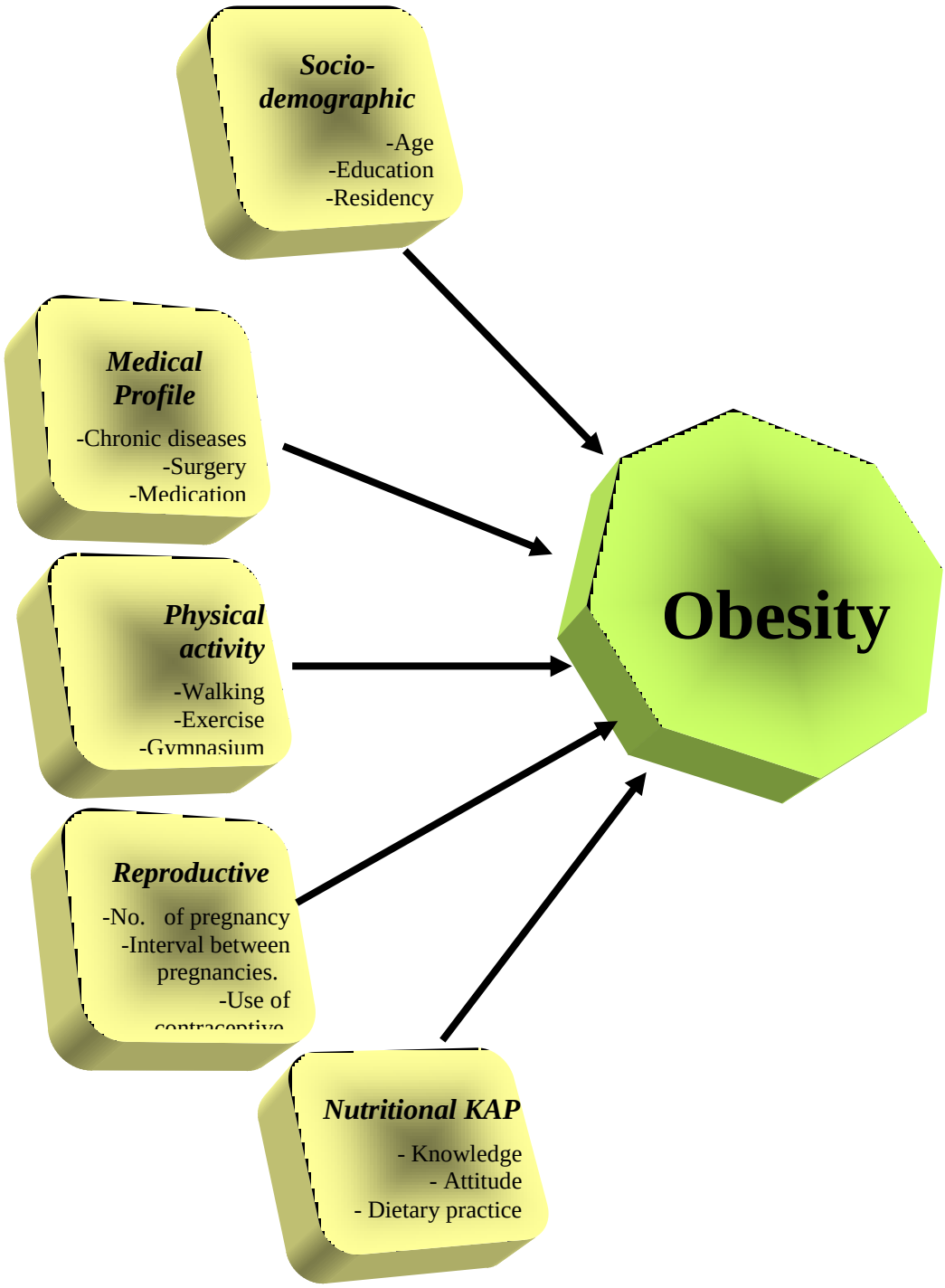
**3.1.4 Physical activities:**

Obesity results from an imbalance between the amount of energy consumed and the amount of energy expended. While there are many elements that affect the energy balance, for example, genetics, growth, and physiology. Some researchers have suggested that obesity is largely the result of a decline in regular physical activity (GAO, 2006). The researcher in this study investigate regular activities as walking, practice home exercise, and gymnasium.

### 3.1.5 Nutritional KAP:

Nutritional knowledge, attitudes, and practice may affect the occurrence of obesity. Studies have suggested that several characteristics of dietary behavior such as eating frequency, the temporal distribution of eating events across the day, breakfast skipping, and the frequency of meals eaten away from home, together referred to as "eating patterns," may influence body weight (Yunsheng, et al,2003**).** Further more positive attitudes and good knowledge toward health eating may reduce obesity.

**3. 2 Theoritical Diagram of Conceptual Framework**



## Chapter (4)

## Methodology

This chapter presents the study methodology. The researcher starts with the selected study design, setting of the study, study population, how sample is calculated and selected, and eligibility criteria. Additionally, this chapter presents tools of data collection, and how standardized the procedure, pilot study and response rate. Furthermore, it illustrates the method of analysis, study population ethical consideration and limitation of the study.

### 4.1 Study design

The design of this study is a cross sectional study. It has been chosen because this method would be less expensive, and usually conducted to estimate the prevalence of the outcome of interest for a given population (Coggon et al, 1993). Cross-sectional studies provide a 'snapshot' of the outcome and the characteristics associated with it at a specific point in time; furthermore it sometimes carried out to investigate associations between risk factors and the outcome of interest. Moreover, it is indicate associations that may exist and are therefore useful in generating hypotheses.

However, disadvantage of cross sectional studies is that, Prevalence-incidence bias, especially in the case of longer-lasting diseases, any risk factor that results in death will be under-represented among those with the disease. Additionally there is difficult to make causal inference (Kate, 2006).

## 4.2 Setting of study

The study was conducted at 10 mother and child health clinics at all Gaza Strip governorates, North Gaza, Gaza City, Mid Zone, Khanyounis and Rafah governorates. The researcher chosed, one MOH clinic and one UNRWA clinic from each governorate.

## 4.3 The study population

The study population consistes of women who were utilizing mother and child health (MCH) services in both UNRWA and MOH clinics at the time of the study; women who utilize FP services, women with their baby who utilize immunization services, and women with there sick baby who utilize services.

## 4.4 Sample size

The sample size was calculated by using Epidemiological Information Program (Epi-enfo), to calculate the desired sample, the researcher estimated the prevalence of obesity based on data from previous study in Palestine (Stene, et al, 2001). This sample is composed of 350 client included participant from different localities (Annex 4).

## 4.5 Eligibility criteria

### 4.5.1 Inclusion criteria:

Most nursing and nutrition textbooks claim that women return to their prepregnant weight between 6 weeks and 6 months after delivery. (Haiek, et al,2001), for that this study include any married women utilize MOH and UNRWA mother and child health clinic at the time of

data collection that had last delivery at least before 9 months and accepted to participate in the study.

### 4.5.2 Exclusion criteria:

- Pregnant women.
- Not married women

## 4.6 Sample process

According to MOH annual report, UNRWA provides mother and child services in 14 main clinics and three sub clinics, and MOH provide the same services in 28 clinics. The researcher was chose the largest UNRWA and MOH clinic from each governorates, the selected UNRWA clinics were, Jabalia, Beach, Deir Al Balah, Maen, Rafah health center. For the MOH, Shuhada Jabalia, Rimal Health Center, Shuhada Deir Elbalah, Bandar Khanyounis, Tall Sultan clinic. proportional sampling was used to select the number of sample from each governorate and each Provider (Annex 5 ). Systematic random sample from married women attended UNRWA and MOH clinics were taken.

## 4.7 Research instrument

Data collected by two methods; the first method was interviews questionnaires, and the second method was measurement of weight and height for women

### 4.7.1 Questionnaire:

The following areas were included in the questionnaire: (Annex 7)

- Socioeconomic data such as age, residency, age, education, type of family, and monthly income
- Medical history profile as chronic diseases, take medication, previous surgery
- Reproductive health profile as number of pregnancy, number of delivery, use of contraceptive, lactation
- Dietary practice as number of meals, snake, favorites drink, type of cooking, and other dietary habits
- Nutritional knowledge and attitude: Nutritional knowledge was measured using 10 items to identify foods that are high of fat and carbohydrates and other 7 item related to relationship of food and health.
- Physical activity as walking, practice exercise at home or going to sport center

**4.7.2. Anthropometric measurement:**

- Women Weight

- Women height

**4.8 Validity and reliability**

**4.8.1 Validity of the instrument:**

Validity is defined as “the extent to which a measuring instrument measure what are supposed to measure” (Mark, 1996). The researcher administered two types of validity as follow.

#### 4.8.1.1 Face validity:

The questionnaire used for data collection in this study is well prepared by the researcher with high face validity.

#### 4.8.1.2 Context Validity Index (CVI):

The researcher designed the study questionnaire for the purpose of the study, after reviewing many studied related to the subject. The validity of the questionnaire has been examined by sending the constructed questionnaire with enclosed covering letter about the objective of the study to 10 experts working in the different field (Researcher, Nutritionist, gynecologists, epidemiologist) in order to give their views on the questionnaire (Annex 11). All of them have responded and send their suggestions and comments. According to their suggestions and advice, the researcher changed some of the questions and put another which was more suitable. Validity of the anthropometric measurement also used by standardization of the procedures as the follow:

**Women weight**

- Balancing the scale (Zero point) with empty scale.
- Asking the women to remove shoes and heavy clothes before measurement of weight and height.
- Asking the women to stand on the scale with no support if possible.
- Reading weight and documentation the weight for women by kilogram (KG).

**Women Height:**

The researcher used standard measurement tape on standing position with documentation of height by centimeters (CM

### 4.8.2 Reliability of the instrument

Reliability is the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects (Luara, 1997). In order to ensure reliability of study instrument the same method of data collection was implemented by training the assistance person how to use the instrument and measure women weight and height.

### 4.9 Data collection

Data were collected by the researcher and one assistant of MOH employees, who was trained and prepared well to interview the women and fill the questionnaire. Data collected using the previously mentioned instrument.

### 4.10 Response rate

The number of respondents was 339 distributed as; 224 women from UNRWA clinics, and 115 women from MOH clinics. By places of residences, the respondents distributed as; 62 women in North Gaza, 119 women in Gaza city, 50 in Middle Zone, 66 in Khanyounis, and 42 in Rafah. The response rate was 96.8%.

### 4.11 Data entry and Statistical analysis:

Statistical Package for Social Science (SPSS) version 15 was used for analysis**.**

The analysis of data was conducted as:

- Review of the filled questionnaire
- Coding the question
- Appropriate entry model
- Coding variables
- Data cleaning
- Frequency and cross tabulation of the result
- Advanced statistical analysis

Statistical relationship between variables and obesity were assessed using Chi-Square with confidence interval (CI) of 95%. T test and Analysis of Variance (ANOVA) was used to compare mean BMI among different variables.

P value equal or less than 0.05 was considered statistically significant.

CIS analysis used to illustrate distribution of overweight and obesity by governorates. Furthermore Epi-enfo program used to analyze Chi- square for trends

### 4.12 Pilot study

Before starting the actual data collection process, Pilot study was done prior to the beginning of data collection to check applicability, identify problems in the research questionnaire and test data collection for validity and reliability.

Sample of 20 women was selected randomly by the researcher from the Rimal clinics, and some modification of questionnaire was done according to piloting result**.** Pilot subject was excluded from the study population.

### 4.13 Ethical consideration

- An official letter of approval to conduct the study was obtained from the Helsinki committee in the Gaza Strip (Annex 8).
- An official letter of request was obtained from MOH general directorate and UNRWA chief field of health program to conduct study in their health setting (Annex 9, 10).
- Consent form were obtained from all participants to ensure their voluntary participation (Annex 6)
- Full explanation about the purpose of study to all participants.
- Maintain confidentiality all the time during the study**.**

### 4.14 Limitations of the study

- The study included certain criteria for women.
- Lack of scientific resources like books and journals.
- Lack of resources including budget and facilities especially during the economic siege for Gaza Strip. Additionally the cut of electricity for long period.
- Political situation. During data collection Gaza Strip exposed to infighting among different political affiliation; which affect the movement between governorates, and sometimes different areas was isolated.

## Chapter (5)

## The results

This chapter presents the results of the study questionnaire with descriptive analysis such as percentage distribution which provides a description of the data including socio-demographic characteristic, medical history, life style and measurement of BMI. Finally inferential analysis used to illustrate the different risk factors affected BMI for married women. The findings based on 339 usable questionnaires with response rate of 96.8% of the total sample.

### 5.1 Descriptive statistics

#### 5.1.1 Characteristics of the study population:

**Table 5.1.: Summary table of socio-demographic characteristics of the study population**

| Variables | Frequency | Percentage |
|---|---|---|
| **Places of residences** | | |
| *North Gaza* | 62 | 18.3 |
| *Gaza City* | 119 | 35.1 |
| *Middle Zone* | 50 | 14.7 |
| *Khan Younis* | 66 | 19.5 |
| *Rafah* | 42 | 12.4 |
| **Citizenship** | | |
| *Refugees* | 247 | 72.9 |
| *Citizens* | 92 | 27.1 |
| **Family type** | | |
| *Nuclear* | 241 | 71.1 |
| *Extended* | 95 | 28.9 |
| **Educational level** | | |
| *Low* | 108 | 31.9 |
| *Moderate* | 172 | 50.7 |
| *High* | 59 | 17.4 |
| **Age group** | | |
| *≤25* | 107 | 31.6 |
| *26-35* | 159 | 46.9 |
| *> 35* | 73 | 21.5 |
| **Average monthly income** | | |
| *< 1700* | 230 | 67.8 |
| *1800-2100* | 59 | 17.4 |
| *> 2100* | 50 | 14.7 |
| **Employment status** | | |

| | | |
|---|---|---|
| *Employed* | 14 | 4.1 |
| *Unemployed* | 325 | 95.9 |

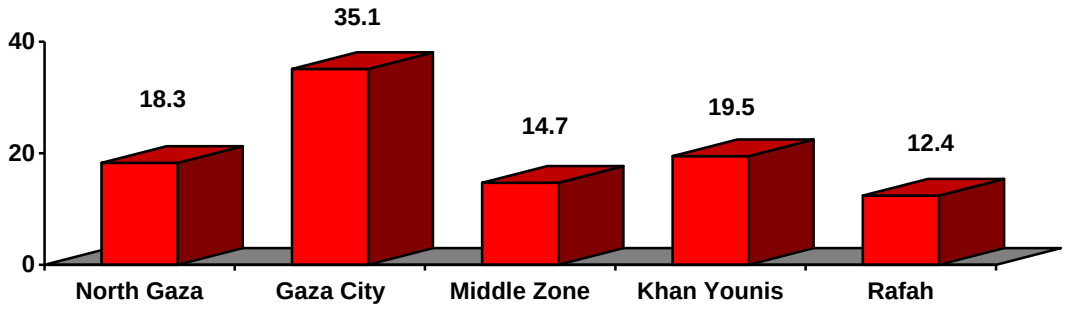



***Figure 5.1: Distribution of study population by provinces***

Figure 5.1 shows the distribution of study population by provinces. The majority of cases were from Gaza city (35.1%) followed by Khanyounis(19.5%), North Gaza (18.3%), Middle Zone (14.7%), where Rafah represented the least score (12.4%). These results were according to population density of Gaza Strip.

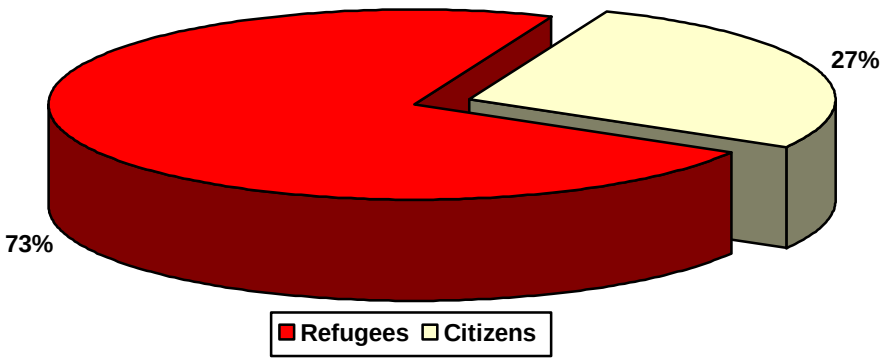



***Figure 5.2: Distribution of study population by citizenships***

As shown in the above figure 5.2, the majority of study population was refugees who represented 73%, while citizens represented 27%.

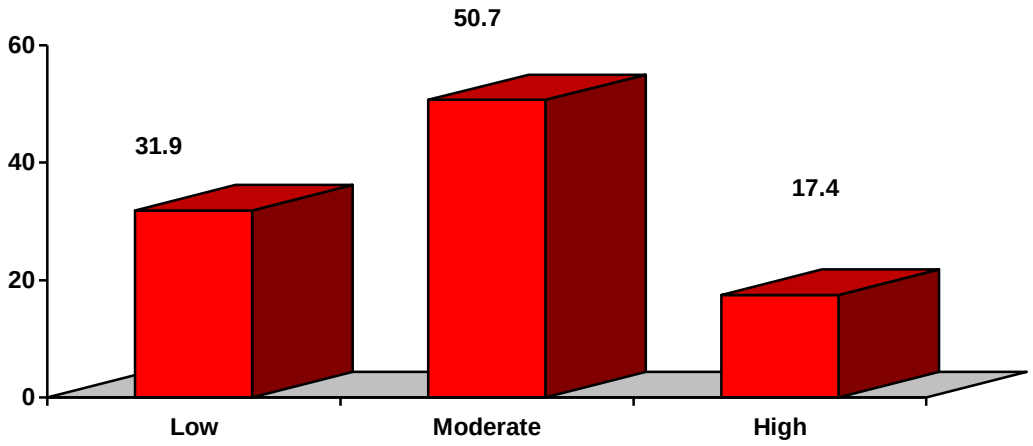



***Figure 5.3: Distribution of study population by Educational levels***

Figure 5.3 shows the distribution of study population by educational levels. The majority of cases were moderate educational level (9 - 12 years) which represented approximately one half of the population (50.7%), followed by low educational level (23.9%), the population of high educational level represented 17.4%, The mean year of education for participant was 10.8 years with median of 11 years, and standard deviation (SD) 3.

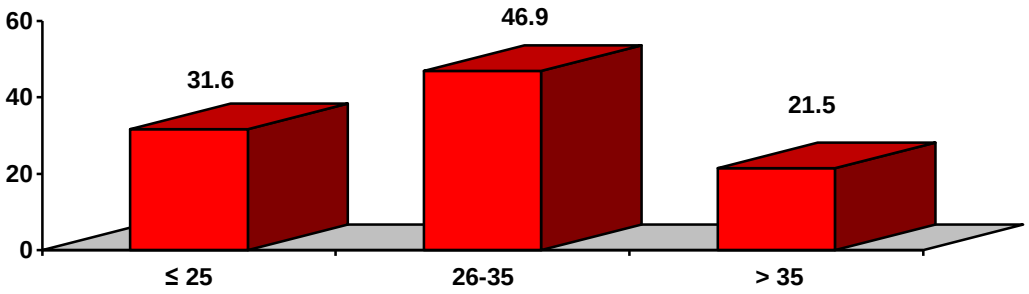



***Figure 5.4: Distribution of study population by age***

The age of study population was divided into three main age group, figure 5.4 shows the majority of population at age group between 26-35years (46.9%) which represented one half of population, followed by age group ≥ 25 years, which represented 31.6% of population, followed by age group > 35years (21.5%). The mean age for participant was 29.5 years with median of 28 years, and standard deviation (SD) 6.8.


**Figure 5.5: Distribution of study *population* by work status**

Regarding to employment status, figure 5.5 shows that, the majority of women were not working which represented 95.9% of total sample and only 4.1% of women were work. In

contrast of this finding, the worker among husband was higher than women represented 85.8% compared with 14.2% of total husband not work.

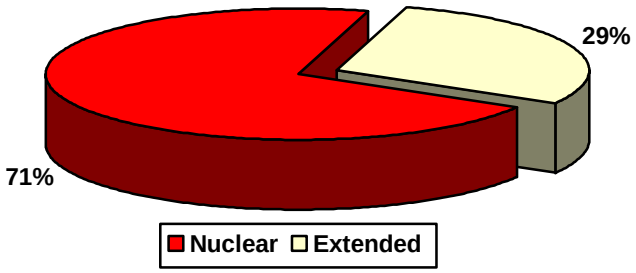



**Figure 5.6: Distribution of *study* population by Family type**

As shown in the above figure, the majority of study population lived in nuclear family which represented 71.1%, while the population lived in extended family represented only 28.9%.

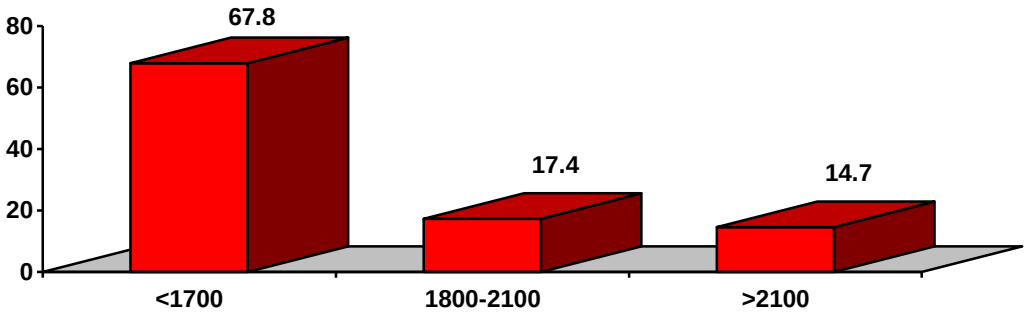



**Figure 5.7: *Distribution* of study population by average monthly income**

The researcher divided monthly income into three categories as shown in figure 5.7, according to the classification of PCBC (2006c). the finding revealed poor economic situation among the population study, Unfortunately, 85.2% of total sample was below poverty line ( less than

2,100 NIS) , they were classified into 2 groups: 67.8% was less than 1,700 NIS (extreme poverty), and 17.4% was average monthly income between 1,800- 2,100 NIS. On the other hand, the population which was above poverty line (more than 2,100) represented only 14.7% of total study population.

### 5.1.2 Maternal characteristic and reproductive health profile:

**Table 5.2: Summary table of selected maternal variables**

| Variables | Frequency | Percent |
|---|---|---|
| **No. of pregnancy** | | |
| *1-3* | 128 | 37.8 |
| *4-6* | 118 | 34.8 |
| *≥ 7* | 93 | 27.4 |
| **Interval between pregnancy (years)** | | |
| *< 1* | 163 | 48.1 |
| *1-2* | 143 | 42.2 |
| *> 2* | 33 | 9.7 |
| **No. of delivery** | | |
| *1-3* | 143 | 42.2 |
| *4-6* | 119 | 35.1 |
| *≥ 7* | 77 | 22.7 |
| **Previous CS** | | |
| *Yes* | 49 | 14.5 |
| *No* | 290 | 85.5 |
| **Contraceptive use** | | |
| *Yes* | 221 | 65.2 |
| *No* | 118 | 34.8 |
| **Lactation** | | |
| *Yes* | 196 | 57.8 |
| *No* | 143 | 42.2 |

Table 5.2 presents some maternal characteristic deals with pregnancy, delivery,…etc. The findings revealed that, around one third of study population have previous pregnancies ≥ 7 times, 37.8% of them have pregnancy 1-3 times, and 34.8% have pregnancy 4-6 times.

Similarity regarding to number of delivery, 42.2% of women have previous delivery 1-3 times, 35% for category between 4-6 times and 22.7% have ≥ 7 deliveries. These finding reflected high fertility rate among study population.

Approximately one half of the study sample have average interval period between pregnancy less than one year, and 42.2% have average between 1-2 yeas, while the rest have average interval period > 2 years. Around 14.5% of women have previous cesarean section (SC), more than 65% of women used contraceptive methods, and 57.8% of study population was lactated.

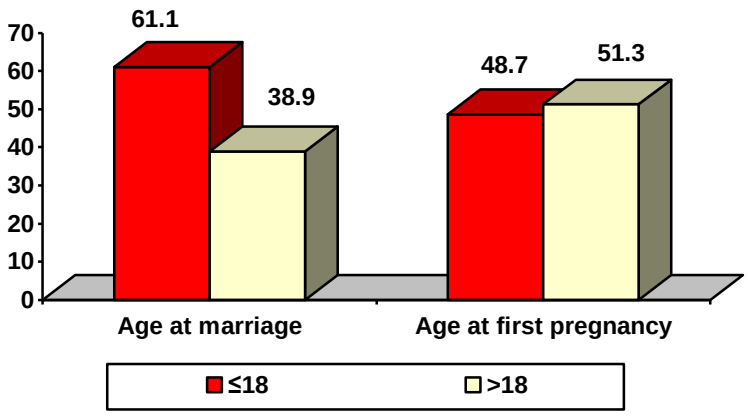



***Figure 5.8: Distribution of study population by age at marriage and first pregnancy***

The researcher classified mother age at marriage and at first pregnancy into two groups: the first was ≤ 18 years and second was > 18 years. Figure 5.8 showed that, more than 60% of women got married at age ≤ 18 years compared with 49% have first pregnancy at the same age. Meanwhile, 38.9% of study sample married at age > 18 years compared with 51% have first pregnancy at the same age.

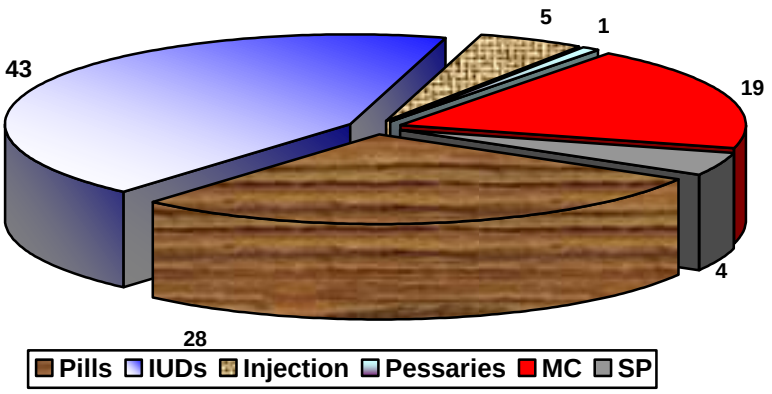



***Figure 5.9: Distribution of study population by Type of contraceptive used***

Figure 5.9 showed that, the most popular method used of contraceptive methods among study sample was Intra Uterine Device (IUD), which represented 43% of total methods, followed by Pills (28%), male condom (19%), and the rest for injection, pessaries and safe period.

### 5.1.3 Medical history

**Table 5.3: Summary table of selected medical variables**

| Variables | Frequency | Percent |
|---|---|---|
| **Chronic disease** | | |
| *Yes* | 52 | 15.3 |
| *No* | 287 | 84.7 |
| **Type of chronic disease** | | |
| *DM* | 1 | 1.9 |
| *BP* | 10 | 19.2 |
| *Joint pain* | 19 | 36.5 |
| *others* | 22 | 42.3 |
| **Take medication** | | |
| *Yes* | 13 | 3.8 |
| *No* | 326 | 96.2 |
| **Previous surgery** | | |
| *Yes* | 25 | 7.4 |
| *No* | 314 | 92.6 |

| **Have relative obese** | | |
|---|---|---|
| *Yes* | 136 | 40.1 |
| *No* | 203 | 59.9 |

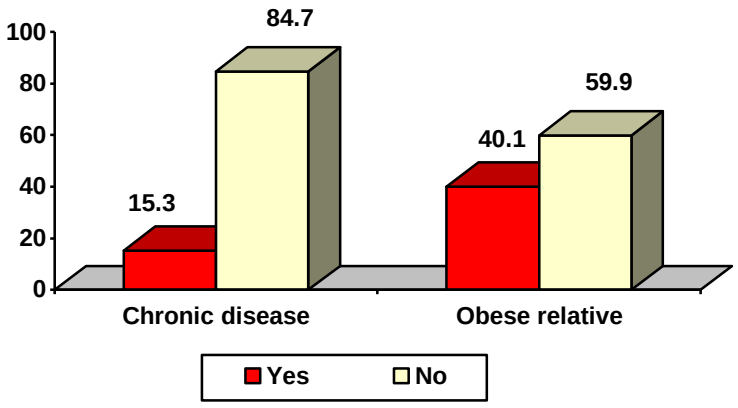



***Figure 5.10: Distribution of study population who has chronic disease and obese relative***

The medical history profile for study population as it's shown in the table 5.3, 15.3% of total study population have chronic disease, which illustrated in graph 5.10; out of them 36.5% have joint pain, 19.3% have BP, 1.9% have DM and 42.3 distributed for other chronic diseases.

On the other hand, graph 5.10 illustrated that, 40.1% of study population have relative obese, more than one half of them (58.2%) have mother obese and 32.3% of them have sister obese.

Fewer number of study population who have history of previous surgery or take medication represented 7.4% and 3.8% of total respectively.

### 5.1.4 Women nutritional KAP:

#### 5.1.4.1 Nutritional knowledge:

The researcher examined the degree of women nutritional knowledge by number of prompted question classified into two groups, first group deals with food groups and the second deals with relationship between foods and health.

**Table 5.4: Distribution of nutritional knowledge score according to groups**

| Knowledge score | Food group | Food & health group | Total |
|---|---|---|---|
| ***≤ 50*** | 6.5 | 3.8 | 2.7 |
| ***50- 80*** | 40.7 | 35.4 | 33.3 |
| ***> 80*** | 52.8 | 60.8 | 64 |

As shown in table 5.4, interestingly, the majority of knowledge score for all groups was more than 80%, which reflect high nutritional knowledge among populations study.

Regarding to knowledge related to food group, 52.8% of women scored more than 80%, while 40.7% of women scored between 50-80 %, and only 6.5% of women scored ≤50%.

Meanwhile, knowledge score related to food and health group classified also into the same three categories. Around 60.8% of women scored > 80%, 35.4% scored between 50 – 80 % and the least score was 6.5 % for category ≤50%.

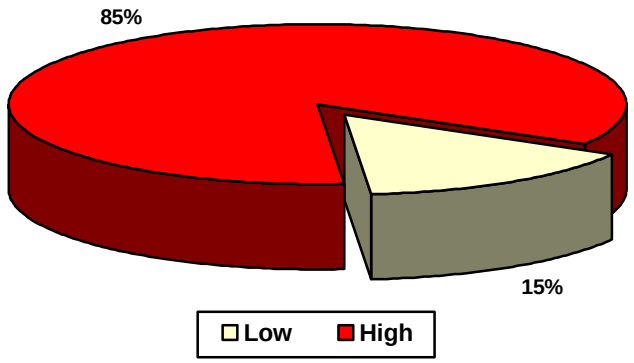
**Table 5.5: Distribution of nutritional knowledge level according to groups**

| Level | Food group | Food & health |
|---|---|---|
| *High* | 84.1 | 86.7 |
| *Low* | 15.9 | 13.3 |
| ***Total*** | 100 | 100 |

Regarding to nutritional knowledge level among women, the researcher classified them into two groups: The first group; which has high knowledge and correct answer for more than 70% of related question and the other group which has low nutritional knowledge.

Table 5.5 illustrated that, 86.7% of women have high nutritional knowledge level for food and health group compared with 13.3% of women in low level.

Similarity regarding to food group, around 84.1% of women had high level of knowledge and the rest had low knowledge.




***5.11: Percentage of women according To the Level of nutritional awareness***

However, in general nutritional knowledge among women was high, which is illustrated by figure 5.11, where 84.7% of women had high nutritional knowledge and only 15.3% had low level of nutritional knowledge.

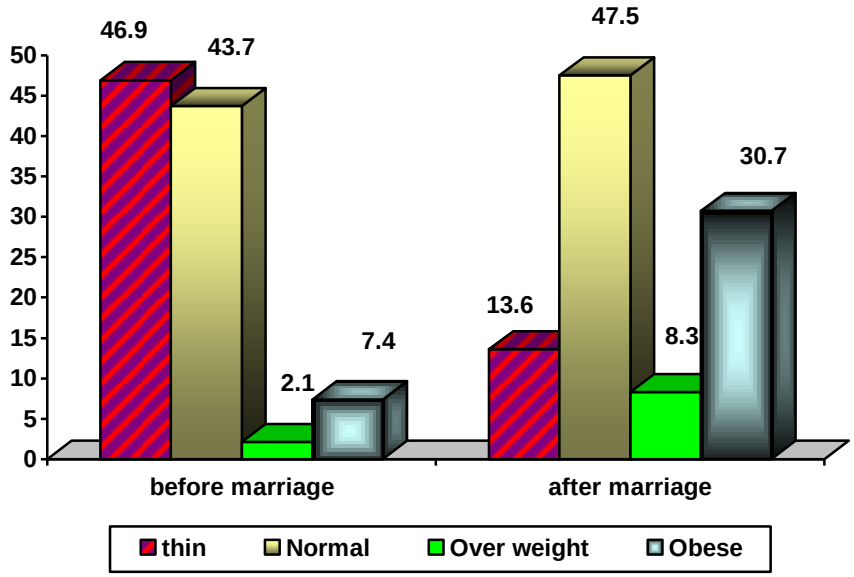
### 5.1.4.2 Nutritional attitude

**Table 5.6: Summary table of dietary behaviors of the study population**

| Variables | Frequency | Percent |
|---|---|---|
| **Women description of their diet** | | |
| *Less than others* | 96 | 28.3 |
| *Normal* | 204 | 60.2 |
| *More than others* | 39 | 11.5 |
| **Women belief about their nutritional knowledge** | | |
| *Yes* | 219 | 64.6 |
| *No* | 57 | 16.8 |
| *Not sure* | 62 | 18.3 |
| *Don't know* | 1 | .3 |
| **Women interest to learn more about nutrition** | | |
| *Yes* | 287 | 84.7 |
| *No* | 42 | 12.4 |
| *Not sure* | 8 | 2.4 |
| *Don't know* | 2 | .6 |
| **Diet description** | | |
| *More health* | 42 | 12.4 |
| *Healthy* | 142 | 41.9 |
| *Moderate* | 89 | 26.3 |
| *Not healthy* | 61 | 18.0 |
| *Don't know* | 5 | 1.5 |
| **Women interest in gaining weight** | | |
| *Yes* | 59 | 17.4 |
| *No* | 280 | 82.6 |
| **Women interest in losing weight** | | |
| *Yes* | 204 | 60.2 |
| *No* | 135 | 39.8 |
| **Difficulty in making healthy diet** | | |
| *Yes* | 98 | 28.9 |
| *No* | 238 | 70.2 |
| *Don't know* | 2 | 0.6 |

The women nutritional attitudes toward selected variables are shown in table 5.6, around 60% of women described their diet size normal compared with their family member, and only

11.5% of study sample eat more than others. Regarding to nutritional knowledge, 64.6% of total women believed that, they have nutritional knowledge and 84.7% of total need to increase their knowledge. Out of total sample, 60.2% interested in losing weight compared with only 17.4% interested in gaining weight. 28.9% of total women believe that it is difficult to take healthy diet because its high price, while 70.2% of women don't have problem to take healthy diet.




***5.1***

***2: Women's opinion about their weight status before and after marriage***

Most of women described their current weight and their weight before marriage as normal weight which represented 47.5% and 43.7% of total sample respectively, which is illustrated in graph 5.12. Around 30.7% of women described their current weight as obese compared with only 7.4% before marriage. More women described their weight status as thin before

marriage (46.9%) compared with 13.6% after marriage, while the least score was for overweight which represented 2.1% and 8.3% before and after marriage respectively.

### 5.1.4.3 Nutritional practice:

**Table 5.7: Summary table of dietary habits among study population**

| Variables | Frequency | Percent |
|---|---|---|
| **No. of meals** | | |
| *One* | 17 | 5 |
| *Two* | 117 | 34.5 |
| *Third* | 202 | 59.6 |
| *Four* | 3 | 0.9 |
| **Eating while watch TV** | | |
| *Always* | 56 | 16.5 |
| *Sometimes* | 156 | 46 |
| *Never* | 127 | 37.5 |
| **Taking breakfast** | | |
| *Always* | 269 | 79.4 |
| *Sometimes* | 39 | 11.5 |
| *Never* | 31 | 9.1 |
| **Taking snake** | | |
| *Always* | 36 | 10.6 |
| *Sometimes* | 153 | 45.1 |
| *Never* | 150 | 44.2 |
| **Emotional state& foods** | | |
| *Happy* | 152 | 44.8 |
| *Anger* | 43 | 12.7 |
| *Stress* | 34 | 10 |
| *Same* | 110 | 32.5 |
| **Shopping** | | |
| *Always* | 59 | 17.4 |
| *Sometimes* | 60 | 17.7 |
| *Never* | 220 | 64.9 |
| **Cooking** | | |
| *Always* | 286 | 84.4 |
| *Sometimes* | 38 | 11.2 |
| *Never* | 15 | 4.4 |
| **Type of cooking** | | |
| *Firing* | 39 | 11.5 |
| *Grill* | 57 | 16.8 |
| *Boiling* | 243 | 71.7 |
| **Restaurant made food** | | |
| *Yes* | 118 | 34.8 |
| *No* | 221 | 65.2 |

| **Sleeping after dinner immediately** | | |
|---|---|---|
| *Always* | 83 | 24.5 |
| *Sometimes* | 94 | 27.7 |
| *Never* | 162 | 47.8 |

As shown in the table 5.7, which illustrate the dietary habits among women. Almost 59.6% of total women take three meals daily as most people in Palestine. Breakfast is considered the main meal among women where 79.4% of total sample always take breakfast, while 10.6 always take snake and 45.1% sometimes take snake. Majority of women depend on their husband of food shopping, 64.9% of total sample didn't go shopping. In contrast to that 84.4% of total women always cook the food; that clearly reflect Palestinian culture regard gender roles. The favorites drink for half of study sample is tea, and almost use boiling for cooking (84.4%) rather than other methods. Most of families depend on home made food rather than restaurant made where 65.2% of study sample not go to restaurant, 34.8% go to restaurant and most of them go once monthly.

**Table 5.8: Weekly average consumption of food groups**

| **Item** | **Average** |
|---|---|
| ***Fruits*** | 2.9 |
| ***Vegetables*** | 5.4 |
| ***Bread*** | 17.7 |
| ***Potato*** | 3.4 |
| ***Milk products*** | 3.5 |
| ***Sweets*** | 2.5 |
| ***Red meats*** | 2.3 |

| | |
|---|---|
| ***White meats*** | 1.4 |
| ***Legumes*** | 2.2 |
| ***Fries*** | 4.2 |

Weekly consumption of food items are presented in table 5.8 that revealed, bread was the most food items consumed per women with average 17.7 times per week. The finding revealed there was gab between the average for the first group and the second group, where the average for vegetables was 5.4 times per week followed by milk products and potato with average 3.5 and 3.4 respectively. The least average was 1.4 time per week for white meats.

### 5.1.5 Physical activity:

**Table 5.9: Summary table of physical activities variables**

| Variables | Frequency | Percent |
|---|---|---|
| **Practice exercise** | | |
| *Yes* | 103 | 30.4 |
| *No* | 236 | 69.6 |
| **Walking** | | |
| *Yes* | 214 | 63.1 |
| *No* | 124 | 36.9 |
| Frequency | | |
| *Daily* | 70 | 32.6 |
| *Weekly* | 124 | 58.6 |
| *Monthly* | 19 | 8.8 |
| **Gymnasium** | | |
| *Yes* | 21 | 6.2 |
| *No* | 318 | 93.8 |
| **Free time spending** | | |
| *Watch TV* | 134 | 39.5 |
| *Read a book* | 65 | 19.2 |
| *House work* | 88 | 26 |
| *Socialization* | 32 | 9.4 |
| *Others* | 20 | 5.9 |

Concerning to physical activity, table 5.9 presents the major finding for its related variable. Around 30.4% of women practice exercise at home compared with 69.6% of total sample didn't practice any exercise. Regarding to walking; 63.1% of women practice walking sport; out of them, 32.6% practice it daily and more than half of sample practice it weekly. 6.2% of total women only enjoined in sport center. Regarding to free time, about 39.5% of women watch TV in free time, 26% do house work, and 19.2% read a book and 9.4% make socialization.

### 5.1.6 Body mass index (BMI):

**Table 5.10: Distribution of study population by BMI**

| BMI | Number | % |
|---|---|---|
| ***Underweight*** | 1 | 0.3 |
| ***Normal*** | 117 | 34.5 |
| ***Overweight*** | 113 | 33.3 |
| ***Obese*** | 99 | 29.2 |
| ***Very obese*** | 9 | 2.7 |
| **Total** | **339** | **100** |

Regarding to BMI distribution, the researcher classified BMI into five groups according to WHO classification (underweight, normal, overweight, obese, and very obese), Table 5.10 illustrate that more one third of study population at normal BMI represented by 34.5% of total sample, followed by overweight which represented 33.3%, obese women represented 29.2% while very obese was 2.7% of total sample, and the least score was for underweight population (0.3%).

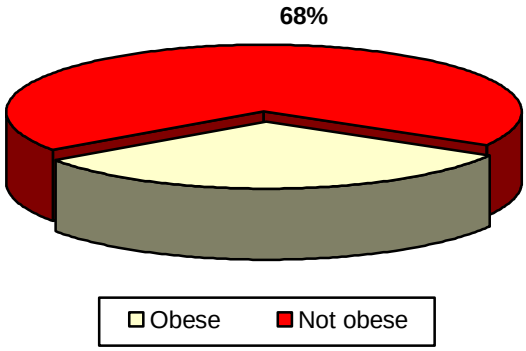



*Figure 5.13: Distribution of study population by obesity status*

As shown in figure 5.13, the population study was classified into two groups obese and other group not obese which includes (overweight, normal weight, and underweight). The findings illustrated that prevalence of obesity among married women attended MCH clinics was 31.9%.

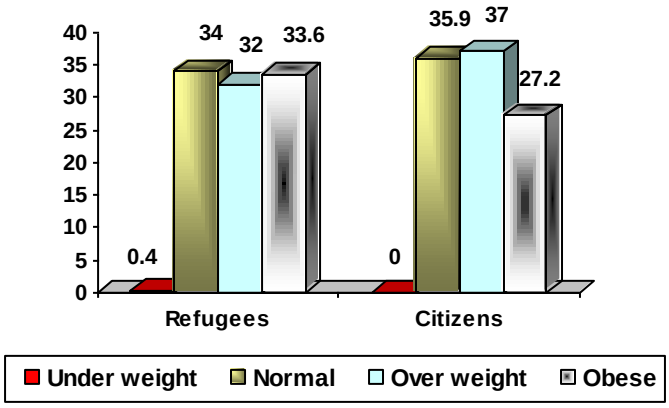


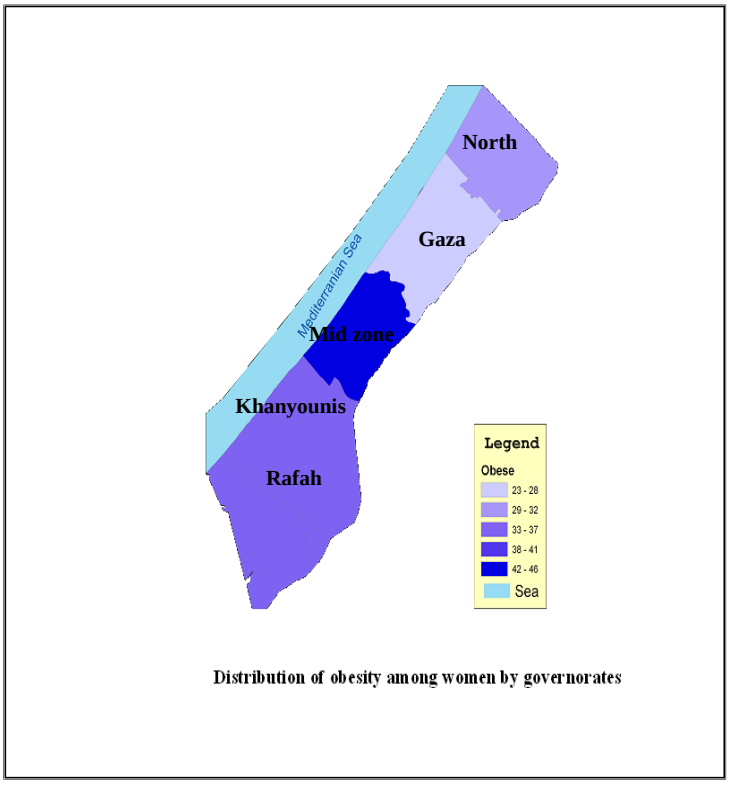

*Figure 5.14: Distribution of BMI by Residential status*

As shown in the figure 5.14; comparison of BMI between the Refugees and citizens, and it illustrates that, more than one third of population among both refugees and citizens are at normal BMI (34% among refuges, 35.9% among citizens), regarding to overweight condition

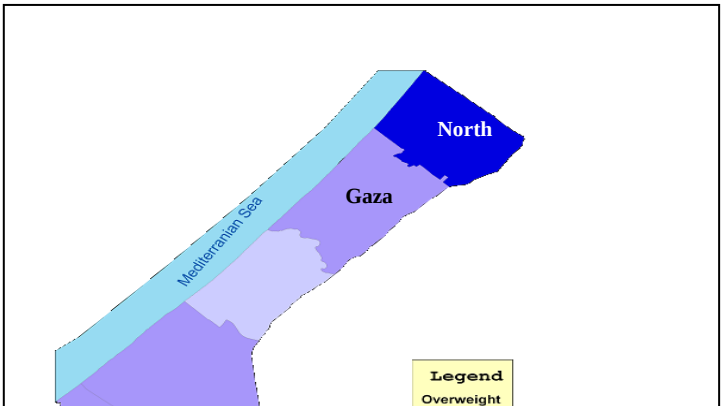
was more in citizens (37%) compared with 32% among refugee. On the other hand the obesity was more in refugees' women, where 33.6% of total sample are obese, compared with 27.2% among citizens. The least proportion was for under weight which constituted 0.4 among refugees and no underweight status among citizens.

Regarding to distribution of BMI by governorates, figure 5.15 shows that highest prevalence of obesity was 46% in Mid Zone, followed by 35.7% in Rafah, 34.8% in Khanyounis, 32.3% in North Gaza, and the lowest prevalence was in Gaza city.

Concerning to overweight, the highest prevalence was 38.7% in North Gaza, followed by 33.3% in Rafah, 32.8% in Gaza city, 31.8% in khanyounis, and the lowest prevalence was 30% in mide Zone. Chi- square test reveals, these differences was statistically significant (P - value 0.04).




Distribution of obesity among women by governorates

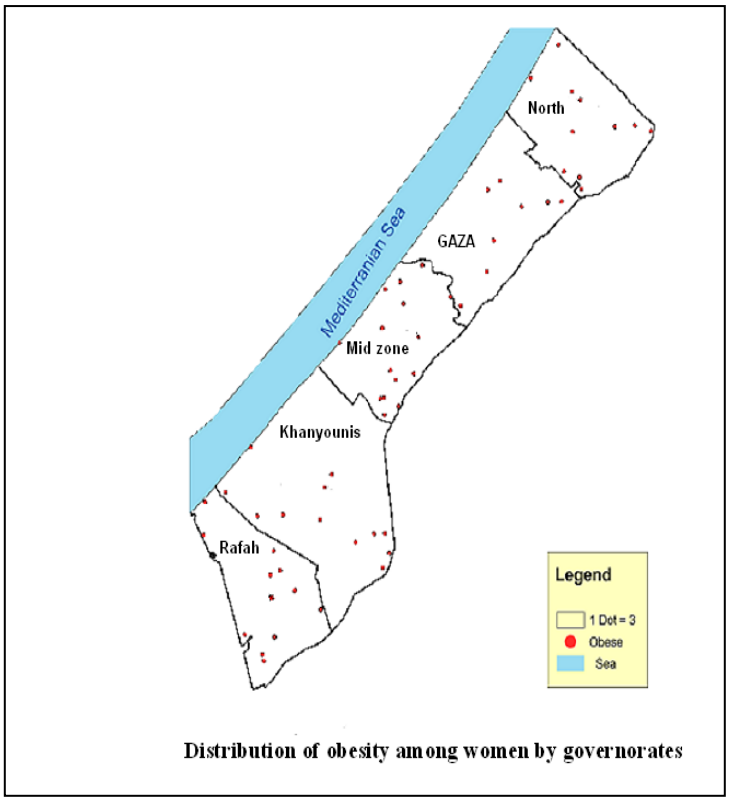


**Mid zone**

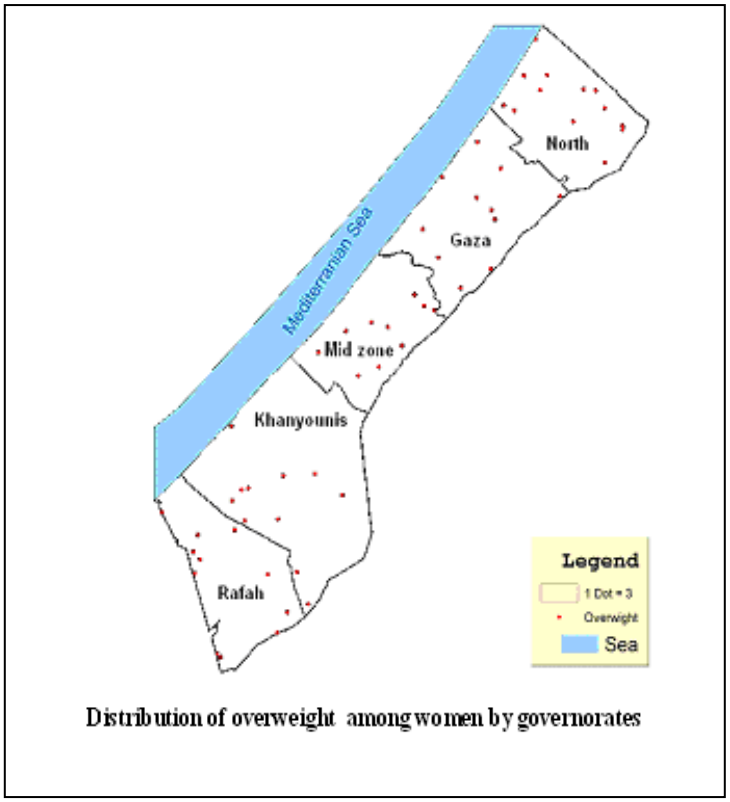
**Khanyounis**

**Rafah**

**Figure 5.15 (a) Distribution of overweight and obesity among women by governorates**




Distribution of obesity among women by governorates




Distribution of overweight among women by governorates

**Figure 5.15 (b): Distribution of overweight and 0besity among women by governorates**

### 5.2 Inferential statistic:

#### 5.2.1 Socio-demographic factors:

**Table 5.11: Relationship between obesity and selected socio-demographic variables**

| Variables | | Obese | | Non obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Citizenship*** | *Refugees* | 83 | 33.6 | 164 | 66.4 | 0.259 |
| | *Citizenship* | 25 | 27.2 | 67 | 72.8 | |
| ***Family type*** | *Nuclear* | 86 | 35.7 | 155 | 64.3 | *0.018 |
| | *Extended* | 22 | 22.4 | 76 | 777.6 | |
| ***Women work status*** | *Yes* | 4 | 28.6 | 10 | 71.4 | 1.0 |
| | *No* | 104 | 32 | 221 | 68 | |

**** Statistically significant***

Table 5.11 illustrates the relationship between selected sociodemographic factor and obesity.

#### Citizenship

The prevalence of obesity was higher among refugees women (33.6%), compared with 27.2% among citizenships, (OR= .73, 95% CI .43-1.25). These differences among refugees and citizenship not statistically significant (P - value 0.259)

### Family type

Regarding to type of family, the prevalence of obesity among women lived in nuclear was higher than that lived in extended family was 35.7% and 22.4% respectively, (OR= 1.91, 95% CI 1.11-3.29). The differences between prevalence were statistically significant (P - value 0.018).

### Women work status

As shown in the same table, the prevalence of obesity among non worker women was 32% compared with 28.6% among worker women. P - value was 1.0, that means these differences not statistically significant (OR= .85, 95% CI .26-2.77).

**Table 5.12: Relationship between obesity and selected sociodemograghic variables**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Mother age*** | *≤25* | 18 | 16.8 | 89 | 83.2 | *0.001 |
| | *26-35* | 47 | 29.6 | 112 | 70.4 | |
| | *> 35* | 43 | 58.9 | 30 | 41.1 | |
| ***Educational level*** | *Low* | 47 | 43.5 | 61 | 56.5 | *0.007 |
| | *Moderate* | 46 | 26.7 | 122 | 73.3 | |
| | *High* | 15 | 25.4 | 44 | 74.6 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Average monthly income (NIS)*** | *< 1700* | 73 | 31.7 | 157 | 68.3 | 0.477 |
| | *1700-2100* | 16 | 27.1 | 43 | 72.9 | |
| | *> 2100* | 19 | 38 | 31 | 62 | |

**** Statistically significant***

As shown table 5.12 illustrates the relationship between obesity and selected variables. Chi-square test was used to examine the relationship between these variables.

### Mother age

The lowest prevalence rate of obesity was among age group ≤25, which constituted 16.8%, followed by 29.6% for age group 26-35 years, and the highest prevalence was 58.9% for age group more than 35 years. The findings revealed that, there was a strong relationship between obesity and mother age, these differences reach statistically significant with P - value 0.001.

### Educational years

Regarding to educational level, the researcher divided educational level into three levels; low, moderate, and high level. The prevalence of obesity among low educated women was 43.5%, followed by 26.7% for moderate educated women, and the lowest prevalence was 25.4% for higher educated women. That means a strong relationship between obesity and educational levels (P - value 0.007). In other words, Figure 5.16 clearly revealed that, low educated women high risk for obesity than higher educated women.

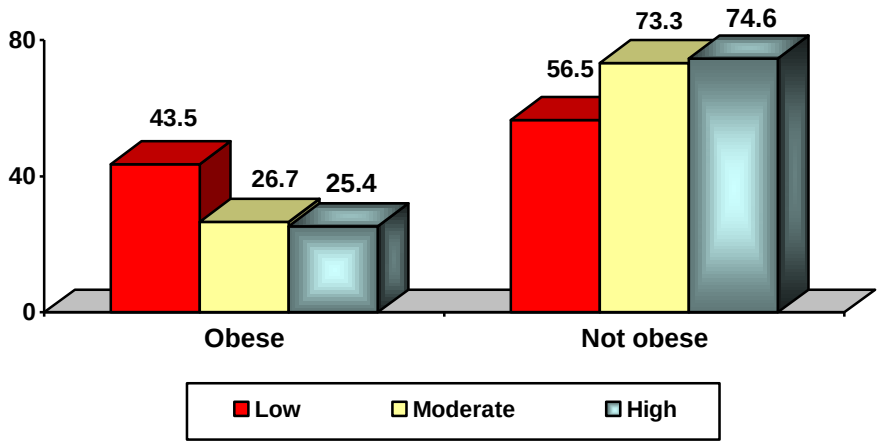



***Figure 5.16: Distribution of the women obesity status by educational level***

### Monthly income

The prevalence of obesity was high among population above poverty line (38%), followed by 31.7% among category < 1700 NIS, which represented population at extreme poverty, while 27.1% prevalence rate was for population whose monthly income between 1700-2100 NIS. These differences between categories did not reach to statistical differences (P - value 0.477).

### 5.2.2 Reproductive health:

**Table 5.13: Relationship between obesity and selected maternal variables**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Age at marriage*** | *≤ 18* | 69 | 33.3 | 138 | 66.7 | 0.465 |
| | *> 18* | 39 | 29.5 | 93 | 70.5 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *≤ 18* | 53 | 32.1 | 112 | 67.9 | |
| ***Age at first pregnancy*** | *> 18* | 55 | 31.6 | 119 | 68.4 | 0.919 |
| | *1-3* | 21 | 16.4 | 107 | 83.6 | |
| ***No. of pregnancy*** | *4-6* | 36 | 30.5 | 82 | 69.5 | *0.001 |
| | *≥ 7* | 51 | 54.8 | 42 | 45.2 | |

**** Statistically significant***

**Age at marriage:**

Concerning to women age at marriage, mother age was divided into two groups , the first ≤ 18 years and the second > 18 yeas. The prevalence of obesity among first group was 33.3%, while the prevalence among women married at age more than 18 was 29.5%, but these differences were not statistically significant (P - value 0.465)

**Age at first pregnancy:**

Similarity, the relationship between obesity and age at first pregnancy was not statistically significant with P - value 0.919. The prevalence rate of obesity among women pregnant at age ≤ 18 years (32.1%) was relatively higher than among women pregnant at age > 18 years (31.6%).

**Number of pregnancy:**

Regarding to relationship between obesity and number of pregnancy, the same test reveals that prevalence rate of obesity among women who pregnant 1-3 times was 16.4%, followed by prevalence rate for women pregnant 4.6 times which constituted 30.5%, and the highest prevalence was among women pregnant ≥ 7 times (54.8%). The relationship was strong statistical significant (P - value 0.001), that revealed increased number of pregnancy increased risk of obesity.

Epi enfo program used to analyze Chi-square for trend. The finding reveals when number of pregnancies increase the chance of obesity increase (P – value 0.001).

**Table 5.14: Relationship between obesity and selected maternal variables**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Interval between pregnancy (years)*** | *<1* | 40 | 24.5 | 123 | 75.5 | *0.018 |
| | *1-2* | 54 | 37.8 | 89 | 62.2 | |
| | *>2* | 14 | 42.4 | 19 | 57.6 | |
| ***No. of delivery*** | *1-3* | 26 | 18.2 | 117 | 81.8 | *0.001 |
| | *4-6* | 40 | 33.6 | 79 | 66.4 | |
| | *≥ 7* | 42 | 54.5 | 35 | 45.7 | |

**** Statistically significant***

## Number of delivery

The Chi-square test reveals strong positive relationship between obesity and number of delivery with P - value 0.000, where the prevalence rate among women delivered 1-3 times was 18.2%, for women delivered 4-6 times was 33.6%, and the highest for women delivered ≥ 7 times (54.5%). Also the Chi – Square for trend reveals that, increase number of deliveries increase the chance of obesity (P – value 0.001)

## Interval between pregnancies

Regarding to interval between pregnancies, the period was classified into three groups: Less than one year, 1-2 years, and more than 2 years. Table 5.14 illustrated that Women at first

category (< 1 year) have lower prevalence rate of obesity (24.5%) compared with category 1-2 years with prevalence rate of 37.8% and category more than 2 years with prevalence rate of 42.4%. These differences were statistically significant with P - value (0.015). In other meaning, there was ejective relation between interval period between pregnancies and obesity. The Chi – Square for trend indicates than, increase interval between pregnancies increases risk of obesity (P – value 0.006).

**Table 5.15: Relationship between obesity and Use of contraceptive**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Use of contraceptive*** | *Yes* | 72 | 32.6 | 149 | 67.4 | 0.697 |
| | *No* | 36 | 30.5 | 82 | 69.5 | |

According to data shown in table 4.15, The prevalence of obesity among women used contraceptive methods was 32.6%, which was relatively higher than the prevalence among women did not used contraceptive methods 30.5%, (OR= 1.10, 95% CI .67-2.78) . The relationship was statistically not significant (P - value 0.697).

**Table 5.16: Relationship between obesity and lactation**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Lactation*** | *Yes* | 53 | 27 | 143 | 73 | *0.026 |

| | | | | |
|---|---|---|---|---|
| *No* | 55 | 38.5 | 88 | 61.5 |

**** Statistically significant***

The prevalence of obesity was higher among not lactated women (38.5%) than lactated women (27%), (OR= .59, 95% CI .37 -.94). there were statistical significant differences between lactated and not lactated women (P - value 0.026).

### 5.2.3 Medical variables:

**Table 5.17: Relationship between obesity and selected medical variables**

| Variables | Subject | Number | Mean | SD | t-test | P-value |
|---|---|---|---|---|---|---|
| ***Have chronic disease*** | *Yes* | 52 | 29.7 | 5.0 | 2.79 | 0.006* |
| | *No* | 287 | 27.4 | 5.4 | | |
| ***Take medication*** | *Yes* | 13 | 32.8 | 4.8 | 3.42 | 0.001* |
| | *No* | 326 | 27.5 | 5.3 | | |
| ***Previous surgery*** | *Yes* | 25 | 29.1 | 5.0 | 1.32 | 0.187 |
| | *No* | 314 | 27.6 | 5.4 | | |
| ***Relative obese*** | *Yes* | 163 | 29.6 | 5.6 | 5.25 | 0.001* |
| | *No* | 203 | 26.5 | 4.9 | | |

**** Statistically significant***

The researcher examined the relationship between obesity and women medical history profile. Independent T test was used to compare between these variables.

**Chronic diseases:**

Firstly, the mean of BMI for women have chronic disease was 29.7 years (SD 5), for women did not have chronic disease the mean BMI was 27.4 (SD 5.4). As shown in table 5.17, the relation between chronic disease and obesity was statistically significant (t test = 2.7, P - value 0.006)

**Take medication:**

Similarity, the mean BMI for women who take medication was 32.8 (SD 4.8), which greatly higher than among women do not take medication 27.5 (SD 5.3). Such these differences were statistically significant (P - value 0.001).

**Previous surgery**

Regarding to women who have previous surgery, the mean of MBI was 29.1 with SD (5), compared with mean 27.6 for women not have previous surgery (SD 5.4). The relationship between obesity and mother previous surgery was not statistically significant (P - value 0.187).

**Have relative obese**

Concerning women who have relative obese or not. The mean BMI was 29.6 for women have relative obese (SD 5.6), compared with mean BMI 26.5 (SD 4.9) for women do not have relative obese. The finding in table 5.17 clearly revealed the strong positive relationship between family history of obesity and obesity, which was statistically significant (P - value 0.001).

### 5.2.4 Nutritional KAP

#### 5.2.4.1 Dietary practice

**Table 5.18: Relationship between obesity and some variables related to dietary habits**

| Dependent variables | Item | Mean BMI | F | P - value |
|---|---|---|---|---|
| ***No. of meals*** | one | 27.3 | 0.535 | 0.659 |
| | two | 28.3 | | |
| | three | 27.5 | | |
| | four | 28.0 | | |
| ***Eat while watch TV*** | Always | 26.8 | 1.12 | 0.326 |
| | Sometimes | 27.8 | | |
| | Never | 28.1 | | |
| ***Take breakfast*** | Always | 27.8 | 1.57 | 0.209 |
| | Sometimes | 26.6 | | |
| | Never | 29.0 | | |
| ***Take snake*** | Always | 26.3 | 2.37 | 0.094 |
| | Sometimes | 27.5 | | |
| | Never | 28.3 | | |
| ***Emotional state & food*** | Happy | 26.8 | 3.96 | 0.008* |
| | Anger | 29.5 | | |
| | Stress | 29.3 | | |
| | Same | 27.9 | | |
| ***Shopping*** | Always | 29.4 | 7.41 | 0.001* |
| | Sometimes | 29.2 | | |
| | Never | 26.9 | | |
| ***Cooking*** | Always | 28.2 | 7.57 | 0.001* |
| | Sometimes | 25.1 | | |
| | Never | 25.1 | | |
| ***type of cooking*** | Frying | 26.8 | 1.17 | 0.309 |
| | Grilled | 27.2 | | |
| | boiling | 28.0 | | |
| ***Favorites drink*** | milk | 24.6 | 3.19 | 0.005* |
| | Juice | 26.1 | | |
| | Water | 28.5 | | |
| | tea | 28.6 | | |
| | Soda | 26.8 | | |
| | coffee | 30.6 | | |

| | |
|---|---|
| others | 27.2 |

Regarding to relationship between obesity and variables related to dietary habits,

Table 5.18 presents the variation among women BMI regarding to their dietary practice and habits. The finding illustrated that, there was significant relationship between obesity and shopping, cooking, favorites drink, and emotional state and foods. On the other hand the table demonstrated differences among women BMI in regard to number of meals, take breakfast, snake, and type of food while these differences according to ANOVA table were not statistically significant.

By comparing the MBI Concerning to number of meals, the finding demonstrated the highest BMI among women who take two meals and the lowest among women who take only one meal, but such differences were not statistically significant (0.659) as shown in ANOVA table.

Among women who always eat while watch TV, the finding in table 5.18 indicated that highest BMI was for women who do not watch TV while eating, while the lowest for women who always watch TV while eating. The relationship among these differences was not statistically significant (P - value 0.326).

Concerning to relationship between obesity and breakfast, the same table illustrated the highest BMI was for women who never take breakfast, and the lowest for women who sometimes take breakfast, the relationship was not statistically significant (P - value 0.209).

Similarity, the finding in table 5.18 revealed that, women who never take snake have BMI higher than women who sometimes and always take snake, but these differences also were not statistically significant (P - value 0.094).

In regard to emotional state while eating, the highest BMI was for women eat more while they were angry, and the lowest BMI for women eat more in happy condition, ANOVA test clearly reflected the significant relationship among these variations (P - value 0.008).

Regarding to shopping, the highest BMI was for women always went to food shopping, followed by women who sometimes went shopping, and the lowest BMI was for women who did not go to shopping, the same table illustrated strong statistical differences among these variation with P - value (0.001).

Concerning to cooking, the highest BMI was for women who always cooked compared with who sometimes or never cooked, ANOVA table illustrated there was statistical significant among these differences (P - value 0.001).

As shown in table 5.18, ANOVA test also comparing the women BMI in regard to their type of cooking used. The finding clearly explained, the highest BMI was for women cooked by boiling, while the lowest BMI was among women who cooked by frying. These differences among method of cooking not reach statistically significant (P - value 0.309)

Moreover, the table 5.18 also showed the relationship between obesity and favorite's drinks. Sheffe test demonstrated the highest BMI among women who drink coffee, followed by women who drank tea compared with other drinks like juice, milk and others. These differences were statistically significant (P - value 0.005).

**Table 5.19: Relationship between obesity and Food group consumption**

| Independent variables | Item | Mean BMI | F | P - value |
|---|---|---|---|---|
| ***Fruits*** | 0 times | 29.6 | 0.265 | 0.851 |
| | 1-3 | 27.7 | | |
| | 4-6 | 27.3 | | |
| | ≥ 7 | 27.7 | | |
| ***Vegetables*** | 0 times | | 1.81 | 0.165 |
| | 1-3 | 27.2 | | |
| | 4-6 | 30.6 | | |
| | ≥ 7 | 27.9 | | |
| ***Bread*** | 0 times | | 0.354 | 0.699 |
| | 1-3 | 28.3 | | |
| | 4-6 | 23.5 | | |
| | ≥ 7 | 27.7 | | |
| ***Potato*** | 0 times | 32.0 | .0971 | 0.407 |
| | 1-3 | 28.0 | | |
| | 4-6 | 29.3 | | |
| | ≥ 7 | 27.2 | | |
| ***Sweets*** | 0 times | 29.6 | 1.05 | 0.370 |
| | 1-3 | 27.7 | | |
| | 4-6 | 30.0 | | |
| | ≥ 7 | 27.2 | | |
| ***Milk products*** | 0 times | 28.4 | 0.678 | 0.566 |
| | 1-3 | 28.0 | | |
| | 4-6 | 29.3 | | |
| | ≥ 7 | 27.2 | | |
| ***Red meats*** | 0 times | 28.4 | 1.26 | 0.287 |
| | 1-3 | 27.6 | | |
| | 4-6 | 29.4 | | |
| | ≥ 7 | 26.9 | | |
| ***White meats*** | 0 times | 29.0 | 0.800 | 0.494 |
| | 1-3 | 27.6 | | |
| | 4-6 | 29.1 | | |
| | ≥ 7 | 29.9 | | |
| ***Legumes*** | 0 times | 21.2 | 1.84 | 0.139 |
| | 1-3 | 27.8 | | |
| | 4-6 | 25.6 | | |
| | ≥ 7 | 28.4 | | |
| ***Fries*** | 0 times | | 0.103 | 0.902 |
| | 1-3 | 27.6 | | |
| | 4-6 | 27.4 | | |
| | ≥ 7 | 27.9 | | |

The researcher classified food into seven groups as mentioned in table 5.8, One Way ANOVA was used to examine the relationship between obesity and each food group frequent consumption. The finding in table 5.19 showed variations in women BMI regarding to number of each food group consumptions.

Firstly, table 5.19 compared the mean BMI by number of fruit consumed weekly. The finding showed that, the highest, BMI was for women did not consume fruits and approximately, BMI mean was equal in other groups.

Regarding to vegetables consumption, the same table revealed that, the highest BMI was for women consumed vegetables 4-6 times weekly. While concerning to bread consumption, the highest BMI was for women consumed bread 1-3 times weekly, compared with lowest BMI for women consumed bread 4- 6 times weekly.

In regard to potato consumption, the highest BMI was for women did not consume potato, in contrast to the lowest BMI for women consumed potato ≥ 7 times weekly.

In the same context regarding to sweets consumption, the highest BMI was for women consumed sweets ≥ 7 times. The highest BMI among women consumed milk product was for women consumed 4-6 times weekly. Regarding to meat group consumption, the findings demonstrated the highest BMI among women consumed red meat 4-6 times, compared with highest BMI for women consumed white meat ≥ 7 times weekly.

Moreover, table 5.19 illustrated that, the highest BMI was for women consumed legumes ≥ 7 times. Similarity, among women consumed fries; the highest BMI was for women consumed ≥ 7 times.

However, the findings mentioned above, revealed that all differences among women in each food group consumption were not significant as shown in table 5.19. That means, obesity among women were not affected by food consumption as other dietary habits mentioned before.

**Table 5.20: Relationship between obesity and restaurant foods**

| Variables | | Obese | | Not obese | | P-value |
|---|---|---|---|---|---|---|
| | | No | % | No | % | |
| ***Restaurant foods*** | *Yes* | 20 | 16.9 | 98 | 83.1 | *0.001 |
| | *No* | 88 | 39.8 | 133 | 60.2 | |

**** Statistically significant***

As shown in table 5.20, there was a strong relationship between obesity and not consuming restaurant made foods with P - value 0.001, (OR = .30, 95%CI .17-.53), where the prevalence of obesity was greatly higher among women take home made foods (39.8%), compared with 16.9% among women take restaurant made foods.

### 5.2.4.2 Nutritional knowledge

**Table 5.21: Relationship between obesity and nutritional Knowledge**

| Variables | Obese | | Non obese | | P-value |
|---|---|---|---|---|---|
| | No | % | No | % | |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Nutritional knowledge*** | *Low* | 12 | 23.1 | 40 | 76.9 | 0.140 |
| | *High* | 96 | 33.4 | 191 | 66.6 | |

The prevalence of overweight and obesity was 23.1% among women who have low nutritional knowledge, compared with 33.4% among women have high nutritional knowledge. The relationship between obesity and nutritional knowledge was not statistically significant (P - value 0.140). (OR= 0.59, 95%CI .29- 1.19).

### 5.2.4.3 Women attitudes:

**Table 5.22: Women's opinion about their weight status by actual BMI**

| **How describe your self** | **Obese** | | **Not obese** | | **Total** |
|---|---|---|---|---|---|
| | ***No*** | **%** | ***No*** | **%** | |
| ***Thin*** | ***0*** | **0.0** | ***46*** | **100.0** | **46** |
| ***Normal*** | ***27*** | **16.8** | ***134*** | **83.2** | **161** |
| ***Over weight*** | ***11*** | **39.3** | ***17*** | **60.7** | **28** |
| ***Obese*** | ***70*** | **67.3** | ***34*** | **32.7** | **104** |

Table 5.22 compared women opinions about their weight status by actual BMI, the findings revealed that, there was no one of thin women described their weight status as obese, while 16.8% among women described their weight as normal was actually obese, meanwhile 39.3% of total women described their weight as overweight was actually obese, and among women described their weight as obese, only 67.3% was obese.

**Table 5.23: Women attitudes toward their weight**

| **Variables** | **Obese** | **Non obese** |
|---|---|---|

| | | No | % | No | % |
|---|---|---|---|---|---|
| ***Interested in gaining weight*** | *Yes* | 0 | 0.0 | 59 | 100.0 |
| | *No* | 108 | 38.6 | 172 | 61.4 |
| ***Interested in losing weight*** | *Yes* | 102 | 50.0 | 102 | 50.0 |
| | *No* | 6 | 4.4 | 129 | 95.6 |

Table 5.23 compared between women attitude toward their bodies weight and actual bodies weight. More than 97% of obese women interested in losing weight; the prevalence of obesity among women interested in losing weight was 50. %. On the other hand, no one of obese women interested in gaining weight. The same table illustrated that; obese women have strong attitude toward losing their weight and more than 40% of not obese women also interested in losing their weight also.

**Table 5.24: Women opinion about their diet size compared with their actual weight status**

| **variable** | **Obese** | | **Not obese** | |
|---|---|---|---|---|
| | **No** | **%** | **No** | **%** |
| ***Less than family*** | 28 | 25.9 | 68 | 29.4 |
| ***Normal*** | 64 | 59.3 | 140 | 60.6 |
| ***More than family*** | 16 | 14.8 | 23 | 10.0 |

Regarding to women's opinions about their diet size compared with other family members, around 60% of obese women described that, their diet size was normal. 25.9% described their diet size less than family members, and only 14.8% of obese women described their diet size more than others. Similarity, 68% of not obese women described their diet normal, 29.4% less than other, and 10% described their diet more than other family members.

### 5.2.5 Physical activity:

**Table 5.25: Relationship between obesity and physical activity:**

| Variables | Subject | Number | Mean | SD | t-test | P-value |
|---|---|---|---|---|---|---|
| ***Practice exercise at home*** | Yes | 103 | 28.9 | 5.2 | 2.25 | 0.012* |
| | No | 236 | 27.3 | 5.5 | | |
| ***Walk*** | Yes | 214 | 28.3 | 5.4 | 2.57 | 0.011* |
| | No | 125 | 26.8 | 5.4 | | |
| ***Go to sport center*** | Yes | 21 | 31.2 | 6.2 | 3.06 | 0.002* |
| | No | 318 | 27.5 | 5.3 | | |

**** Statistically significant***

Table 5.25 present some variables related to physical activity among women, the researcher used Independent T test to compare between these variables.

**Practice exercise at home**

Table 5.25 illustrated that, mean BMI for women practice exercise at home was 28.9 (SD 5.2), which was higher than mean BMI 27.3 (SD 5.5) for women not practice exercise. The relationship was statistically significant with P - value 0.012.

**Practice Walk**

The mean BMI for women practice walking was 28.3 (SD 5.4), compared with mean BMI 26.8 (SD 5.4) for women not practice walking. The differences between two groups were statistically significant (P - value 0.011).

**Go to sport center (Gymnasium)**

Regarding to women go to gymnasium, the mean BMI was 31.2 (SD 6.2) compared with mean BMI 27.5 for women not go to gymnasium. The finding in table 5.25 reveals that there was strong relationship between these differences (P - value 0.002).

# Chapter (6)

## Discussion

In this study we measured the prevalence of obesity in the Palestinian community among married women. This study provides detailed investigation of the relationship between obesity and other contributing factors such as socioeconomic factors, reproductive and medical history, physical activity, and finally nutritional KAP.

In this chapter, the researcher explains the finding in this study compared with other global and regional studies and attempts to interpret and discuss the results and findings of study and its implication.

### 6.1 Prevalence of obesity

This study used the categories set by WHO to define overweight and obesity: BMI between 25 and 29.9 kg/m2 was defined as overweight and BMI of 30 kg/m2 or above as obesity. That is to make the result of the study comparable to those reported by from similar study in other countries, the international criteria was used.

The present study provides the first data on the prevalence of obesity in Gaza Strip among married women and its distribution by residency and citizenship. This study results showed that 0.3%, 34.5%, 29.2%, and 2.7% of the studied sample were, underweight, overweight, obese, and morbid obesity respectively, only one third (33%) of the sample was of normal weight. This means that the BMI of 67% of the women were abnormal, with mean BMI of 27.7 and 5.4 SD. The prevalence of obesity in general was (31.9%) high and alarming comparable with findings in the world; below 5% in China, 20-25% in some countries in America (Cihangir, et al, 2004), nearly 26% in Europe countries (ICN, 2007), and between 6-8% in Nigeria (Ania, 2004). 31.9% included within the range of obesity among Mediterranean region which found between 10.5% in Pakistan to 64.0% in Saudi Arabia (Khatib, 2004). On other hand, the findings in this study were similar to finding in other Arab countries; 30% among Kuwaitis women (Olusi, et al, 2003), 31.4% for Bahraini women aged 20-65 years (Hamdan, 2000), and the prevalence of obesity was 37% among Iraqi women (Tawil, et al, 2007). The similarity in this finding between Arab countries may be attributed to the comparable eating habits in these countries, further more the comparable genetic constitution of these communities.

Regarding to studied conducted in Palestine, the findings in this study approximately consistent with finding in West Bank villages; prevalence rate of obesity among women was 37% (Abdul Raim, et al, 2003 ), while it is not congruent with Rizqallah; who found (70%) very high prevalence rate in west Bank villages (WHO, 2007). This difference was due to different age group in both studies; In this study, the women ages was between 17-53 years, while Rizqallah study included women aged 40-65 years in Palestinian refugee camps.

**6.2 Socio-Demographic characteristics**

### 6.2.1 Citizenship:

Refuges population constitutes 69% of total population in Gaza Strip, and 72% of total sample in this study. This study concluded that being refugees could be increase the risk of obesity, where the prevalence of obesity was 33.6% among refugees and 27.2% among citizens population. The researcher refer that to bad economic status especially in the period of study conducted; increases unemployment rate, and number of people lived under poverty line.

In comparison to other studies, no studies were available in hands about the role of citizenship status on obesity. Most studies worldwide compared between rural and urban based on economic situation. Martiz, et al, (2001), found that obesity among women who live in rural and semi urban area present with obesity more than those living in urban area (Martiz, et al, 2001). In contractor to that Abd Rahim, et al, (2003), found prevalence rate of obesity among Palestinian West Bank rural women was 36.8% compared with 49.1% in urban women (Abd Rahim, et al, 2003). The majority of studies results in developing countries indicated that obesity concentrated among urban women; the prevalence of obesity was 56% in urban area compared with 44% in rural area in Jordan and Egypt. The same findings were found in Islamic Republic Iran, Morocco, Turkey and Lebanon (Martorell, etal, 2000; Musaiger, 2004).

Most researchers found that obesity is higher in urban area refer that to increasing consumption of quick meals; nutrient poor food with high level of sugar and saturated fats, in addition to reduced physical activity, through increasing usage of automated transport, and advanced technology at home. All that led to marked increase of obesity rate.

### 6.2.2 Women age:

Age of mother in this study ranged from 17-53 years. The result indicated that prevalence of obesity increased strongly with age to more than 58% in women aged > 35 years.

This result consistent with globally and regionally studies assess the relationship between obesity and age. Firstly, in South East Spain, Martinze, et al (2001), found that in both sex, the prevalence of obesity was strongly associated with age, in men aged 40 – 49 years the OR of obesity is 2.3 as compared to younger men, and it's increased with age. Regarding to women aged 30-39 years the risk of obesity is doubled, in those aged 40-49 years OR was 6.3 and in those age 50-65 years 12.7, linear strong association was observed between age and obesity in both sex ($P < 0.001$) (Martinez, et al, 2001).

In regional studies, Aljouni, et al (1998), found obesity more prevalent in the older age groups. Similarity, Malki, (2003) who classified female into different age groups, found that obesity increased positively with age with positive correlation between age and weight ($P < 0.001$) (Malki, 2003). The same pattern of prevalence of obesity observed by Tawil, et al (2007), the result indicates the proportion of women with overweight, obesity, and morbid obesity increased with increasing age (Tawil, et al, 2007).

The results indicate old women has risk factor for obesity, this may be refer to younger women who are more physically active, higher educated than old women, in addition to probability of the present of other confounder factor as pregnancy, delivery, and present of chronic diseases as well. However, that needs paying special attention through counseling and health education, and further research to explore the present of confounder affect the relationship between age and weight.

### 6.2.3 Education:

The results in this study reveal that an inverse relationship between level of education and obesity; obesity is less frequent in those with higher level of education. This is consistence with some literature and inconsistence with others. Ajlouni found that obesity was more common among lliterate people (Ajlouni, et al, 1998). Similar to that Martinez M etal (2001), indicated that, OR of obesity was 0.54 for those having completed secondary education and 0.24 for university students, showing an inverse linear association (Martinez M etal, 2001). In contracty to that, Tawil, et al (2007), found that no significant relation between educational level of the women and their BMI (Tawil, et al, 2007). Furthermore Musaiger, (2004) found that obesity is more prevalent in people who have better educated (Musaiger, 2004).

### 6.2.4 Employment status:

The results in this study reveals that no association between obesity and work status (OR= 0.85, 95% CI .26-2.77), in spite of, prevalence of obesity among unemployed women was 32% compared with 28.6% for employed women. Most researchers congruent with this result, for example Juhee, et al (2006), indicated no differences when comparing employment status and BMI among Korean American men and women (Juhee, et al, 2006). Similarity Martinez (2001) found no differences between employed and unemployed women, while lower prevalence of obesity was found among student contrary to retired women and

significant association with obesity was found only with women engaged in domestic duties (Martinez, et al, 2001). Musaiger, (2004), more consistent with this study result, he indicated that obesity was more prevalent among unemployed than employed women (Musaiger, 2004). This result may be refer to employed women more physically active and sleep less hour, and have lower number of children.

However, employed women constitute only 4.1% of total sample in this study. Further researches recommend with larger sample to explore the relationship between obesity and employment status.

**6.2.5 Income:**

The study reveals no significant relationship between obesity and monthly income, in spite of highest prevalence among women who live above poverty line (> 2100 NIS). There is inconsistency with literature about the relationship between obesity and economic status. Jackson et al (2003) indicated that obesity is more prevalent in those with higher economic status than in lower economic status (Jackson, et al, 2003). Contrary to that Degginger, (2004), found that highest rate of obesity are found among groups with highest poverty rates (Degginger, 2004). Similarly, Drewnowski, (2004), also indicated that highest rate of obesity is found among population group with highest poverty rates (Drewonowski, 2004). Additionally Erem, et al (2004), indicated that there is a significant association between household income and prevalence of obesity ($p < 0.0001$). Prevalence of obesity was increased as income level decreased, except for people who had an income above $400 (Erem, et al, 2004).

Debate between researchers still present regarding the illustration of the relationship between obesity and economic status. Some of them show obesity common on high class referring to their consumption of more fast and fatty foods, snake, caloric beverages, sweets and desserts. On other hand those found obesity common in highest poverty rates refers that to lower energy cost foods are associated with higher energy intakes and have less access to affordable healthy foods.

However, the period when collect data for this study was present unstable political and economical situation; where irregular salary paid, so further researches is recommend to explore the relation in more economical stable period.

### 6.3 Reproductive file

#### 6.3.1 Number of pregnancy:

The findings of this study indicate that reproductive factors exert a significant independent effect on risk of obesity in women. The result reveals strong positive association between number of pregnancy and deliveries and obesity; women with higher number of pregnancy and delivery have higher rate of obesity. Approximately most of studies were congruent with this result. Hajian, et al (2001), indicates the risk of obesity increased significantly by 9% with each additional parity (Hajian, et al, 2001). Similar association between number of children and obesity was observed by Weng, et al (2004), 7% increase in risk of obesity was noted for each additional child (Weng, et al, 2004). In Eastern Mediterranean region, several studies were carried out and indicate that obesity is high among women with multiple pregnancies (Musaiger, 2004).

### 6.3.2 Lactation:

Some women link their status of obesity to breast feeding. In fact, this study reveals higher prevalence of obesity among non lactated women with statistical significant relationship. Musaiger, (2004) agree with this result, he found decline in exclusive breast feeding important factor for obesity among women in Eastern Mediterranean region (Musaiger, 2004). On the other hand Tawil et al 2007 inconsistent with this result, he found obesity was greater among lactated women but the difference was not significant (Tawil et al, 2007).

It is well known that breast feeding have several advantages for mother and her baby, this study explore one of the most important advantage for women especially to faster return to normal birth after delivery. More education should be enhanced about this benefits and its future outcomes, and false believes among women about breast feeding increase weight must be change because that excess in weight may be refer to unhealthy dietary practice.

### 6.4 Medical history

Concerning to relationship between obesity and chronic diseases, the results reveals strong positive significant relationship with P value of 0.006. Regarding to literature, no one found disagree with this result, additionally most research revealed that obesity risk factor for many non communicable diseases and estimated the cost of these preventable diseases. So, further investigations and researches are necessary in order to estimate the impact of obesity on health in our countries.

Regarding to relationship between obesity and history of previous surgery, results indicates no significant relationship. On other hand, there is scarcity of literature regarding to that.

Among literature in our hand, only Tawil, et al, 2007, indicated that more obese women had history of previous laparatomy compared with non obese (Tawil, et al, 2007).

Having obese relative's increases risk for obesity, the result of this study congruent with this statement, and the finding clearly reveals the strong positive significance relationship between family history of obesity and women obesity. Most of researchers rationalized the global epidemic of obesity to a combination of genetic susceptibility, increased availability of high energy foods and decreased physical activity (Kopelman, 2000; Slawik, et al, 2006)

For that reason, those women have relative obese should be more aware for healthy diet and be encouraged for physical exercises to avoid more excessive weight, regularly follow up the measurement of BMI, and use further measurement as waist hip circumference.

**6.5 Physical activity**

Physical activity is assessed in different ways, walking, practicing home exercise, and going to sport center. The result in previous chapter reveals strong significant relationship between obesity and exercise with p value 0.001, 0.012, 0.002 respectively for three ways mentioned. This means that women practice of any of these activities have higher BMI than others.

The relationship between physical activity and obesity has been studied by many authors; all found an association between inactivity and obesity. For example, Cameron, et al (2003) indicated that the decrease of physical activity time is related to obesity defined by BMI and waist circumference in women (Cameron, et al, 2003). Erem, et al (2004), observed an inverse association between physical activity and prevalence of obesity and BMI ($p < 0.0001$). Prevalence of obesity is increased with the decrease of physical activities (Erem, et

al, 2004). Recently, Tawil, et al (2007), found the prevalence of overweight and obesity was lower among women who practice any exercise (Tawil, et al, 2007).

The researcher refers the illogic findings in this study regarding to physical activities for many reason. Firstly, Physical activity is not common concept in the Palestinian context, especially among women in refugee's camp, Unlikely in our culture to find women involved in gymnasium and enjoy it regularly, and additionally Women seemed not to be interested in physical exercise. We conclude factors to this unhealthy life style; such as lack of public parks, open spaces, bad economical status, and cultures norms and believe. So, we find only obese women who attempt to practice exercise or go to sport centers. This study is cross sectional study, we can not predict obesity came before or the physical activity, the researcher suggests further researches needed to explore the relationship as prospective studies.

### 6.6 Nutritional KAP

#### 6.6.1 Nutritional knowledge:

The result in this study reveals that more than 80% of women have high nutritional knowledge regarding to food items and relation between food and health. While the result reveals also no significant association between obesity and level of knowledge.

This is consistence with some literature and inconsistence with others. Kim (2003) agrees with this result by knowledge score was high in females, and disagree with increased BMI associated with low nutritional knowledge (Kim, 2003). Similarly, Reinehr, et al (2003), conducted case control study to compare nutritional knowledge between obese and non obese

children found no differences and obesity not associated with lack of nutritional knowledge (Reinehr, et al, 2003). Concurrent to that Naini, et al (2006), found that obese children knew about food groups and classify foods better than those with normal weight (Naini, et al, 2006).

Nutrition knowledge was shown to be a partial mediator of the socio-demographic variation in intake, especially for fruit and vegetables. This demonstrates the value of using more sophisticated statistical techniques to investigate associations between nutritional knowledge and BMI and indicates that knowledge is an important factor in obesity.

**6.6.2 Nutritional attitude:**

Presence of obesity is considered as a problem, but not being aware for this problem is crisis. In this study, about 16.8% among women described their weight as normal was actually obese, meanwhile 39.3% of total women described their weight as overweight was actually obese, and 32.7% of obese women describe their weight status as non obese. There is scarcity of literature that investigates the relationship between nutritional attitudes and obesity. Naini, et al (2004), noted that about 14% of obese children described their weight as normal weight (Nani , 2004). While Tawil, et al (2007), found 96.6% of overweight and obese Iraqi women described their weight status as overweight and obese and only 3.4% described their weight as normal weight (Tawil, et al, 2003).

Believes and attitudes may be linked with obesity but have not been investigated enough. So, further researches necessary to focus in nutritional KAP and investigate its relationship with obesity. Health education should be focus on training women about methods of weight measurement to increase awareness of problem as early as possible.

### 6.6.3 Dietary practice:

In many studies, correlations between obesity and dietary practice have failed to reach statistical significance. In this study, result reveals bread was the most food item consumed by women with average 17.7 times per weeks. That means bread is consumed more than 2 times daily. The average consumption of Potato and sweet was 3.4 and 2.5 times respectively, consumption of all bread, potato, and sweet is not associated significantly with obesity. This result congruent with Leibovici, et al, (2007), who found that obesity, was not significantly associated with daily energy and macronutrient intake (Leibovici, et al, 2007). While Koski, et al (2002), found bread consumption was positively associated with obesity (Koski, et al, 2002).

The average consumption of vegetables and fruit per week was 5.4 and 2.9 times respectively, but not associated significantly with obesity This result inconsistent with He, et al (2004), who found an inverse association between increased intake of fruits or vegetables and risk of obesity (He, et al, 2004).

The researcher refer the finding regarding average food group consumption in this study to bad economic status which affect on dietary habits, in addition some women may be on diet. That means, current diet not be representative of diet in previous years; which is the diets that lead to obesity not the current diet.

Concerning to emotional state while eating, the finding reveals that women eat more when they are stress risk for obesity more than other women. This result consistent with Laitinen, et al, (2002), who found certain proportion of people, primarily women eat more when they are upset and this associated significantly with obesity (Laitinen, et al, 2002). The result

also reveals statistical significant relationship between obesity and other variables as emotional state while eating, shopping, cooking, and favorite drinks. On other hand there is no association between obesity and frequency of food consumption.

# Chapter (7)

# Conclusion and recommendations

## 7.1 Conclusion

As aforementioned obesity is becoming common condition in developed and developing nation worldwide. Among women, the Eastern Mediterranean region shows high prevalence of obesity. The present study provides the first data on the prevalence of obesity in Gaza Strip and its distribution among women. It is cross sectional study aimed to identify potential risk factors associated with obesity and to provide basis for further intervention by health provider. The study sample was proportional sample from each governorates, largest UNRWA and MOH clinics were selected, and systematic random sample from married women attended MCH clinics were taken. The response rate was high as 96.8% of total sample.

An important finding of this study is high prevalence of overweight (33.3%) and obesity (31.9%) among women which considered from the highest prevalence in neighbor countries. It is seems to be more among refugee's women. Distribution of obesity by governorates shows the highest prevalence in Mide Zone (46%), while the highest prevalence of obesity was in North Gaza (38.7%).

Globally several factors as socioeconomic status, medical history, reproductive history, dietary habits, nutritional KAP and other are associated with obesity. In this study the researcher

investigate firstly the socioeconomic status with obesity. The findings reveal that, obesity associated positively with mother age. Women educational level plays an important role as contributing factor for obesity, where lower educated women seem to be more obese. Regarding to monthly income, the study revealed that obesity more among population with higher monthly income.

The study revealed that number of pregnancies and deliveries are associated positively with obesity among women, meanwhile there is inverse relationship between obesity and interval between pregnancies. Additionally the result illustrate that lactated women have lower risk of obesity and women use contraceptive methods have more obesity.

The findings in this study also illustrate the present of chronic diseases and take its medication associated positively with obesity, further more strong positive relationship between family history of obesity and obesity was present. While, there is no relation between obesity and history of previous surgery.

Unexpected result in this study, there is positive association between obesity and physical activities, the researcher refer that to Palestinian women seemed not to be interested in physical exercise, expect obese women who try to reduce their weight, so we found prevalence of obesity higher among those practice physical activities.

Unfortunately, about 33% of obese women were not aware for their problem and describe their weight as over or normal weight. Furthermore around 60% of obese women describe their diet size as normal and 26% describe their diet size less than others family members. Regarding to nutritional knowledge, the finding reveals that prevalence of obesity higher

among women with high nutritional knowledge. That's mean, obese women on diet regime have more knowledge about food groups and its contents.

Regarding to dietary habits, the finding reveal that women eat more while they were anger, women always went for food shopping, and women always cooked the food at home, were risk for obesity than others. Meanwhile, obesity not affected by food group consumption as other dietary habits. That's may be related to bad economic status at period of data collection, which affected the amount and quality of daily food intake, furthermore face to face questionnaire make women embarrassed to talk more about there dietary habits.

Ultimately, the study reports the prevalence of obesity and its distributions. In addition, it explores the associated factors with obesity in our community. The researcher suggest another studies for every factor separately to provide more details about the relationship between obesity and associated factors

### 7.2 Recommendations

The finding in this study help the researcher to understand the problem and give him the chance to make number of recommendation that may help policy maker in solving this problem and control and treat obesity as soon as possible.

#### 7.2.1 General recommendations:

- Health education campaigns, there is urgent need to spread awareness about obesity, its consequences, and the ways of preventing, health dietary habits, attitude toward obesity need to be better understand

- Training course for women for methods of obesity measurement, to enable women to determine obesity early, and make follow up.
- Effort to promote an active lifestyle and maintaining normal weight should be targeted, as providing the facilities for practicing physical exercise in the community.
- Encourage breast feeding that help women in faster return to normal weight.
- effective weight management for individual and group especially those at risk of developing obesity, as those have chronic diseases or have familiar history of obesity.
- Develop national obesity control strategy
- Strength of non communicable diseases (Related to obesity) information system

### 7.2.2 Future research recommendations:

- Further studies should be conducted with larger sample as community based study to verify the finding of this study.
- Independently study the relationship between obesity and physical activities is needed.
- More studies with finer instrument are needed for a deeper understanding of the relationship between obesity and nutritional KAP
- Further studies are needed to assess obesity for gender, all age groups, and frequent educational levels separately.
- More studies needed to determine the economic cost of obesity and evaluates its cost from the total health care system budget**.**

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**Annex 1**

**Map of Palestine**


Source: MOH, 2000

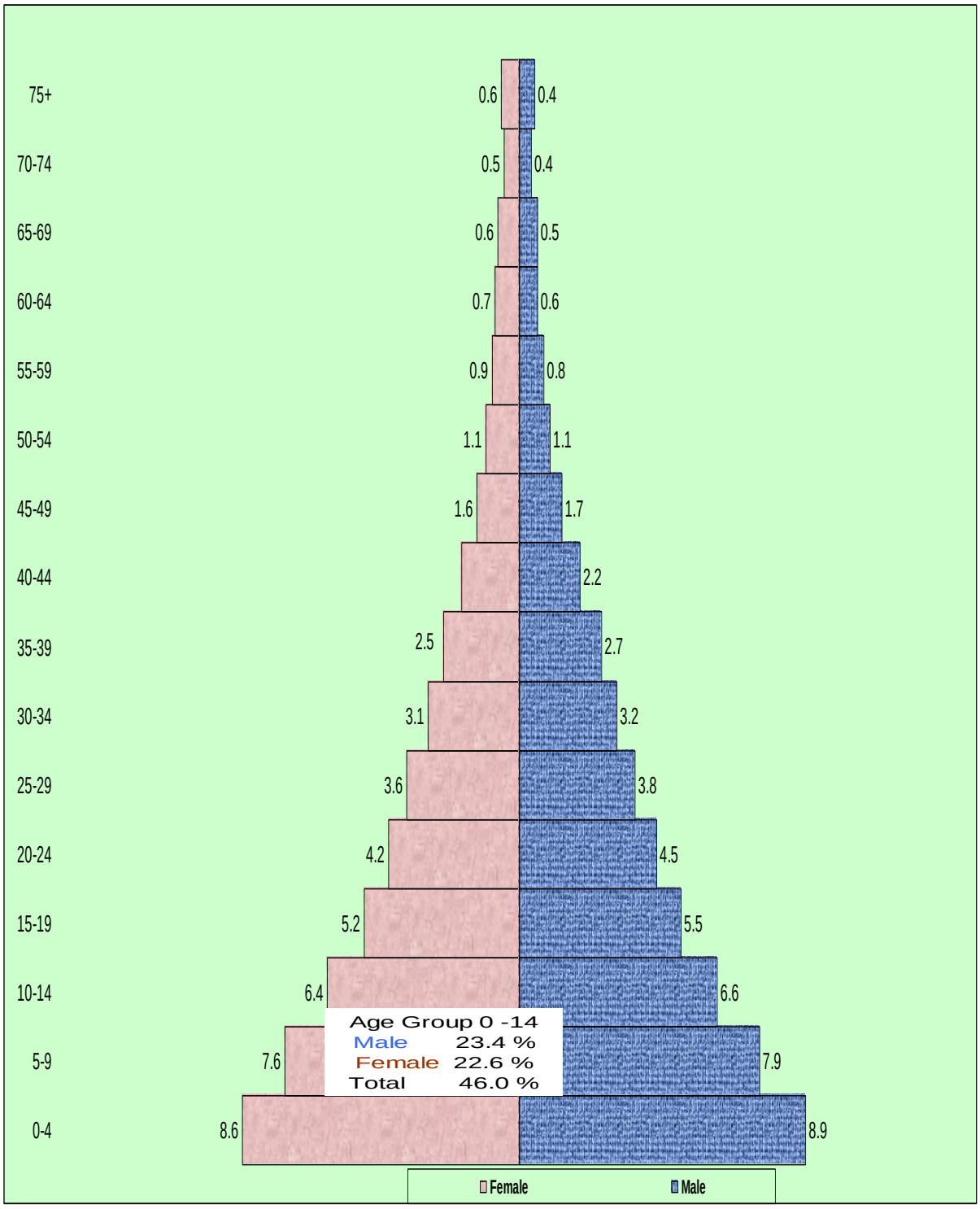
**Annex 2**

**Map of Gaza Strip**

Source: www. Islamonline.net

**Annex 3**

**Age pyramid for Palestinian population, 2006**



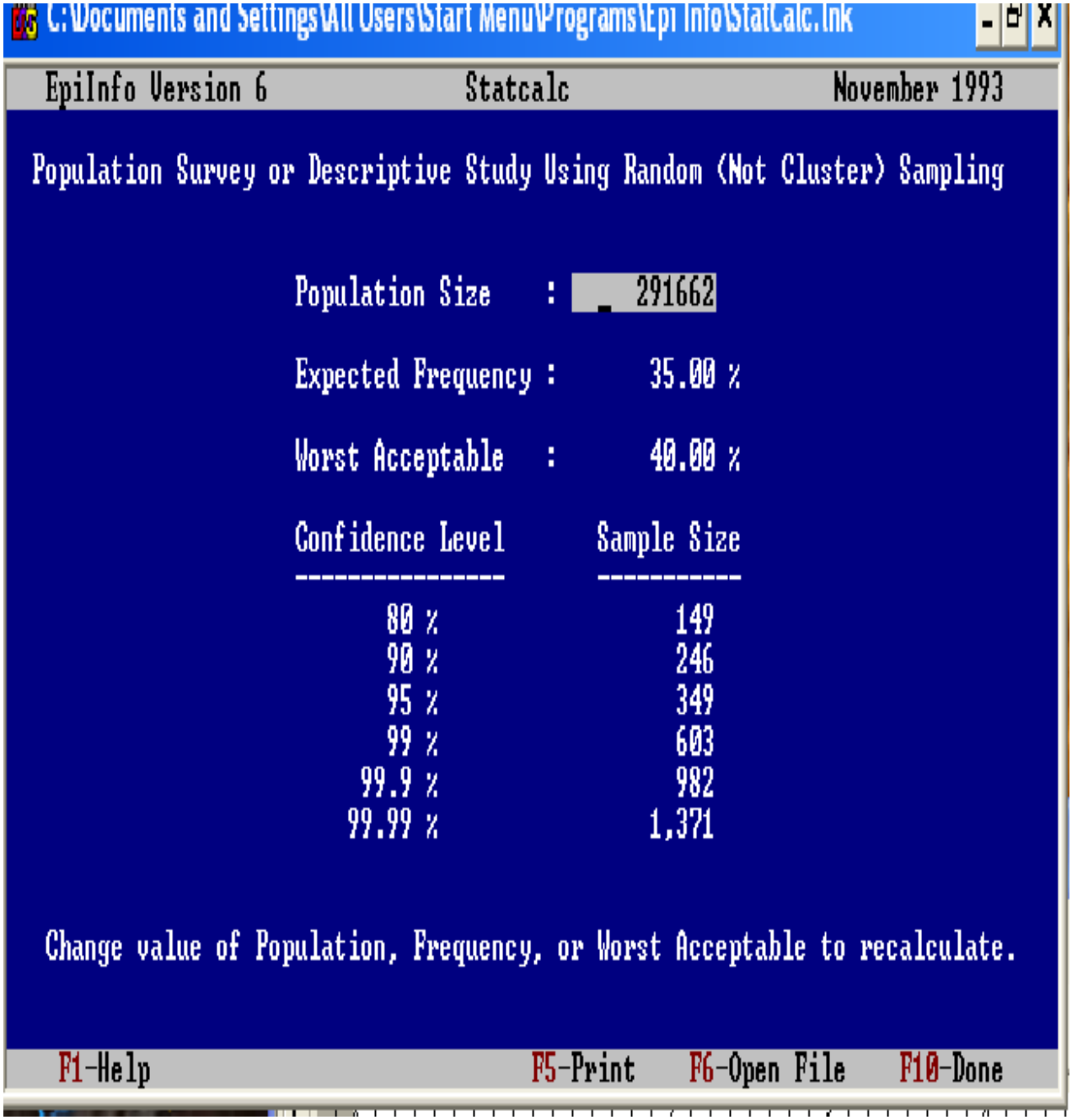
**Annex 4**

**WHO classification of obesity by BMI**

| WHO | Popular | BMI (kg/m$^2$) | Risk of co-morbidities |
|---|---|---|---|
| ***Under weight*** | Thin | <18.5 | Low (but risk of other clinical |
| ***Normal weight*** | Normal | 18.5 - 24.9 | Average |
| ***Over weight*** | | > 25.0 | |
| ***Pre obese*** | Overweight | 25 - 29.9 | Increased |
| ***Obese Class I*** | Obese | 30.0 - 34.9 | Moderate |
| ***Obese Class II*** | Obese | 35.0 - 39.9 | Severe |
| ***Obese Class III*** | Morbid obese | > 40.0 | Very severe |

**Annex 5**

**Sample size by Epi-enfo program**



**Annex 6**
**Distribution of proportional sample**

**Sample proportion for each governorate**

| District | pop | % of total | sample |
|---|---|---|---|
| ***North Gaza*** | 56,539 | 19 | 67 |
| ***Gaza City*** | 103,732 | 35 | 122 |
| ***Mid Zone*** | 42,758 | 14 | 50 |
| ***khanyounis*** | 57,319 | 19 | 68 |
| ***Rafah*** | 35,131 | 12 | 43 |
| ***Total*** | **295480** | **100** | **350** |

**Sample proportion for each Provider**

| District | NO. of women attending MCH clinics(UNRWA) | % | NO. of sample | NO. of women attending MCH clinics(MOH) | % | NO. of sample |
|---|---|---|---|---|---|---|
| ***North Gaza*** | 32,229 | 70 | 47 | 13,714 | 30 | 20 |
| ***Gaza City*** | 59,485 | 52 | 63 | 55,362 | 48 | 58 |
| ***Mid Zone*** | 40,600 | 89 | 45 | 4,815 | 11 | 6 |
| ***khanyounis*** | 30,494 | 58 | 39 | 21,861 | 42 | 29 |
| ***Rafah*** | 29,441 | 86 | 37 | 4,854 | 14 | 6 |
| ***Total*** | **192,249** | **66** | **231** | **100,606** | **34** | **119** |

**Annex 7**

**بسم الله الرحمن الرحيم**
**دعـــوة**

**عزيزتي المشـاركة:**

أنا الطالبة ***جملات يوسف المجدلاوي*** أدرس بكلية الصحة العامة – جامعة القدس أبو ديس، أقوم بإعداد بحث بعنوان " **محددات السمنة بين السيدات المتزوجات** " باعتباره متطلب للتخرج والحصول على درجة الماجستير وتم اختيارك بناءاً لمطابقتك شروط اختيار العينة.

**تهدف هذه الدراسة** إلى تحديد عوامل الخطر المصاحبة للسمنة بين السيدات في قطاع غزة والخروج بتوصيات للحد من انتشار السمنة وتجنبها.

**ونشكر لك** مشاركتك في هذه الدراسة بالإجابة على بعض الأسئلة خلال المقابلة، مع العلم أن المقابلة لن تستغرق أكثر من 15 دقيقة تقريبا. بالإضافة إلى قياس وزنك وطولك، **في حال** أن الوقت غير مناسب الرجاء تحديد موعد آخر يناسبكم.

**مشاركتكم تطوعية** يمكنكم رفض الإجابة على أي سؤال وأرغب أن أؤكد لكم أن المعلومات التي تذكروها ستكون مصدر ثقة وسرية وستستخدم فقط لغرض البحث العلمي وبدون ذكر الأسماء ولذا أرجو أن تكون الإجابات دقيقة.

- قبل البدء في المقابلة هل تودين الاستفسار حول أي شيء عن الدراسة؟
- هل من الممكن أن نبدأ المقابلة الآن؟ 1. نعم 2. لا

**وشكراً لكم على حسن تعاونكم**

**Consent Form**

My name is jamalat majdalawi, I am studying in Al Quds University in Public health thesis as research study.” Determent of obesity among married women”. This study is being carried out as a part of the requirement for the master degree of public health.

The aim of this study to determine the associated risk factors with obesity in married women to provide basis for further intervention by health provider.

I appreciate your participation in this research study and you need to answer the interviewers’ questions that do not take more than 15 minutes. Your height and weight will be measured.

Your Participation is optional and you are not obliged to answer any question you do not want to, further more confidentiality of the data will be provided and maintain.

At this time, do you want to ask me anything about the research study?

May I begin the interview now? 1- Yes 2- No

**Annex 8**
**استبيان حول**
**محددات السمنة بين السيدات المتزوجات**

- التاريخ: ----------الرقم: ----------
- اسم العيادة: ---------- رقم التليفون: ----------
- العنوان: ----------الاسم: ----------
- تاريخ الميلاد: ----------

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**1. معلومات شخصية:**

- الحالة المدنية: مواطن□ لاجئ□
- المحافظة:

شمال غزة□ غزة□ الوسطى□
رفح□ خان يونس□

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**2. المعلومات الاجتماعية و الاقتصادية:**

- عدد سنوات التعليم : ----------

- هل تعملين:

نعم□ لا □

إذا كانت الإجابة رقم "1" حددي نوع العمل----------

- هل يعمل الزوج:

نعم□ لا □

إذا كانت الإجابة رقم "1" حددي نوع العمل----------

- معدل الدخل الشهري للأسرة ( NIS:( ----------
- نوع العائلة التي تعيشين فيها:

عائلة نووية□ عائلة ممتدة□ غير ذلك□

---

**3. معلومات الصحة الإنجابية:**

- العمر عند الزواج بالسنوات: ----------
- العمر عند الحمل الأول: ----------
- عدد مرات الحمل: ----------
- متوسط المدة الزمنية بين الأحمال: ----------
- عدد مرات الولادة: ----------
- عدد حالات الولادة القيصرية: ----------
- عدد الأطفال الأحياء: ----------

- هل تستخدمين أياً من وسائل منع الحمل:

نعم□ لا □

إذا كانت الاجابة نعم ما هي الوسيلة: ----------

- ما هي الفترة الزمنية لاستخدام هذه الوسيلة في كل مرة تستخدمينها: ----------

- هل ترضعين طفلك:

نعم□ لا □

❖ إذا كانت الإجابة نعم ما هو نوع الرضاعة:

رضاعة مختلطة□ رضاعة صناعية□ رضاعة طبيعية□

---

**4. التاريـخ الطبـي:**

❖ هل تعاني من أمراض مزمنة:

نعم□ لا □

إذا كانت الإجابة نعم حددي؟

أمراض القلب□ ضغط الدم□ سكري□

أخرى (حددي)□ آلام المفاصل□ أمراض الصدر□

❖ هل تتناولين أي من العلاجات بشكل دائم:

نعم□ لا □

إذا كانت الإجابة نعم حددي نوع العلاج:----------

❖ هل تعرضي لعمليات جراحية:

نعم□ لا □

إذا كانت الإجابة نعم حددي نوع العملية:----------

**5. هل يعاني أحد من أقربائك من السمنة:**

نعم□ لا □

إذا كانت الإجابة نعم حددي:

الأخ□ الأم□ الأب□

ابن/ابنة□ الأخت□

---

**6. الممارسات والاتجاهات والمعرفة التغذوية:**

**الممارسات: ☒**

❖ كم وجبة تتناولي في اليوم:

ثلاث□ اثنتين□ واحدة□

أكثر□ أربع□

❖ هل تتناولين وجبات الطعام أثناء مشاهدة التلفزيون:

إطلاقاً□ أحياناً□ دائماً□

❖ هل تتناولي وجبة الإفطار:

إطلاقاً□ أحياناً□ دائماً□

❖ هل تتناولين وجبات خفيفة بين الوجبات الرئيسية:

إطلاقاً□ أحياناً□ دائماً□

❖ في أيا من الحالات تتناولين الطعام بكثرة:

الغضب□ الفرح□

لا أعرف□ التوتر النفسي□

❖ ما هي المشروبات التي تفضلين تناولها:

الماء□ العصير□ الحليب□

القهوة□ المشروبات الغازية□ الشاي□

غير ذلك□

❖ هل أنت التي تقومين بشراء الطعام للمنزل:

إطلاقاً□ أحياناً□ دائماً□

❖ هل أنت التي تقومين بإعداد الطعام في المنزل:

إطلاقاً□ أحياناً□ دائماً□

❖ ما هي طريقة الطبخ المعتمدة في منزلك:

الشوي□ القلي□

السوتيه□ السلق□

❖ هل تشتري الطعام الجاهز من المطعم:

لا□ نعم□

إذا كانت الإجابة نعم كم مرة في:

---------- الشهر □ ---------- الأسبوع□

❖ هل تتناولي وجبة العشاء قبل النوم مباشرة:

إطلاقاً□ أحياناً□ دائماً□

❖ من هذه المجموعات اذكري عدد مرات الاستهلاك بين القوسين:

| | يومياً | أسبوعياً | شهرياً | أكثر من شهر |
|---|---|---|---|---|
| **الفواكه** | (  ) | (  ) | (  ) | (  ) |
| **الخضروات** | (  ) | (  ) | (  ) | (  ) |
| **الخبز أو الأرز** | (  ) | (  ) | (  ) | (  ) |
| **البطاطا** | (  ) | (  ) | (  ) | (  ) |
| **الحليب ومشتقاته** | (  ) | (  ) | (  ) | (  ) |
| **الحلويات** | (  ) | (  ) | (  ) | (  ) |
| **اللحوم الحمراء** | (  ) | (  ) | (  ) | (  ) |
| **اللحوم البيضاء** | (  ) | (  ) | (  ) | (  ) |
| **البقوليات** | (  ) | (  ) | (  ) | (  ) |
| **المقالي** | (  ) | (  ) | (  ) | (  ) |

**المعرفة: ☒**

❖ هل من الضروري تناول وجبات ذات قيمة غذائية جيدة:

لا أعرف□ لا□ نعم□

❖ هل هناك علاقة بين الإصابة ببعض الأمراض المزمنة والعادات الغذائية:

لا أعرف□ لا□ نعم□

❖ هل تناولك الطعام الصحي يساعدك أن تبقي بصحة جيدة:

لا أعرف□ لا□ نعم□

❖ هل من الضروري تناول الخضروات والفواكه:

لا أعرف□ لا□ نعم□

❖ هل من الضروري تناول الأطعمة التي تحتوي على الألياف:

لا أعرف□ لا□ نعم□

❖ هل من الضروري تناول الأطعمة التي تحتوي على قليل من الدهون:

لا أعرف□ لا□ نعم□

❖ من هذه الأطعمة ما هو الطعام الذي يحتوي على دهون مشبعة:

| | نعم | لا | لا أعرف |
|---|---|---|---|
| **الأرز** | (  ) | (  ) | (  ) |
| **اللحوم** | (  ) | (  ) | (  ) |
| **الخضروات** | (  ) | (  ) | (  ) |
| **الجاتوه** | (  ) | (  ) | (  ) |
| **المقالي** | (  ) | (  ) | (  ) |

❖ هل من الضروري تناول الأطعمة التي تحتوي على قليل من النشويات:

لا أعرف□ لا□ نعم□

❖ من هذه الأطعمة ما هي الأطعمة التي تعتبر مصدر جيد للكربوهيدرات:

| | نعم | لا | لا أعرف |
|---|---|---|---|
| البطاطا | (  ) | (  ) | (  ) |
| التفاح | (  ) | (  ) | (  ) |
| الأسماك | (  ) | (  ) | (  ) |
| الخبز | (  ) | (  ) | (  ) |
| الفواكه | (  ) | (  ) | (  ) |

**الاتجاهات:** ☒

❖ كيف تصفين نفسك الآن:

متوسطة□ نحيفة□

سمينة□ وزن زائد□

❖ كيف تصفين نفسك قبل الزواج:

متوسطة□ نحيفة□

سمينة□ وزن زائد□

❖ كيف تصفين نظامك الغذائي:

أكثر من أفراد العائلة□ معتدل□ أقل من أفراد العائلة□

❖ هل تعتقدي أن لديك معلومات عن التغذية:

لا□ نعم□

لا أعرف□ غير متأكدة□

❖ هل ترغبي في أن تتعلمي أكثر عن التغذية:

لا□ نعم□

لا أعرف□ غير متأكدة□

❖ كيف تصفين غذائك:

متوسط□ صحي□ صحي جداً□

لا أعرف□ غير صحي□

❖ هل ترغبين في تخفيف وزنك:

لا□ نعم□

❖ هل حاولت تخفيف وزنك:

لا□ نعم□

❖ هل ترغبين في زيادة وزنك:

لا□ نعم□

❖ هل حاولت أن تزيدي وزنك:

لا□ نعم□

❖ هل تعتقدي أنه من الصعب تناول وجبات صحية:

لا أعرف□ لا□ نعم□

❖ إذا كانت الإجابة نعم لماذا هي صعبة:

غالية الثمن□ أنا لا أعرف ما هي الأطعمة الصحية□

أخرى □ من الصعب الحصول على وجبة صحية تحبها العائلة□

---

**7. النشاط الجسماني:**

❖ هل تمارسي أي نوع من الرياضة في المنزل:

نعم□ لا□

إذا كانت الاجابة نعم حددي نوع الرياضة----------

❖ هل تمارسي رياضة المشي:

نعم□ لا□

❖ إذا كانت الاجابة نعم:

يومياً□ أسبوعياً□ شهرياً□

كم دقيقة؟----------

❖ هل التحقت بأي مركز رياضي؟

نعم□ لا□

إذا كانت الإجابة نعم ما هي المدة الزمنية؟----------

❖ إذا كان لديك وقت فراغ ماذا تفعلي:

أشاهد التلفزيون□ أقرأ كتاب□ زيارات□

أقوم بأعمال المنزل□ أخرى□

---

**8. القياسات:**

❖ الطول----------

❖ الوزن----------

**Determinants of obesity among married women**

No: ---------- Date: ----------

Telephone No: ---------- Clinic: ----------

Name: ---------- Address: ----------

Date of birth: ----------

**1-Identifier:**

❖ **Citizenship:**

□ Citizen □ Refugee

❖ **Governorates:**

□ North Gaza □ Gaza city □ Mide Zone

□ Rafah □ Khanyounis

**2-Socio-economic Information**

- Years of education**:** _____

Do you work?

□ Yes □ NO

- If the answer yes, please what is your job: _____
- Is your husband work?

□ Yes □ NO

- If the answer yes, please what is your husband job: _____
- Average monthly income **(NIS):** ----------
- Family type

□ Nuclear □ Extended □ Other

**3-Reproductive information:**

- Age at marriage: ----------
- Age at first pregnancy: ----------
- No of pregnancy: ----------
- Average interval between pregnancy: ----------
- No of CS: ----------
- No of children: ----------
- No of live births: ----------:
- Do you use any contraceptive methods?

□ Yes □ NO

- If yes what is the used method: _____
- Period of using this method: ----------
- Do you lactate your baby?

□ Yes □ NO

**4- Medical history**

- Do you suffer from chronic disease?

□ Yes □ NO

- If yes, specify:

□ Diabetes □ High blood pressure

□ Hears diseases □ Chest diseases

□ Joint pain □ Others

- ❖ Do you under medication?

□ Yes □ NO

- ❖ If yes what is used drug: _____
- ❖ Do you have a history of previous surgery

□ Yes □ NO

- ❖ If any of your relatives suffering from obesity?

□ Yes □ NO

- ❖ **If yes**

□ Father □ Mother □ Brother

□ Sister □ Son or daughter

**6- Nutritional attitude, knowledge, and practice**

- ☒ **Practice**
- ❖ No of meals

□ One □ Two □ Three

□ Four □ More

- ❖ Do you eat while watching TV?

□ Always □ Sometimes □ Never

- ❖ Do you have breakfast daily?

□ Always □ Sometimes □ Never

- ❖ Do you take snakes between meals

□ Always □ Sometimes □ Never

- ❖ At what emotional status you eat more?

□ Happiness □ Anger

□ Stress □ The same

- ❖ Which drink you prefer

□ Milk □ Juice □ Water

□ Tea □ Soda □ Coffee

□ Others

- ❖ Do you buy food by your self?

□ Always □ Sometimes □ Never

- ❖ Do you prepare food by your self?

□ Always □ Sometimes □ Never

- ❖ Which type of cooking used?

□ Frying □ Roasting

□ Boiling

- ❖ Do you take restaurant made food?

□ yes □ No

- ❖ If yes at what frequency?

□ Weekly □ Monthly

- ❖ Do you eat your dinner exactly before sleeping?

□ Always □ Sometimes Never □

- ❖ **From the below menu please mention how many times you consuming each food groups**

| **Group** | **Daily** | **Weekly** | **Monthly** | **More than** |
|---|---|---|---|---|
| **Fruits** | **( )** | **( )** | **( )** | **( )** |
| **Vegetables** | **( )** | **( )** | **( )** | **( )** |
| **Bread & rice** | **( )** | **( )** | **( )** | **( )** |
| **Potatoes** | **( )** | **( )** | **( )** | **( )** |
| **Milk products** | **( )** | **( )** | **( )** | **( )** |
| **Sweets** | **( )** | **( )** | **( )** | **( )** |
| **Red meats** | **( )** | **( )** | **( )** | **( )** |
| **White meats** | **( )** | **( )** | **( )** | **( )** |
| **Legumes** | **( )** | **( )** | **( )** | **( )** |
| **Fried foods** | **( )** | **( )** | **( )** | **( )** |

## ☒ Knowledge

❖ Is it essential to take healthy diet?

□ Yes □ No Don't know □

❖ Is there a relationship between dietary habits and chronic diseases?

□ Yes □ No □ Don't know

❖ Is healthy food helps you maintain your health?

□ Yes □ No □ Don't know

❖ It is essential to consume fruits and vegetables?

□ Yes □ No □ Don't know

❖ Is it essential to consume food rich in fibers?

□ Yes □ No □ Don't know

❖ Is it essential to consume food rich in fibers?

□ Yes □ No □ Don't know

❖ Is it necessary to eat food with low fat contents?

□ Yes □ No □ Don't know

❖ **From list below, which food contain saturated fats**

| **Food** | **Yes** | **Low** | **Don't know** |
|---|---|---|---|
| **Rice** | **( )** | **( )** | **( )** |
| **Meats** | **( )** | **( )** | **( )** |
| **Vegetables** | **( )** | **( )** | **( )** |
| **Cake** | **( )** | **( )** | **( )** |
| **Fried food** | **( )** | **( )** | **( )** |

❖ It is necessary to eat food with little amount of carbohydrates?

□ Yes □ No □ Don't know

❖ **From the list below, which food contain carbohydrates**

| **Food** | **Yes** | **Low** | **Don't know** |
|---|---|---|---|
| **Potatoes** | **( )** | **( )** | **( )** |
| **Apples** | **( )** | **( )** | **( )** |
| **Fish** | **( )** | **( )** | **( )** |
| **Bread** | **( )** | **( )** | **( )** |
| **Fruits** | **( )** | **( )** | **( )** |

☒ **Attitude**

❖ How describe your weight now?

□ Thin □ Normal weight

□ Overweight □ Obese

❖ How describe your weight before marriage?

□ Thin □ Normal weight

□ Overweight □ Obese

❖ How describe your diet?

□ Lower than others □ Normal □ More than others

❖ Do you think that you have nutritional knowledge?

□ Yes □ No

□ Not sure □ Don't know

❖ Are you interested in learning more about nutrition?

□ Yes □ No

□ Not sure □ Don't know

❖ How do you describe your dietary habits?

□ Very healthy □ Healthy □ Moderate

□ Not healthy □ Don't know

❖ Are you interested in losing weight?

□ Yes □ No

❖ Did you tried to lose weight?

□ Yes □ No

❖ Are you interested in gaining weight?

□ Yes □ No

❖ Did you tried to gain weight?

□ Yes □ No

❖ Do you believe that it is difficult to eat healthy meals?

□ Yes □ No □ Don't know

❖ If the answer is no, why do you think it is difficult?

□ High price □ I don't know what is healthy foods

□ It is difficult to have health meal that a tasty □ Others

**7- physical activities**

- ❖ Do you practice exercise at home?

□ Yes □ No

- ❖ Do you walking?

□ Yes □ No

- ❖ If yes

□ Daily □ Weekly □ Monthly

- ❖ How many minutes?
- ❖ Do you go to sport center (Gymnasium)?

□ Yes □ No

- ❖ If you have free time, what you do?

□ Watching TV □ Read book □ Socialization

□ Perform home duties □ Others

**8- Anthropometrics measurements:**

- ❖ **Weight: _____**
- ❖ **Highest: _____**

**Annex 9**

**Palestinian National Authority**
**Ministry of Health**
**Helsinki Committee**

**السلطة الوطنية الفلسطينية**
**وزارة الصحة**
**لجنة هلسنكي**

Date: 12/2/2007

التاريخ:2007/2/12

Name: Jamalat Al Majdalawi

I would like to inform you that the committee has discussed your application about:

الاسم: جملات المجدلاوي

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

**Determinants of Obesity Among Married Women Attended Mother and Child Health Clinics, Gaza - Palestine.**

In its meeting on February 2007
and decided the Following:-
To approve the above mention research study.

و ذلك في جلستها المنعقدة لشهر فبراير 2007
و قد قررت ما يلي:-
الموافقة على البحث المذكور عاليه.

Signature
توقيع

Ministry of Health
Helsinki Committee

| Member | Member | Chairperson |
|---|---|---|
| عضو | عضو | |

Conditions:-

- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

Gaza Etwam – Telefax 972-7-2878166

**Annex 10**

وزارة الصحة

كليــة الصحــة العامـــة
School of Public Health
القدس - فلسطين

جامعة القد

2007/2/7

الأخ/ د. أيوب العالم المحترم
مدير برامج الصحة بوكالة الغوث
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالبة جملات المجدلاوي

تقوم الطالبة المذكورة أعلاه بإجراء بحث بعنوان:

**"Determinates of obesity among married women attended mother and child health clinics, Gaza-Palestine "**

كمتطلب للحصول على درجة الماجستير في الصحة العامة-مسار الوبائيات و الإحصاء الحيوي علماً بأن الطالبة قد حصلت على موافقة لجنة هلسنكي لأخلاقيات البحوث و ستكون المعلومات متوفرة لدى الباحثة فقط. و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالبة في جمع البيانات الخاصة.

موافقتكم دعماً للمسيرة الأكاديمية
و تفضلوا بقبول فائق الاحترام ،،،

د. سوزان شعشاعه
عميد كلية الصحة العامة المساعد

كلية الصحة العامة / غزة
رقم الصادر: 13
تاريخ الصادر: 2007/2/7

نسخة: الملف

**Annex11**

وزارة الصحة

كليـة الصحـة العامـة

School of Public Health

القدس - فلسطين

جامعة القد

2007/2/7

الأخ/ د. علي قويدر المحترم

مدير عام الرعاية الأولية

تحية طيبة وبعد،،،

الموضوع: مساعدة الطالبة جملات المجدلاوي

تقوم الطالبة المذكورة أعلاه بإجراء بحث بعنوان:

**"Determinates of obesity among married women attended mother and child health clinics, Gaza-Palestine "**

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موافقتكم دعماً للمسيرة الأكاديمية

و تفضلوا بقبول فائق الاحترام ،،،

د. سوزان شعشاعه

عميد كلية الصحة العامة المساعد

نسخة: الملف

كلية الصحة العامة / غزة
رقم الصادر: 12
تاريخ الصادر: 2007/2/7

**Annex 12**

**List of Expert Names who Review Study Questionnaires.**

| | | |
|---|---|---|
| **Dr** | ***Abed Al Jabar Al tibi*** | Former Director General of General PHC Directorates |
| **Dr** | **Adly Skeik** | Director of Nutritional Department |
| **Dr** | **Adnan Al whedi** | Medical directors of Ard El Insan |
| **Dr** | **Ayoub El Alem** | Former chief Field Health Program, UNRWA |
| **Dr** | **Dina Abu Shaban** | Director of Women Health and Development Directorate |
| **Mrs** | **Dina Al shareef** | Nutritional Health Counselor |
| **Dr** | **Mona Al – Astal** | Director in community health directorate |
| **Mr** | **Saadi Abu Awad** | Lecturer in Alquds University |
| **Dr** | **Suzanne Shosha'a** | Assistance Dean of School of Public Health |