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Determinants of Overweight and Obesity among University Students in the Gaza Strip: Cross-sectional Study

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Dedication

To whom they strive and never stint what they own to push me in the success way...

Who motivated me to climb the life stairs wisely and patiently ... To my father and my mother

To my brothers and sisters

And

To my grandfather and grandmother

Shoroq H. Abu Hamad

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 of its parts has not been submitted for higher degree to any other university or institution.

Signed:

Date:

Acknowledgement

This study would not be feasible without the guidance and assistance of many individuals who helped me to overcome all the obstacles I have faced during completion of this study.

Abstract

Obesity is considered the main driver to the global burden of non-communicable disease and disability, affecting all ages and socio-demographic groups in developed and developing countries. Globally, obesity is a serious health issue among university students. This cross-sectional study was carried out to assess the prevalence and the determinants of overweight and obesity among university's students in the Gaza Strip.

The design of this study is a descriptive analytical cross sectional design. It is a quantitative research approach. This study was conducted at three universities in the Gaza Strip: Islamic University, Al-Aqsa University, and Al-Azhar University. Simple random sampling technique was used to select the three universities. In total, 400 students aged from18-24 years, distributed as 200 male students and 200 female students were selected randomly through a simple random technique from the three universities. A face-to-face interview questionnaire was used in this study. Standardized measurements of students' height and weight were used, and the World Health Organization Body Mass Index was the standard for defining obesity and overweight. Analysis of the data was conducted using SPSS program, the analysis involved frequency distributions, chi-square and ANOVA tests.

The overall prevalence rates of overweight and obesity among university students were 18.8% and 20.8%, respectively. There was a significant association between overweight and obesity and some socio-economic factors such as being female, being at fourth or fifth studying year and had the average monthly income ranges from 2101 ILS to 3990 ILS. Age, marital status, number of family members and parent's years of schooling were not associated with the high risk of obesity. Selected life style factors were significantly associated with overweight and obesity such as being physically inactive, water-pipe smoking, less number of sleeping hours at night, high number of sleeping hours at the daytime, and spending much time sitting, studying, watching TV, and using social media, as well as, eating while studying, watching TV, and while using social media, have chips, soda drinks and hot drinks while studying and watching TV and have chips while using social media. Cigarette smoking and using video games were not associated with overweight and obesity among university students. Having un-healthy dietary habits was significantly associated with overweight and obesity such as skipping breakfast, having breakfast at university, snacking between breakfast and lunch, late-night snacking, having fast food, high consumption of fried food and carbohydrates, and low consumption of milk product. Daily number of consumed servings from fruits, vegetables and protein was not significantly associated with overweight and obesity. Eating due to emotions and stress was significantly associated with high risk of overweight and obesity. Socio-cultural factors such as physical look dissatisfaction, self-perception, parents-perception and peers-perception of the student's body image were significantly associated with overweight and obesity. Eating fast food at universities and preferring eating with peers were significantly associated with high risk of overweight and obesity. Medical factors were significantly associated with overweight and obesity among university students such as childhood obesity, parents, sisters and brother's obesity. Overweight and obesity is a problem among the university students in the GS. Intervention programs focused on promoting healthy life style, positive behaviors, good food habits, and increasing physical activity need to be implemented. There is a dire need to conduct health education campaigns that aim to increase students' awareness about obesity and its impact on morbidity and mortality. Also, universities should play an integral part of the fight against obesity epidemic through conducting university-based prevention programs that encourage students to eat better, be more active, and achieve healthier weights. There is a need to conduct more research including both qualitative and quantitative methods to deeply explore the associated factors with overweight and obesity among larger samples representing all Palestinian university students. Finally, there is a need to conduct research studies to investigate the issue of overweight and obesity among preschoolers, schoolchildren, and adolescents.

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Abbreviations

ACSM	American College of Sports Medicine
AED	Antiepileptic Drugs
ANOVA	Analysis of Variance
BID	Body Image Dissatisfaction
BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Center of Disease Control and Prevention
CHD	Coronary Heart Disease
CS	Cushing's Syndrome
CVA	Cerebrovascular accident
DM	Diabetes Mellitus
DQI	Diet Quality Index
EADES	Eating and Appraisal Due to Emotions and Stress
EMR	Eastern Mediterranean Region
FFQ	Food Frequency Questionnaire
GDP	Gross Domestic Product
GPAQ	Global Physical Activity Questionnaire
GS	Gaza Strip
HDL	High-Density Lipoproteins
HSES	High Socioeconomic Status
IARC	International Agency for Research center
IASO	International Association for the Study of Obesity
IDF	International Diabetes Federation
IR	Insulin Resistance
LDL	Low-Density Lipoproteins
LSES	Low Socioeconomic Status
METs	Metabolic Equivalents
MoH	Ministry of Health
MoHE	Ministry of High Education
NCDs	Non-Communicable Diseases
OA	Osteoarthritis
PA	Physical Activity
PCBS	Palestinian Central Bureau of Statistics
PHE	Public Health England
POS	Polycystic Ovary Syndrome
REE	Resting Energy Expenditure
RF	Risk Factors
SES	Socioeconomic Status
SPSS	Statistical Package for the Social Science
SRI	Serotonin Reuptake Inhibitors
TPA	Total Physical Activity
UNRWA	United Nations Relief and Work Agency
US	United States
USD	United States Dollar
WB	West Bank
WC	Waist Circumference
WHO	World Health Organization
WHR	Waist-Hip Ratio

Chapter 1

Introduction

1.1 Background

In past decades, most societies have gone through social and economic changes that contributed to fundamental epidemiological shift of the main cause of mortality and morbidity from communicable diseases to the non-communicable diseases (NCDs) (Abdul-Rahim et al., 2001; Ulijaszek, 2007).

Currently, overweight and obesity are the most prevalent public health issues in the world as they contribute to different morbidities and mortalities as well (Calderon-Guzman et al., 2011). The definition of obesity has changed over the years; it is described as a state of excess weight that may have adverse effect on health; it is a chronic condition characterized by a long-term imbalance between calorie intake and energy consumption (Zabut et al., 2007). Among adults, obesity is defined by using the Body Mass Index (BMI), which is the ratio of weight in kilograms divided by the height in meters squared. According to BMI, overweight is defined as a BMI between 25.0 and 29.99 kg/m^2 and obesity is defined as BMI equal or greater than 30.0 kg/m^2 (WHO, 2016).

Overweight and obesity are considered to be the main driver to the global burden of non-communicable disease and disability, affecting all ages and sociodemographic groups in developed and developing countries (Nani et al., 2006). Obesity is a long-term complex public health issue, as it is the sixth most contributing factor of the global burden of diseases (Zlot et al., 2007). Worldwide, several studies have revealed that obesity is tremendously associated with NCDs, including Coronary Heart Disease (CHD), Hypertension, Diabetes Mellitus (DM), Gall Bladder disease, Osteoarthritis, Dyslipidemia, and certain types of cancer (Bodur et al., 2010; Musaiger, 2011). Generally, NCDs represent a real threat to human health and development; it is estimated that 38 million

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deaths annually occur due to NCDs (World Health Organization (WHO), 2015). The WHO estimates that by 2020, NCDs will account for 80 percent of the global burden of diseases, causing seven out of every 10 deaths in developing countries about half of them are considered premature deaths that occur under the age of 70 (WHO, 2013a). Total deaths from NCDs are projected to increase by a further 17% over the next 10 years. Obesity affects not only people's health, but also it has serious social and psychological dimensions. It impairs people's day-to-day functions, wellbeing, quality of life and personal relationship (Nani et al., 2006). Although obesity is a preventable risk factor for serious diseases, it is still a cause of decreasing life expectancy and decreasing quality of life (Haslam and James, 2005). On average, obesity reduces life expectancy by six to seven years (Fried et al., 2007; Constantine et al., 2008).

The prevalence of overweight and obesity has reached an alarming level among all ages and socioeconomic groups of the Eastern Mediterranean Region (EMR) countries. The prevalence of overweight among men ranged from 19.2% in Libya to 51.7% in Tunisia, while the corresponding proportion among women was 21.1% in Libya and 71% in Tunisia. The prevalence of obesity ranged from 5.7% in Morocco to 39% in Kuwait among men and ranged from 7.1% in Libya to 53% in Kuwait among women (Musaiger, 2011). In Palestine, the prevalence of overweight and obesity is 67 % among women and 57.8% among males (Abdeen et al., 2012).

Many studies have shown that obesity is a multi-factorial health issue that is caused by different underlying biological and non-biological factors such as sociodemographic factors age, sex, heredity, Socio-Economic Status (SES), social factors, dietary behavior and physical activity (Al-Kandari, 2006; Fouad et al., 2006; Al-Tawil et al., 2007; Pengpid and Peltzer, 2014).

As children grow up, they develop their life style and food choices, which is influenced by several factors in a complex interactive manner. Parents and the family environment are playing a critical role in teaching children and developing their food choices and eating habits and behaviors (Story et al., 2002). When children grow up and start going to schools, the influence of teachers, peers and other people at school together with the media and social environment becomes more important. Gradually, children become more independent and able to start making their own food choices. It is worth to mention that peer group is a key for adolescents and can greatly influence their food preferences and life style behavior (Cusatis and Shannon, 1996).

College students usually experience transition period from late adolescence to young adulthood (aged 18-24 years). This period is characterized by many behavioral changes that affect weight like unhealthy dietary habits and sedentary life style; such changes place students at greater risk of weight increase (Carson et al., 2002; Cusatis et al., 2000; Demory et al., 2004 and Lytle et al., 2000). The dietary behavior and food choices of university students are mainly determined by an interaction of different factors like biological factors such as changing energy demands, weight change and sociocultural factors and psychological factors such as freedom from parental control and social support (Sanlier and Unusan, 2007).

Many Studies were conducted to assess the prevalence of overweight and obesity among university students in the developed and developing countries. Most studies have shown a high alarming level of the prevalence of overweight and obesity among university students. The main determinants of overweight and obesity among university students were sociodemographic factors, physical inactivity, changing in sleeping patterns, and dietary behaviors such as breakfast skipping, eating patterns, diet quality (Issa, 2015; Karl et al., 2014; El-Qudah et al., 2012; Suleiman et al., 2009). In addition to physiological factors,

sociocultural factors such as body image attitude and genetic factors (Bin Zaal et al., 2009; Suleiman et al., 2009; Al-Sendi et al., 2004).

1.2 Research statement

In Palestine, after the nutritional transition in dietary behavior from the typical Mediterranean diet into fast food pattern, a continuous rising in the prevalence of excessive weight is noted among all age groups and gender (Musaiger, 2011), the prevalence of overweight and obesity among adults in the GS is estimated to be 59.6% (Khellah et al., 2010). Furthermore, Palestine is highly characterized by the rapid rise in NCDs rates, which is linked directly with obesity (Ministry of Health (MoH), 2012a; UNRWA, 2011). This put more economical, psychological, social, and medical burden on Palestinian's wellbeing, and subsequently, increase the health care cost. University students often experience transition period which is characterized by behavioral, physiological and environmental changes. They develop unhealthy eating behavior and life style, as consequence of the rapid change in the traditional diet to undesirable one and modification of the life style into globalized behavior. These changes put students at greater risk to gain excess weight as well as increase weight in the later stages (Carson et al., 2002; Cusatis et al., 2000; Demory et al., 2004; El-Qudah, 2008; Lytle et al., 2000). The number of students in universities in Palestine is 204745 students (Palestinian Central Bureau of Statistics, 2015). Thus, universities could play an important role in reducing the prevalence of obesity among young. They also may provide an ideal forum for reaching out many young adults, and in turn, this could help prevent overweight and obesity in the later stages of life.

1.3 Justification of the study

Obesity is one of the main fast growing public health problems in both developed and developing countries, irrespective of age or gender (Calderon-Guzman et al., 2011). It is a risky factor of several serious chronic diseases (Musaiger, 2011). Obesity is also associated with increased risk of mental health issues including depression and low self-esteem (Story et al., 2002).

There is a few published research studies about determinants of overweight and obesity in Palestine, thus, there is a need for more studies to assess the prevalence of overweight and obesity among all ages and community groups (Ellulu et al., 2014). A few studies have been conducted to assess the prevalence of overweight and obesity among university students in the West Bank (WB) (Al-Sabbah, 2012; Bayyari et al., 2013). Regarding the situation in the Gaza Strip (GS), only Lubbad and colleagues (2011) assessed the prevalence of overweight and obesity among pharmacy college students, it was 20% among males, and 7.1% among females (Lubbad, et al., 2011).

To the researcher best knowledge, this study will be the first to assess the prevalence and the determinants of overweight and obesity among university's students in the GS.

1.4 Study objectives

      1.4.1 Overall aim

The overall aim of this study is to assess the prevalence and the determinants of overweight and obesity among university's students in the GS, in order to improve the health status of students and reduce morbidity and mortality in the later stages.

      1.4.2 Specific objectives

1. To assess the prevalence of overweight and obesity among university students in the GS.

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2. To identify the main determinants of overweigh and obesity among university students in the GS.

3. To examine university student's life style, dietary and behavioral habits.

4. To explore the socioeconomic and psychological factors that are associated with overweight and obesity among university students.

5. To propose recommendations that could be used to reduce the prevalence of overweight and obesity.

1.5 Context of the study

1.5.1 Demographic Context

The total area of both GS and WB is 6257 km2, representing 22% of occupied Palestine (MoH, 2006) **(Annex 1)**. In 2015, the total population of the Palestinians in both GS and WB is about 4,682,467 (1,819,982 in GS and 2,862,485 in WB). The percentage of people aged 60 years and above in GS is 2.4%, and 3.2% in the WB from the total population (PCBS, 2015). Among Palestinians, life expectancy is 72 years for males, and 75 years for females. The Palestinian society is considered as a young one, 39.4% of its total population are below 15 years old (37.2% in WB and 43.0% in G) (PCBS, 2015), with median age is 19.8 (18.2 in G, 20.9 in WB) (PCBS, 2015).

GS is a narrow piece of land lying on the southern eastern coast of the Mediterranean Sea **(Annex 2)**. With its area of 365 Sq. Km2, constituting about 1.35% from the historical Palestine (MoH, 2014). It is a very crowded area, with a population density of 5,070 individuals by Km2 (PCBS, 2015).

1.5.2 Epidemiological transition in Palestine

Palestinians are undergoing a rapid epidemiological transition; NCDs are the main causes of morbidity and mortality (Giacaman et al., 2009). In Palestine, the leading causes of

death are cardiovascular disease; cancer, Cerebro-Vascular Accident (CVA) and diabetes, which reflect the main health challenges currently facing the occupied Palestinian territory. The prevalence and risk of NCDs are high (WHOb, 2013). Among Palestinians in the GS and WB aged 15-64 years old, about 58% are overweight, 36% have high cholesterol level, 8.5% have DM, 3.8% of men smoke tobacco daily; nearly 75% of people do not engage in reasonable physical activity, surveys also indicate that unhealthy behaviors start early by Palestinians (MoHb, 2012).

1.5.3 Socioeconomic characteristic

Years of conflict and blockade have devastated Gaza's economy and left 80 percent of the population relying on the international humanitarian aid (UNRWA, 2016). Poverty rate among individuals in the GS according to household monthly consumption is 49%. Deep poverty rate in the GS is 21.1% (PCBS, 2011).

The unemployment rate has remarkably increased to 41% (PCBS, 2015). Gross Domestic Product (GDP) in GS is 3,134.1 USD Million (PCBS, 2015). The complicated political and economic situation worsen the life of people, with restriction of goods passage across the borders, both importing and exporting goods to and from GS are restricted because of the frequent closure of borders.

1.5.4 Education System

According to Ministry of Education and Higher Education system in Palestine, there are 14 universities: 5 universities in the GS and 9 universities in the WB, in addition to 19 colleges that grant bachelor's degrees: 6 in the GS, and 13 in the WB. There is only one university for Open Education, which has 15 centers in the WB and 5 centers in the GS. Moreover, there are 18 community colleges: 11 in the WB and 7 in the GS. The number of students in universities in Palestine is 204745, distributed as 79809 males and 124936

females. While, the number of students in community colleges in Palestine is 11283, distributed as 5376 males and 5907 females (PCBS, 2015).

It is worth to mention that, the illiteracy rate among Palestinians aged 15 years and above is 3.3%, distributed as 1.5% of males and 5.1% of females. It is 3.5% in WB and 3.0% in GS. Literacy rate among Palestinians aged 15 to 19 years is 99.4% distributed as 99.4% for males and 99.4% for females, while the literacy rate among Palestinians aged 20 to 24 years is 99.1% distributed as 99.5% for males and 99.1% for females. Mean years of schooling among Palestinians aged 15 years and above is 10.67, distributed as 10.77 among males and 10.56 among females. It is 10.46 in the WB and 11.04 in the GS (PCBS, 2015).

1.6 Operational definitions

The following operational definitions will be used in this study.

1.6.1. Body mass index (BMI): Weight in kilograms over height in meters squared (BMI = wt/ ht2) (CDC, 2014).

- **Underweight:** is defined as any individual who has a BMI of less than 18.5 kg/m^2 (CDC, 2014).

- **Normal weight:** is defined as any individual who has a BMI between 18.5 and 24.99 kg/m^2 (CDC, 2014).

- **Overweight:** is defined as any individual who has a BMI between 25 and 29.99 kg/m2 (CDC, 2014).

- **Obesity:** is defined as any individual who has BMI equal to or greater than 30 kg /m^2 (CDC, 2014).

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1.6.2. Central obesity: is defined as waist circumference > 90cm for men and > 80cm for women (International Diabetes Federation (IDF), 2006).

1.6.3. Risk factor: any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (WHO, 2015).

1.6.4. Metabolic equivalents (METs): are used to express the intensity of physical activities. MET is the ratio of person's metabolic rate relative to the resting metabolic rate.

1.**6.5. Total physical activity (TPA):** is define as the sum of the total MET minutes of the activity computed for each setting. Total Physical Activity (TPA-MET) = [(P2*P3*8) + (P5*P6*4) + (P8*P9*4) + (P11*P12*8) + (P14*P15*4)]

1.6.6. Physical activity (PA): is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (WHO, 2014).

- **High PA:** IF: (P2+P11) ≥ 3 days & TPA-MET is ≥ 1500.
- **Moderate PA:** IF: (P5+P8+P14) ≥ 5 days & [(P5+P6) + (P8*P9) + (P14*P15)] ≥ 150 minutes.
- **Low PA:** IF level of physical activity doesn't reach the criteria for either high or moderate level of physical activity.

Chapter 2

Conceptual framework and Literatures review

2.1 Conceptual Framework

A conceptual framework is a tool that researchers use to guide their research studies. It enables researchers to find links and relations between the existing literature and their own research goals and objectives (Miles and Huberman, 1994). A conceptual framework explains either graphically or in a narrative way the main variables and domains to be studied and the presumed relationship among them (Miles and Huberman, 1994).

As shown in **Figure (1)**, the researcher has included the main determinants of overweight and obesity among university students in the GS, such as socio-demographic factors, life style factors, dietary habits, socio-cultural factors, psychological factors and medical profile.

2.1.1 Socio-economic factors

Several studies have revealed that the socio-economic factors could contribute to overweight and obesity, such as age, gender, marital status, family members, family income and parent's level of education (Al-Isa, 1999). About 90% of the epidemiological studies that were conducted in the developing countries showed a high positive relationship between socio-economic status and obesity and overweight among all age groups including university students (Carlos et al., 2004).

As shown in **Figure (1)**, the researcher has included several socio-economic factors such as age, marital status, family size and family income.

2.1.2 Life style variables

University students experience transitional period from secondary school to university life that could be characterized by unhealthy behavior changes in life style such as decreasing physical activity and increasing sedentary behavior and changing in sleeping patterns (Crombie et al., 2009).

Many studies have shown that physical inactivity and sedentary behaviors, such as watching television, computer use, sitting for work, chatting and studying, are highly associated with the development of overweight and obesity (Hu, 2003; Must and Tybor, 2005; Miller, 2010; Owen et al., 2010).

The researcher in this study has investigated several student's life style behaviors such as, physical activity, sleeping patterns and smoking, as well as, certain sedentary behaviors such as, sitting for a long time, watching TV, and using social media, as shown in **Figure (1)**.

2.1.3 Dietary habits

Many research studies have revealed that certain eating habits such as breakfast skipping, eating patterns, food groups consumption, and eating meals away from home are associated with an increased risk of developing obesity and overweight (Yunsheng et al., 2003; Kumar et al., 2004; Bin Zaal et al., 2009; Suleiman et al., 2009; El-Qudah et al., 2012).

The researcher has examined several dietary behaviors such as, breakfast skipping, meal patterns, snacking, eating fast food, eating during watching TV, using social media and studying, in addition to the daily consumption of food groups, as shown in **Figure (1)**.

2.1.4 Psychological factors

Research studies have shown that behavioral consequences of stress and anxiety may affect individuals eating behavior (Torres and Nowson, 2007; Adam and Epel, 2007). Several studies have shown that depression and anxiety disorders are associated with obesity and overeating (Thayer, 2001).

The researcher has investigated the relationship between obesity and some of psychological factors, namely; stress, depression, socialization, being lonely, anger, happiness, sadness, anxiety and frustration, as shown in **Figure (1)**.

2.1.5 Socio-cultural factors

The researcher investigated the relationship between obesity and some of socio-cultural factors like body image attitude of the participants, parents and peers, sharing food with friends and family, eating out doors, social pressure and having a weight scale at home, as shown in **Figure (1)**.

2.1.6 Medical profile

The research has excluded participants with chronic disease. This study has examined the relationship between genetic factors such as childhood obesity, parent's obesity and brothers' and sisters' obesity, as shown in **Figure (1)**.

Determinants of overweight and obesity

Socio -Ecnomic Factors	Life style	Diatery hapits	Psychological factors	Sociocultural factors	Medical profile
•Age •Marital status •Family size •Fmily income •Parents education	•Physical activity • Smoking •Sleep pattern •Sedentery behavior	•Skipping breakfast •Meals pattetn •Snacking •Fast food •Food group consumption	•Emotional eating •Stress	•Body image •Socialization •Eating outdoors	•Childhood obesity •Parents obesity •Medication

Overweight and obesity

Figure (2.1): Conceptual Framework for determinants of overweight and obesity

2.2 Literature review

2.2.1 Definition of obesity

The definition of obesity has changed over the years; it is described as a condition by which there is excess body fat leading to health impairment (WHO, 2016). WHO also defined obesity as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired (WHO, 2016). Clinically, obesity is defined for adults as BMI equal to or more than 30 (WHO, 2016).

Growth changes, reproductive status and variation in life style as dietary habits, socio-demographic factors e.g. aging, income, education level and family size highly affect the body weight (Laquatra, 2004). In general, coordination between neural, hormonal and chemical mechanisms maintains the balance between energy intake and energy consumption, which in turn keeps the bodyweight constant. Any Abnormalities in these mechanisms result in exaggerated weight fluctuations such as underweight, overweight and obesity (Laquatra, 2004).

Epidemiologic studies commonly use BMI as a convenient, simple and reliable indicator of overweight and obesity. BMI is the recommended method for assessing the body weight of children, adolescents, and adults. It is calculated by dividing weight in kilograms (kg) by square height in meters (m2). BMI values are age-independent and the same for both sexes. BMI may not correspond to the same degree of fatness in different populations due to different body proportions. The health risks are associated with increasing BMI, even though the interpretation of BMI grading according to the risk may differ for different populations. Recently, there was a growing debate on the need for establishing different BMI cut-off points for different ethnic groups, because of the increasing evidence that the associations between BMI, percentage of body fat, and body fat distribution differ across populations, and therefore, the health risks may increase even below the current cut-off

point of 25 kg/m^2. WHO classifies adults as obese when BMI is >/=30 kg/m^2, overweight when BMI is between 25 and 29.99 kg/m^2, while, normal weight is between 18.5 and 24.99 BMI, and underweight is less than 18.5 BMI (WHO, 2016).

According to WHO, Waist Circumference (WC) and Waist-Hip Ratio (WHR) are also useful tools to assess obesity (WHO, 2011). People are considered at increased risk of abdominal obesity, when WC is >/=94 cm for men and >/=80 cm for women. While, people are considered at substantially increased risk of abdominal obesity when WC is >/=102 cm for men and >/=88 cm for women. With regard to WHR, individuals are considered obese if the WHR is above 0.90 for men and above 0.85 for women (WHO, 2011).

2.2.2 Health consequence of obesity

Being obese is a long-term complex public health issue that affects not only people's health, but also it has serious social and psychological dimensions. It impairs people's day-to-day functions, wellbeing, quality of life and personal relationship (Nani et al., 2006). Obesity is considered as the main driver to the global burden of NCD and disability, affecting all ages and sociodemographic groups in developed and developing countries (Nani et al., 2006).

Park and colleagues (2006) have estimated that the burden of overweight is 3.2 times higher than the burden of obesity. The disease burden due to overweight was 827.1 years lost, 732.66 years lost for men, and 922.9 years lost for women per 100,000 people. While, the disease burden of obesity is 260 years lost (144.2 for men and 377.3 for women. Hazmi and Warsy (2000) found that obesity is a leading cause to coronary diseases, neoplasm, digestive diseases, type2 diabetes, cancer, arthritis, arteriosclerosis, and many chronic disorders.

With regard to cardiovascular diseases, increasing BMI is a major risk factor for cardiovascular diseases such as hypertension, low concentration of High-density lipoproteins (HDL) cholesterol, and high concertation of Low-density lipoproteins (LDL) (WHO, 2007). The relative risk of cardiovascular diseases in obese compared with normal weight people is between 1.5 and 2.5 (WHO, 2007). James and Elizabeth (2001) reported that, when a young adult exceeds the optimal BMI by 1%, the risk for developing CHD increases by 3.3% for women and 3.6% for men. Excess weight after the age of 18 for women and the age of 21 for men significantly increases the risk of CHD (James and Elizabeth, 2001).

As inferred from the literature, the link between obesity and cancer has just become much wider, researchers from International Agency for Research on cancer (IARC) in 2002 listed obesity as a contributing risk factor for five cancers: breast, colon, kidney and esophageal cancer, in addition to uterine lining cancer (IARC, 2002). It is estimated that about 40% of uterine lining cancers, 25% of kidney cancer, and 10% of breast and colon cancers would be prevented if individuals stop gaining more weight (IARC, 2002). A new published scientific literature for the IARC revealed that the agency has added eight more cancers to that list: stomach (gastric cardia), liver, gall bladder, pancreas, ovarian, thyroid, meningioma, and multiple myeloma (IARC, 2016). Moreover, there is a limited evidence suggesting a link for three other cancers like fatal cancer of the prostate, breast cancer in men, and diffuse large B-cell lymphoma (IARC, 2016). IARC attributed the link between obesity and cancer to chronic inflammation and dysregulation of the metabolism of sex hormones (IARC, 2016). Recently, Arnold and colleagues (2016) have found that being overweight for a longer duration has significantly increased the incidence of all obesity-related cancers by 7 % for every 10-year increase in overweight adulthood period. An

increase in risk for postmenopausal breast cancer, by 5 %, and endometrial cancer, by 17 % (Arnold et al., 2016).

Regarding obesity and DM, several epidemiological studies have shown that overweight and obesity are associated with non-insulin dependent DM (Pollock & Favret, 2001; Al-Sharafi & Gunaid, 2014). Obese individuals are more likely to develop type 2 DM, especially when one of the family members suffers from DM (Pollock & Favret, 2001; Al-Sharafi & Gunaid, 2014). According to the Public Health England (PHE), about 90% of adults with type 2 diabetes aged 16-54 years are overweight or obese (PHE, 2014). Hazmi and Warsy (2000) have reported a statistically significant difference between the prevalence of overweight and obesity among diabetic and non-diabetic participants. The prevalence of obesity among non-diabetic participants (15.8%) was nearly about one-half of the prevalence among diabetic patients (30%), otherwise, overweight among non-diabetic participants was 25.2% and 33.3% among diabetic patients (Hazmi and Warsy, 2000).

With regard to obesity and its relationship with Osteoarthritis (OA), Manninen and colleagues (2004) have conducted a case control study in Finland to assess the relationship between obesity and the risk of severe knee osteoarthritis among age group between 20 to 50 years old. Manninen and colleagues (2004) found that, the weight gain is associated with a higher relative risk of knee OA than constant overweight among 20 to 50 years old participants, compared to participants with normal relative weight during the same age group.

2.2.3 The economic burden of obesity

Obesity continues to trend towards a global health epidemic. The crisis is not only a health risk but also a significant economic threat. Obesity is considered as one of the main drivers of preventable chronic diseases. Assessing the economic cost and consequences of

obesity plays an important role in the development of public health policy, providing an evidence-based information to help decision-makers set priorities, as well as, comparing policies to prevent or reduce obesity. Reducing the prevalence of obesity is a public health priority that has substantial health and economic benefits (WHO, 2000).

According to WHO, the costs of obesity are usually divided into three components (WHO, 2000)

• Direct costs: resulting from the conversion of health care resources to the management of obesity itself and diseases directly related to obesity.

• Indirect costs: the impact of the reduced quality of life of the obese individuals, as the production lost through work-related absenteeism and premature death.

• Intangible costs the cost of obesity impact on individual's health and quality of life.

For instance, the direct and indirect costs of the adolescence obesity exceed $140 billion annually. The United States (US) spends six to ten percent of the healthcare spending on costs attributable to adolescence obesity, compared to 2 percent to 3.5 percent in other Western countries (Ardoin, 2010). Excess medical costs due to adolescent obesity are estimated at more than $14 billion per year (Ardoin, 2010). Trogdon and colleagues (2008) estimated that the total indirect cost was $65.67 billion in the U.S. for1999, based on data from systematic review. Tsai and colleagues (2012) estimated that the direct medical cost for obesity is $1723 per person and $266 per person for overweight. As well as, that the total health care spending on overweight was 4.8% of the national expenditures of the U.S. (Tsai et al., 2012). In another study, Wang and colleagues (2008) estimated the future obesity-related health care costs for the U.S. health care system. They concluded that obesity-related expenditures would increase to 16–18% of health care spending expenditure by 2030 (Wang et al., 2008). Strum (2002) used a national survey of adults aged 18 to 65 to estimate that obesity increases health care costs by 36 % and medications

costs by 77%, compared with being a normal weight. Finkelstein and colleagues (2014) estimated that the incremental lifetime medical cost of an obese child is $19000 compared to a normal weight child who maintains normal weight throughout adulthood. Finally, Carter and colleagues (2009) assessed the cost effectiveness of obesity intervention costs among Australian population of children and adolescents (aged 5-19 years) in the year 2001. The intervention costs were estimated from (<AUD1.0 to AUD31, 553) per child (Carter et al., 2009).

On average, obesity reduces life expectancy from six to seven years (Constantine et al., 2008; Whitlock et al., 2009). BMI of 30–35 reduces life expectancy from two to four years, while morbid obesity (BMI > 40) reduces life expectancy by 10 years (Peeters et al., 2003; Whitlock et al., 2009).

2.2.4 Global prevalence of obesity among university students

According to a cross-sectional survey, which aimed to assess the prevalence of overweight/obesity among university students from 22 countries, the prevalence of overweight and obesity among male students was 18.9%, 5.8% respectively; while among female students, the prevalence of overweight and obesity was 14.1% and 5.2%, respectively. Overall, 22% of students were either overweight or obese (24.7% men and 19.3% women) (Karl et al., 2014). The main determinants of overweight and obesity among male students were younger age, coming from a higher income countries, consciously avoiding fat and cholesterol, physical inactivity, current tobacco use and childhood physical abuse. While, the main determinants of overweight and obesity among female students were older age, coming from a higher income country, frequent organized religious activity, avoiding fat and cholesterol, posttraumatic stress symptoms and childhood physical abuse (Karl et al., 2014). In a cross-sectional survey that aimed to assess the prevalence of overweight and obesity and central obesity and its associated

factors among Gitam University students in India. About 38% of students were either overweight or obese (26.8% overweight and 10.7% obese) (Pengpid and peltzer, 2014). According to Pengpid and Peltzer (2014), the main determinants of overweight and obesity and central obesity among male students were lower dietary risk knowledge, tobacco use, and suffering from depression, living away from parents or guardians, healthy dietary practices and sleeping for nine hours or more. While, the main determinants of overweight, obesity and central obesity among female students were lack of social support, lower dietary risk knowledge, tobacco use, and sleeping for nine hours or more, living away from parents or guardians and abstinence from alcohol (Pengpid and peltzer, 2014). A cross-sectional survey that was conducted to assess the prevalence of obesity among university students of Iran University of Medical Sciences in Tehran, the study findings revealed that about 12.4% of the students had a BMI of more than 25 (Nojomi and Najamabadi, 2006). The main risk factors associated with obesity were smoking, age, sex, and place of resident (Nojomi and Najamabadi, 2006). A study was conducted in California State University, Chicago, to assess the diet, exercise habits and perceived barriers to following a healthy lifestyle of college students, showed that the prevalence of overweight and obesity was 31% (Silliman, 2004). The study findings revealed that breakfast was the most commonly missed meal and 63% of the students ate snacks one to two times per day. The most common barrier to exercise was "lack of time" (Silliman, 2004). In a study conducted in the State University in Spain, the prevalence rate of overweight and obesity was 25% in males and 13.9% in females (Arroyo et al., 2006). Another study conducted on medical students from the University of Crete reported that approximately 40% male students and 23% female students had BMI > 25 kg/m^2 (Bertsias et al., 2003). Several Studies were carried out to assess the prevalence of obesity among university students in developing countries. Most studies have shown a high prevalence of

overweight and obesity among university students: In Nigeria, the prevalence was 10% (Nwachukwu et al., 2010); in Bangladesh, it was 20.8% (Sultana et al., 2011); in China, it was 2.9%–14.3% (Sakamaki et al., 2005; Jingya et al., 2013); in Malaysia, it was 20%–30.1% (Boo et al., 2010; Gopalakrishnan et al., 2012); in Thailand, it was 31 % (Banwell et al., 2009); in Pakistan, it was 13%–52.6 % (Hingorjo et al., 2009; Chaudhry et al., 2012); in Colombia, it was 12.4%–16.7 % (Vargas et al., 2008); in Mexico, it was 31.6 % (Trujillo-Hernández et al., 2010).

2.2.5 Prevalence of obesity among Arab university students

Many Studies were conducted to assess the prevalence of overweight and obesity among university students in the Arab World. A cross-sectional survey was conducted to assess the prevalence of overweight and obesity among Jordan University students (aged 17-28 years), the prevalence rates were 28.5% and 10.2%, respectively (Suleiman et al., 2009) . According to Suleiman and colleagues (2009), the main determinants of overweight and obesity are age, being female and parental obesity, as well as, physical inactivity, eating unhealthy diet, lower family income and being nonsmoker. Another study was conducted in Jordan to assess the prevalence of obesity among female students aged 20-25 years from the Jordan Northern Badia; the study findings have revealed that the prevalence rates of overweight and obesity were 27.0%and 6.9%, respectively (Tukan et al., 2006). The factors that were found to be significantly associated with high BMI included educational status, marital status, work status, smoking status and chronic diseases (Tukan et al., 2006). Yahia and colleagues (2008) have conducted a study to assess the prevalence of overweight and obesity among students of the Lebanese American University, the study findings have revealed that the prevalence of overweight and obesity among males students was 50%, and 16.8% among females students (Yahia et al., 2008). Healthy eating habits were higher among female students compared to male students such as daily breakfast

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intake and meals frequency, furthermore, alcohol intake and cigarettes smoking were not common among both males and females students (Yahia et al., 2008). A cross-sectional survey that was performed to investigate the major dietary risk factors associated with the development of overweight and obesity among Beirut Arab University students, the findings of the study have shown that 26.6% of the participants were overweight or obese (El-Kassas et al., 2015). Male students (67.4%) were significantly more obese than females (32.6%), more than three quarters of students (76.8%) reported having irregular meal patterns and high fast food consumption (El-Kassas et al., 2015). The strongest protective factors for maintaining normal weight were breakfast consumption, female sex and being a health science student (El-Kassas et al., 2015). A cross-sectional study that aimed to explore the BMI distribution and food consumption pattern and health related behaviors among Saudi female university students, the prevalence of overweight and obesity reached 47% (Al Qauhiz, 2010). Regarding to Al Qauhiz (2010), marriage, presence of obese members in the family and frequency of drinking carbonated beverages were the main determinants of overweight and obesity. Similarly, El-Qudah and colleagues (2012) aimed to assess the nutritional status among Saudi college students and their dietary behaviors, the results showed that the prevalence of overweight and obesity was 34.2%. The main findings have shown that 15.7% of the students skip their breakfast daily, high consumption of sweets and chocolates on daily basis and high portion size of potato chips were more common among females, while males were more prone to consume red meat and fish than females (El-Qudah et al., 2012). Arafa (2005) has reported that the prevalence of overweight and obesity among Saudi students was 42.4% among males and 31% among females. The prevalence of overweight and obesity among Taif University students was 44.6% (Issa, 2015). Regarding Issa (2015), the main determinants of overweight and obesity were older students, high family income, physically inactive,

consuming unhealthy diet, sleeping less than 8 hours per day, with history of obesity. A cross-sectional study among male university students in the United Arab Emirates that was conducted to study the relationship between obesity and some lifestyle factors; the overall prevalence of obesity was 35.7% (Musaiger, 2006). According to Musaiger (2006), family history of obesity, watching Television (TV) for more than four hours a day, smoking, physical inactivity and had a car. In Kuwait, the prevalence of overweight and obesity among Kuwaiti college men was 49.6% (Al-Isa, 1999). Al-Ansari and colleagues (2000) reported that the prevalence of obesity among university students in Bahrain was 11.8% in males and 7.6% in females. A study that was performed on university students (aged 17-38 years), in Bahrain, showed that the prevalence of obesity was 11.8% in males and 7.6% in females (Al-Ansari et al., 2000). A more recent study carried out in Bahrain among students aged from 6 to18 year, presented that the prevalence of overweight and obesity was 25.5% among girls and 21.4% among boys (Gharib, 2006). Skipping breakfast, physical inactivity and sedentary lifestyle were the main determinants of overweight and obesity among Bahrain students (Gharib, 2006). In Egypt, the prevalence of overweight and obesity among medical students at Ain Shams University was 49.4% (Bakr et al., 2002). Family history of obesity, duration of computer use, eating more during stress time and snacking between meals were the major risk factors for obesity (Bakr et al., 2002).

2.2.6 Prevalence of obesity among university students in Palestine

In Palestine, few studies were conducted to assess the prevalence of obesity in Palestine. Al-Sabbah (2012) has conducted a cross-sectional study to assess the prevalence of obesity among Al-Najah National University students in the WB, the study findings revealed that the prevalence rate of overweight and obesity among students was 24.7%. Overweight and obesity were more common among male students compared to females (27.0% and 5.9%

vs. 13.2% and 3.3%, respectively) (Al- Sabbah, 2012). The study findings revealed also that 68.4% of the students used to take meals irregularly, as well as 58.2% (57.2% of females and 59.2% of males) and 43.4% (40.8% of females and 46.7% of males) reported daily intake of vegetables and fruits, respectively (Al-Sabbah, 2012). Moreover, physical activity and sports are common among male students (69.1%) than female students (55.9%), the same study showed that 91.4% of females never smoked (Al-Sabbah, 2012). A more recent study conducted in WB aimed to explore dieting practices among female Palestinian college students from four universities, the study findings showed that the prevalence of overweight and obesity among students was 14.1% (Bayyari et al., 2013).

With regard to the situation in Gaza, Lubbad and colleagues (2011) has conducted a cross-sectional study to assess the BMI and dietary intake among university students, Pharmacy College, aged 19 to 30 years in the Gaza Strip. The main findings of the study revealed that the prevalence rates of overweight and obesity among males and females students were 20% and 17.1% respectively (Lubbad et al., 2011).

It is worth mentioning that several studies were conducted in Palestine to assess the prevalence of obesity among students in the early adolescence period. Abudayya and colleagues (2007) have described the socio-demographic differences in nutritional status among school adolescents aged 12 to 15 years in north GS through a cross-sectional survey. The prevalence of overweight and obesity was 17.9%; overweight and obesity were common in girls (20.2%) more than boys (15.4%) because girls being from a low-income residential area, having employed fathers, and having reached puberty, while, boys had medium socio-economic status (SES) (Abudayya et al., 2007). Similarity, another publication conducted by Abudayya and colleagues (2009) aimed to describe the association between socio-demographic factors and food intake, and meal patterns among Palestinian school adolescents (12–15 year) in North GS. The results showed that, as the

household SES increased the number of meals, having breakfast daily and the amount of intakes of many nutritious foods also increased, such as; animal food items, fruits and vegetables and dairy foods (Abudayya et al., 2009). Ghrayeb and colleagues (2013) targeted older age group, across-sectional study aimed to determine the prevalence of overweight and obesity among students aged 13-17 years in Tarqumia, Palestine. Overweight and obesity was 27.8%, and was significantly higher among male students, students aged 13 years or younger and those with moderate income (Ghrayeb et al., 2013). Jalambo and colleagues (2011) reported that the prevalence of overweight and obesity among female secondary students in the GS was 19.9%. Musaiger and colleagues (2012) performed a cross-sectional study to assess the prevalence of overweight and obesity among adolescents in seven Arab countries, Palestine was included in the study; the study was conducted in Al-Khalil city, WB. The prevalence rates of overweight and obesity among males and females were 17.7% and 16%, respectively (Musaiger et al., 2012).

2.2.7 Risk factors for obesity among university students

2.2.7.1 Socio-economic status

Age

Age has a significant influence on overweight and obesity. There was consistency among literature regarding the increasing overweight and obesity prevalence with advanced age (Lahmann et al., 2000 and Temple et al., 2001). According to Temple and colleagues (2001), the incidence of obesity increases significantly with age, with 32% of women being obese at age 25 to 44 years, rising to 49% at ages 45 to 64 years; while a much lower prevalence of obesity was reported among men, 14% at 35 to 65 years. Similarly, Martinez and colleagues (2001) revealed that the prevalence of obesity among participants increased with age, as 8% prevalence of obesity was 8% among 18-29 years age group and it increased to 38.1% among the age group of 50-65 years old. Moreover, Malik and

colleagues (2003) explored the relationship between obesity and age. The results showed that the highest prevalence rate of obesity was 60.9% for age group 41-45 years, followed by 42.8 % for age group 36-40, 34% for 31-35 years, 25% for 25-30 years, 12.4% for 21-25 years, finally the lowest prevalence rate of obesity was 8% for age group 16-20 years (Malik et al., 2003). Furthermore, the findings have revealed that morbid obesity was the highest (10.7%) among age group 36-45 years (Malik et al., 2003).

Concerning age and gender, studies by the International Association for the Study of Obesity

(IASO) (2004), showed that the prevalence of overweight and obesity among young people aged 13 to19 years is17% affecting more girls than boys at a rate of 25% and 7%, respectively. In a cross sectional survey conducted at Jordan University, it was found that age is statistically significantly associated with overweight and obesity of university students (Suleiman et al., 2009). The prevalence rate of overweight and obesity among students increased with increasing age ranging between 47.4 % and 42.7% in the age group 17-20 years to 52.6% and 57.3% in the age group 17-20 years, respectively (Suleiman et al., 2009).

Marital status

The marital status is an important factor which may influence the body weight in both developed and developing countries. Studies revealed that the prevalence of overweight and obesity varied by marital status for women, but not for men (Tjepkema, 2005). It was reported that about one-quarter of married men and women aged 25 or older were obese, while the obesity prevalence rate was significantly higher among women who were widowed (30%) (Tjepkema, 2005). On the other hand, the percentage of married, divorced, widowed and never married men who were obese was not significantly different

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(Tjepkema, 2005). In Korea, the prevalence of overweight and obesity was lower among people who never married (Juhee and Hee, 2006).

Malki and colleagues (2003) examined the prevalence of overweight and obesity among women in Saudi Arabia; the observation showed that married women had the highest rates of overweight and obesity. It is worth to note that, the study has reported that the prevalence of obesity is significantly higher among married females aged 16-20 years, and 26-30 years age group (Malki et al., 2003).

A recent study was conducted to determine the risk factors for obesity among Pharmacy College students in Gaza, the results revealed that there was a statistical significant relationship between BMI and marital status among male students, it was found that 57% of single students are of normal BMI and 26% of single students are of overweight (Lubbad et al., 2011).

Parent's education level

In general, several studies that were carried out in developed and developing countries agreed that there was an inverse relationship between obesity and individual's level of education. It was reported that obesity was more frequent among people with lower educational level (Martinez et al., 2001; Grujic, et al., 2005; Gillum, 2006). Similarity, Aljouni and colleagues (1998) noted that obesity was more common among illiterate people, where obesity was 27.5% among illiterate people, 27.3% among people educated between 1 and 12 years, and 26% for people educated more than 12 years of schooling. Education attainment can lead to practicing different lifestyle that may affect BMI positively or negatively (Sundquist & Johansson (1998); Lahmann et al., 2000; Puoane et al., 2002 and Kruger et al., 2005).

There is an inconsistency in the literature review about the relationship between parent's education and children's obesity. Issa (2015), assessed obesity and overweight among

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Saudi Arabia university student, the researcher found a significant positive relationship between father's education and the prevalence of overweight and obesity. Students whose fathers had secondary grade and higher were more obese and overweight (43% and 30.3%, respectively) compared to students whose fathers do not read or write (12.7% and 15.7%, respectively) (Issa, 2015). On the other hand, Issa (2015) found a significant inverse relationship between mother's education and the prevalence of overweight and obesity. Students whose mothers do not read or write were more obese and overweight (25.3% and 30%, respectively) compared to students whose mothers had university grade and higher (25.3% and 20%, respectively) (Issa, 2015). Similarity, A recent study was performed among Egyptian adolescents, showed a significant association between obesity and parent's education, as the highest prevalence of obesity was among students with low educated parents as they are responsible for food choices for their children as well as their life style activities (Talat and El Shahatb, 2016). In addition, Wang and colleagues (2014) examined weight status among southern Appalachian adolescents, the findings among adolescent boys showed lower levels of education among mothers and fathers predicted a higher likelihood of obesity, whereas among girls, only a lower level of education among mothers was predictive. While, other studies have revealed that the father's level of education was a better predictor of obesity among adolescents than the mother's education (Wang et al., 2014). In contrary, Lubbad and colleagues (2011), found no relationship between BMI and parent's education level of Pharmacy College students in Gaza.

Income

Many studies have shown that there were differences in the prevalence of overweight and obesity associated with variation in socio-economic status (Cavalli-Soforza et al., 1996; Moreno et al., 2004 and Kruger et al., 2002). The effect of the income on BMI varies between developed and developing countries. Overweight and obesity tend to be high

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among low-income populations in developed countries; mainly due to their limited ability to purchase healthy food and good quality food (Ferro-Luzzi and Puska, 2004). In contrary, overweight and obesity are higher among high-income people in developing countries (Ferro-Luzzi and Puska, 2004).

Marwaha and colleagues (2006) assessed the differences in SES and its relationship with overweight and obesity among schoolchildren in Delhi, they classified the government schools (non-fee paying) as having Low Socio-Economic Status (LSES), and those in the private schools (fee-paying) as having high Socio-Economic Status (HSES). About 8,840 children were randomly chosen from the government schools (3,566 boys, and 5,274 girls) and 12,645 from the private schools (6,197 boys and 6,448 girls). The study results have shown significant differences between SES and BMI. The prevalence of overweight and obesity in HSES children was 16.75% and 5.59% among boys, respectively, and 19.01% and 5.03% among girls, respectively (Marwaha et al.,2006). Suleiman and colleagues (2009) found that the prevalence rates of overweight and obesity were higher among the low-income university students compared to those students who come from high-income families.

2.2.7.2 Life style

Physical inactivity and sedentary behaviors

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that result in an essential increase over the resting energy expenditure (Ulijaszek, 2007; Krebs et al., 2007). The physical activity is a basic modifiable component in the energy equation (Ulijaszek, 2007; Krebs et al., 2007). PA has an essential role in preventing NCD, especially obesity (Ulijaszek, 2007).

Recently, both developed and developing countries have had reported a significant alarming increase in physical inactivity among young adults (Kohl et al., 2012). Despite

the global concern about preventing obesity and risks of NCD, only few countries carried out PA surveillance and monitoring (Bauman et al., 2009). WHO (2010) released recommendations for PA levels for promoting and maintaining health among adults. They are based on the PA recommendations lunched by the U.S. Department of Health and Human Services. The WHO-PA recommendations are also similar to those of the American College of Sports Medicine (ACSM). WHO recommends aerobic PA of structured or unstructured character at moderate-intensity for 150 min, 75 minutes of vigorous-intensity aerobic PA or an equivalent combination of moderate-intensity and vigorous-intensity activity throughout the week as a mean of health enhancement (Haskell et al., 2007; WHO, 2010).

The transition period which students go through from secondary school to university is characterized by unhealthy behavior changes such as decreasing physical activity and increasing sedentary behavior (Crombie et al., 2009; Vella-Zarb and Elgar, 2009). Unsurprisingly, it was reported that about 40-50% of college students were physically inactive (Keating et al., 2005). A more recent study on Czech university students revealed that only 9% walk 10,000 steps every day (Sigmundova et al., 2013). Another study showed that the university students spent eight hours per day on sedentary activities such as studying, watching television, gaming, using social media, sitting and chatting, shopping and hanging out (Rouse and Biddle, 2010). Many studies have pointed out that sedentary behaviors, such as watching television, computer use, sitting for work, chatting and study purposes, are highly associated with overweight and obesity (Hu, 2003; Must and Tybor, 2005; Miller, 2010; Owen et al., 2010). However, using internet and social media may induce mental health benefits due to improving socialization, literature showed that higher levels of sedentary behaviors are associated with decreased quality of life, increased risk of depression, and weaker cognitive functioning (Iannotti et al., 2009; Miller, 2010;

Teychenne et al., 2010; Syvaoja et al., 2014). Epidemiological studies revealed a negative correlation between sedentary behaviors and physical activity of students in college (Buckworth and Nigg, 2004; Romaguera et al., 2011). While, Rouse and Biddle (2010) reported that physical activity and sedentary behaviors of the university students are highly uncorrelated (Rouse and Biddle, 2010). Similarity, Rey-López and colleagues (2008) made a review to explore the association between the sedentary behavior and obesity development among children and adolescents. Rey-López and colleagues (2008) have found a positive association between television watching and obesity. Watching TV seemed to be the most sedentary behavior affecting overweight and obesity among adolescents (Rey-López et al., 2008). Huang and colleagues (2002) reported that male students are more likely to be engaged in aerobic exercise with more days per week than female. Furthermore, students aged ≤ 19 years were more likely to practice aerobic exercise than students aged ≥ 20 years, this means that the level of physical activity may decrease by time (Huang et al., 2002). Teleman and colleagues (2015) pointed out that 25.8% of the Italian university students never practiced any type of physical activity. Khalaf and colleagues (2013) have examined the prevalence of the physical activity and associated factors among Saudi female university students. The study findings have revealed significantly higher PA levels among married students, those with high-educated mothers, and those who lived far from parks. (Khalaf et al., 2013). El-Gilany and colleagues (2011) carried out a cross-sectional study on 1708 students from Mansoura University, in Egypt, to describe the pattern of physical activity; the findings revealed that more than 11% of students were physically inactive. The predictors of physical inactivity were high socio-economic level of families, female sex, medical education and non-membership in sports clubs (El-Gilany et al., 2011). While, the most frequent barriers to

physical activity were time limitation and lack of accessible sporting places (El-Gilany et al., 2011).

In Palestine, Lubbad and colleagues (2011) have illustrated that there was no statistical significant relationship between BMI and physical activity level of Al-Azhar university students. In contrast, Al-Sabbah (2012) has revealed that about two-thirds (62.5%) of the Al-Najah University students were practicing different kinds of sports while 37.5% of them were not; There was a significant relationship between overweight and obesity and physical activity.

Smoking

Regarding to smoking, Suleiman and colleagues (2009) explored that smoking was significantly associated with overweight and obesity among Jordan University students. Prevalence rates of overweight and obesity were 84.2% and 91.1% respectively among non-smoking students compared to 15.8% and 8.9% respectively, among smoking students (Suleiman et al., 2009). On the other hand, Lubbad and colleagues (2011) reported that there was no statistical significant relationship between BMI and smoking habit among Gaza's students. Lubbad and colleagues (2011) found that 49% of male students and 77% of female students who did not smoke cigarettes had normal BMI; about 30% of male students who smoke less than 10 cigarettes per day had normal BMI and 30% of male students who smoke more than 10 cigarettes per day had overweight (Lubbad et al., 2011).

Sleeping patterns

Several studies have explored the association between the number of sleeping hours and obesity. In a meta-analysis covering 11 studies on children aged between 2 and 20 years, seven of the 11 studies found a significant association between the short sleep duration and obesity (Cappuccio et al., 2008). Bawazeer and colleagues (2009) aimed to identify the relationship between sleeping patterns and obesity among Saudi students, aged between 10

and 19 years. Sleeping for seven hours or less was significantly associated with increasing the risk of obesity among both boys and girls (all age categories) (odds ratio=1.25–1.38, 95% confidence intervals =1.02–1.89) (Bawazeer et al., 2009). Park (2011) found an inverse relationship between sleep duration and both BMI and being overweight or obese among 74,000 students in South Korea. Kjeldsen and colleagues (2014) have examined the relationship between sleep pattern and obesity among Danish schoolchildren, it was reported, that the sleep duration is negatively associated with the dietary risk factors for obesity, such as energy density, added sugars, and consumption of sugar-sweetened beverages. Bel and colleagues (2013) reported a positive association between sleep duration and the diet quality index (DQI-AM) among adolescents. Teens who got the recommended sleep hours, achieved a better DQI-AM score than those with insufficient sleep hours (Bel et al., 2013). Cappuccio and colleagues (2008) found that the short sleep duration was associated with an 89% increase in the odds of developing obesity among children and adolescents. Moreover, Chen and colleagues (2008) pointed out that, each hour of increased sleep duration was associated with a 9% decrease in the odds of developing excess weight or obesity. The association between sleep deprivation and obesity is particularly prevalent when teens getting sleep less than six hours per day (Shigeta et al., 2001; Vorona et al., 2005). Many studies have proven that the short sleep duration among children is associated with increased risk of obesity during adolescence (Calamaro et al., 2010; Lumeng et al., 2007; Lytle et al., 2012; Snell et al., 2007; Van Cauter, 2010).

2.2.7.3 Dietary Habits

Eating behavior

University students develop unfavorable eating habits, showing a rapid change of the traditional diet in an undesirable direction and lifestyle modification towards globalized behaviors (El-Qudah, 2008; Nasreddine et al., 2005; Popkin et al., 2005). Studies have shown that the trend of fast food consumption among college students is dramatically increasing (Bodur et al., 2010; Tayyem et al., 2008; Musaiger et al., 2011).

Eating a nutritious breakfast regularly is an important diver to a healthy lifestyle and health status. Many studies have shown a significant relationship between skipping breakfast and stress, catching cold, chronic disease and high BMI among adolescents (Keski-Rahkonen et al., 2003; Kumar et al., 2004; Berkey et al., 2003; Smith, 2003). Breakfast skipping is also associated with an increased risk of obesity (Ma et al., 2003). Musaiger and colleagues (2011) explained that skipping breakfast was significantly greater among females 62.8% compared to males 37.2%. Skipping breakfast reflects a dieting technique practiced by girls, and studies in the US showed that 32% of female college students aged 18 to 24 years skip breakfast as means of weight control (Malinauskas et al., 2006). Girls who miss their breakfast tend to consume greater amounts of food at lunch, which in turn leads to weight gain (Huon and Lim, 2000).

Some studies have suggested that eating patterns, which describe eating frequency, the temporal distribution of eating events across the day, breakfast skipping, and the frequency of eating meals away from home may influence the body weight (Yunsheng et al., 2003). Irregular main meal intake may be associated with poorer lifestyle factors and decreased diet quality compared to regular main meal intake. (Sjoberg et al., 2003). The number of eating episodes was inversely associated with the risk of obesity. Furthermore, it was

reported that the risk of obesity would increase, if the number of meals were three or fewer per day (Yunsheng et al., 2003).

Snacking is an important feature of adolescent food behavior. Generally speaking, snacks have a high caloric content so that there is a direct relationship between the frequency of snacking and obesity (Forslund et al., 2005). Snacking may lead to weight gain by both increasing consumption of energy-dense foods in between meals, as well as by increasing the frequency of such intake (Jahns and Popkin, 2001).

A cross-sectional study was carried out to explore the association between the dietary habits and behavioral factors with the increased risk of obesity among adolescents in Dubai, the researcher reported that the risk of obesity decreased among adolescents who always and frequently had breakfast, compared to those who never had breakfast (Bin Zaal et al., 2009). Moreover, a high risk of obesity was associated with eating breakfast at school among adolescents; and it was estimated three times more than the risk of eating breakfast at home (Bin Zaal et al., 2009). As well as, Bin Zaal and colleagues (2009) found a significant relationship between snacking in between breakfast and lunch and obesity among girls, while, midnight snacking was significantly associated with obesity among boys. The obesity risk was higher among girls who always consumes midnight snacks. In addition, the frequency of eating fast food was significantly related to obesity among girls (Bin Zaal et al., 2009). Another cross-sectional survey was performed to assess the prevalence of overweight and obesity among Lebanese University student and to examine their eating habits, the majority of students ate meals regularly and ate breakfast daily or three to four times per week (Yahia et al., 2008). Female students showed healthier eating habits compared to male students in terms of breakfast intake and meal frequency female students reported eating breakfast daily or three to four times per week compared to 52.1% male students (Yahia et al., 2008). About half of the students (52.7%)

reported eating two meals per day, as well as, the daily intake of snacks apart from regular meals was more common among females than males (Yahia et al., 2008). A cross–sectional survey conducted among Jordan University students revealed that the prevalence rates of overweight and obesity were 15.2% and 7.3%, respectively, among students on a healthy diet compared to 84.8% and 92.7% respectively, among students on non-healthy diet (Suleiman et al., 2009).

Al-Sabbah (2012) reported that half of Al-Najah University students consumed fast-meals once a day, most of the participants were taking their meals irregularly; more than half of the participants consume two main meals per day. Furthermore, about 47% of the participants usually consume one snack between meals and 23.1% usually consume two snacks between meals (Al-Sabbah, 2012). Al-Rethaiaa and colleagues (2010) reported that the most common eating habits developed among Saudi students were eating with family, having two meals per day including breakfast, together with frequent snacks and fried food consumption. El-Qudah and colleagues (2012) investigated the fast food consumption, eating patterns and physical activity habits among Saudi Arabia college students; they found that about 15.7% of the study participants skip their breakfast daily. Both males and females eat their meals irregularly, as well as, more than half of the students stated that they consume fast foods; the proportion of females consuming fast food was higher (64.9%) than the males (51.4%) and the difference was statistically significant (El-Qudah et al., 2012). Lubbad and colleagues (2011) investigated food consumption patterns and daily habits among pharmacy college students, the study findings have revealed that there was no statistical significant relationship between BMI and having breakfast at home, number of daily meals variable, eating out home variable, and skipping skipped meal.

Food groups consumption

Food groups is a diet planning tool which classifies foods of similar origin and nutrient content into groups by a nutrient density, and indicates that people should eat certain numbers of servings from each group. Food groups are composed from five major groups: (1) fruits, (2) vegetables, (3) grains, (4) meat, poultry, fish, legumes, eggs and nuts, (5) milk, yoghurt and cheese (Cataldo et al., 2003).

Food guide pyramid is a suitable tool for the evaluation of food intake of individuals, which aims to promote health status and reduce the risk of NCD, such as, heart disease, certain types of cancer, diabetes and stroke (Escott-Stump and Earl, 2008). The food guide pyramid presents the daily food guide in pictorial form (Cataldo et al., 2003). It converts dietary guidelines of nutrient recommendations into visual form of the daily amounts and the type of food consumed (Earl, 2004). It was developed according to nutritional problems, food supplies, eating habits and cultural beliefs of the American population. The food guide pyramid consists of the five main food groups (e.g., grains, vegetables, fruits, milks, meats and beans), with the recommended daily amounts (Smolin and Grosvenor, 2008). It has a pyramid shape, with grains at that base, that's main, grains are the foundation of healthy diet. Then fruits and vegetables share the next level of the pyramid, followed by meat and milks with smaller section before the top. Finally, fats, oils, and sweets at the top of the pyramid, convey a message that, fats, oils, and sweets should be in a very little amount in the diet.

Bazzano and colleagues (2002) found significant decreases in BMI as fruit and vegetable intake increases among the participants. Fruits and vegetables with low calories and high water content, so that it could increase satiety and decrease body weight (Bazzano et al., 2002).

Literature shows inconsistencies about the mechanisms for the inverse association between fruit and vegetable intakes and body weight (Yao and Roberts, 2001). Calcium and diary intake have been associated with decreased body fat and increased dietary variety and found to be a potential important adjustable factor for individuals' diet that may decrease their risk of developing obesity later in life (Skinner et al., 2003; Weinberg et al., 2004 and Zemel et al., 2004). Several epidemiological studies have revealed that Intracellular calcium has a key role in metabolic disorders associated with obesity and insulin resistance (Draznin et al., 1987; Draznin et al., 1988; Byyny et al., 1992 and Davies et al., 2000). Studies showed that the calcium intake among young women (as a ratio to caloric intake) was inversely related to weight and fat gain over a period of 2 years (Lin et al., 2000). As well as, the calcium was inversely related to fat mass among preschool children (Carruth and Skinner, 2001). According to the Food Guide Pyramid, it is recommended to consume grains food six to eleven servings each day (Cleveland et al., 2000). The whole grains are rich sources of dietary fibers, starch, vitamins (particularly vitamin E), minerals, complex carbohydrates, phytoestrogens, antioxidants and other substances which regulate the body weight and reduce the insulin resistance and cardiovascular disease risk factors (Anderson et al., 2000). Diets rich in whole grain are associated with a healthier dietary profile, including greater intakes of fruits and vegetables, fiber, iron, zinc, calcium, folate, and vitamin E and lower intake of saturated fatty acids, meat, cholesterol (McKeown et al., 2002; Liu et al., 2003 and Steffen et al., 2003). Studies have revealed an inverse dose-response relationship between the BMI and waist circumference with the whole grain intake (Steffen et al., 2003). The whole grains are characterized by high-fiber content, which may protect against weight gain or promote weight loss (McKeown et al., 2002). High fiber diets decrease energy intake due to its bulk, low energy density and through promoting earlier satiety which help in loss weight (Koh-Banerjee et al., 2003). Moreover,

high fiber diets also slow starch digestion or absorption, this lower insulin and glucose responses to induce the oxidation and lipolysis of fat rather than its storage (Liu et al., 2003). Yahia and colleagues (2008) found that the intake of colored vegetables and fruits was common among Lebanese American University students. About 30.5% of the students reported daily intake of colored vegetables with no gender differences (31.5% females vs. 29.2% males) (Yahia et al., 2008). About 27% of the students reported daily intake of fruits, male students tend to eat more fruits daily as compared to female students (29.2% vs. 25.8% respectively) (Yahia et al., 2008). The majority (57.3%) of the students reported eating fried food more than three times per week (Yahia et al., 2008). Among females, 54% reported eating fried food daily or three to four times per week compared to 61.4% males (Yahia et al., 2008). El-Qudah and colleagues (2012) assessed the nutritional status among Saudi college students, the results showed that the majority of the students eat sweets and chocolates 6 times/week in maximum; females showed a higher rate in the consumption of sweets and chocolates on daily basis (28.4% and 29.7%, respectively) compared to males (18.1% and 16.6%, respectively). El-Qudah and colleagues (2012) reported that only about half of the students eat vegetables, fruits, milk, and dairy products on a daily basis. A regular portion size of potato chips was preferred by 61% of the students (El-Qudah et al., 2012).

2.2.7.4 Psychological factors

Eating due to emotions and stress

Emotional eating is defined as over eating in response to negative effect, as an attempt to cope with stressful events and bad news (Thayer, 2001), without specificity to particular moods or emotions (Faith et al., 1997). Emotional eating concerns three dimensions: (1) Disinhibition, (2) type of food, (3) sense of guilt (Garaulet et al., 2012). "Disinhibition" refers to losing control of the food intake. Emotional eaters eat a lot without boundaries

and out of control; they cannot control the amount of food intake anymore and overeat excessively (Garaulet et al., 2012). "Type of food" defines the food, which typically, they eat. Those people eat food with high calorie intake, also called high palatable food, like chocolate, ice cream and cake. They use this type of food to cope with negative emotions (Garaulet et al., 2012). "Sense of guilt" refers to the conflict between feeling guilty of eating too much that emotional eater's face and the happiness which food provides them. Literature revealed that the emotional individuals are more prone to such a conflict (Garaulet et al., 2012). It is obviously noticed from the literature that there is a little known about the phenomenon of emotional eating especially among university students. Being a university or a college student can be a stressful experience (Gower et al., 2008). Many studies found that the behavioral consequences of stress may affect the eating behavior (Torres and Nowson, 2007; Adam and Epel, 2007). Stressful events lead people to eat more as a way of coping with stress (Gower et al., 2008).

Many of the negative moods like depression and anxiety have been found to be associated with overeating. Food is used as an attempt to self-medicate and self-regulate mood (Thayer, 2001).

Tension among undergraduate students often promotes overeating. Researchers have also pointed out tiredness, boredom, loneliness, anxiety, tension, and stress as triggers to overeating among women and they found that these feelings increase after eating (Weingarten and Elston, 1991). Regarding anxiety, it was found that overweight and obesity are developed and maintained by overeating in an attempt to reduce anxiety (Kaplan & Kaplan, 1957). Sims and colleagues (2008) revealed that perceived stress explained a higher proportion of the variance in emotional eating among overweight and obese participants (Sims et al., 2008). Obese persons often reported over eating in response to anger, loneliness, boredom, and depression (Sims et al., 2008). Within the

same context, Ganley (1989) has pointed the importance of conducting a comprehensive assessment of stress and the specific mood states that result in overeating.

Eating habits score was significantly lower among those who ate because of feeling lonely, ate until stomach hurts, ate because of feeling upset or nervous and ate because of feeling bored (Ganasegeran et al., 2012). Another cross-sectional study was carried out to explore the association between the dietary habits and the behavioral factors with the increased risk of obesity amongst adolescents in Dubai, the results showed that eating when upset, angry or bored was not associated with an increase in BMI and obesity in both genders (Bin Zaal et al., 2009).

2.2.7.5 Sociocultural factors

Body image attitude

Body image is an important contributing psychological factor that is associated with the body weight. The body image dissatisfaction (BID) is defined as a subjective negative evaluation of one's physical look (WHO, 2000). Negative body image attitude leads to unhealthy nutritional attitudes, bad eating habits and eating disorders. Negative body image attitude and underestimation of the body weight are associated with the increased risk of the development of overweight and obesity (WHO, 2000).

It is worthy to mention that, people's perception of their physical look found to be affected by the surrounding sociocultural environment (WHO, 2000).

Literature showed that limited studies were concerned about body image dissatisfaction. It was found that, 66% of adolescent girls (13–18 years) in the United Arab Emirates (UAE), perceived themselves as thin (Eapen et al., 2006), whereas, the prevalence of BID among adolescent girls in Pakistan was 11.4% (Mumford et al., 1992). Furthermore, Mousa and colleagues (2010) revealed that 21% of the Jordanian's adolescent girls aged 10–16 years under estimated their body weight. The researcher predisposed this dissatisfaction to the

physical changes associated with puberty and the exhibiting of negative eating attitudes (Mousa et al., 2010). Naini and colleagues (2006) showed that about 2.8% of obese children perceived themselves as normal, 11.1% perceived themselves as overweight, and 86.1% showed themselves as obese compared with their actual body weight (Naini et al., 2006).

In Bahrain, Al-Sendi and colleagues (2004) found a significant relationship between adolescents' perception of the body weight and their actual weight, overweight and obese adolescents tend to underestimate their weight status. About (33.5%) and (26.6%) of the adolescents thought that their parents and their peers, respectively, would perceive them to be overweight or obese (Al-Sendi et al., 2004).   The percentage of adolescents who reported that the parental or peer underestimation was higher among those were actually overweight or obese (Al-Sendi et al., 2004).

2.2.7.6 Medical profile

Genetic factors

Genetic factors play an important role in the development of obesity. Heredity factors affect 45%-75% of the inter-individual variation in BMI (Farooqi and O'Rahilly, 2007; Lyon and Hirschhorn, 2005).   Life style factors, social, behavioral, cultural and environmental factors determine susceptibility to obesity among genetically predisposed individuals (WHO, 2005).

The genes and behavior together affect obesity development (CDC, 2016). Multiple genes may increase susceptibility for being obese, as well as, outside factors; such as increased food intake and sedentary activities also needed (CDC, 2016).

As obesity runs in families, weight status of a child's parents is strongly affecting child's risk of being overweight at all ages. Studies pointed out to genetic link, as well as, families

share common eating behavior, sedentary life style, and attitude (Lyon and Hirschhorn, 2005).

Nearly one in five (19.8%) children living in households where both parents were overweight or obese were themselves obese, additionally, 8.4% of children if one of the two parents was overweight or obese were themselves obese (London Susan Mayor, 2005). While, 6.7% of children living in households where neither parents were overweight or obese were themselves obese (London Susan Mayor, 2005). Similarly, Krebs' and colleagues (2007) discussed the impact of the parental weight status; findings revealed that, the children with at least one obese parent were at the highest risk for adult obesity. Zabut and colleagues (2007) investigated the effect of parental obesity on serum leptin hormone concentrations among obese adults in the Gaza Strip. The mean of serum leptin hormone levels for the obese adults with history of obese parents was significantly higher than obese adults without history of obese parents (Zabut et al., 2007). A cross sectional study conducted among Jordan University's students revealed that, the parental obesity was statistically significantly associated with overweight and obesity (Suleiman et al., 2009). Prevalence rates of overweight and obesity among students whose father and \ or mother were obese were higher compared to similar rates of those students whose one of the parents was obese (Suleiman et al., 2009).

Literature showed information gaps about genetic pathways, which lead to an increased risk of obesity, studies suggested that the underlying molecular mechanisms might be clarified later in the future (Salwik and Beushlein, 2006).

Medical causes of overweight and obesity

Many research studies have revealed that certain underlying medical conditions may contribute to weight gain, so that, physicians should first focus on the differential diagnosis of possible underlying disorders before overweight and obesity management (Maddox and Leiderman, 1969; Price et al., 1987). Obesity is a prominent feature of endocrine diseases particularly Cushing's syndrome (CS), hypothyroidism, insulin-excess syndromes, polycystic ovary syndrome (PCOS) (Maddox and Leiderman, 1969; Price et al., 1987).

Cushing's syndrome results from inappropriate exposure to high levels of the cortisol hormone for a long time. This leads to a build-up of fat in characteristic sites such as the face, upper back, and abdomen (Newell et al., 2006). Tiryakioglu and colleagues (2010) revealed that 9.33% of patients with simple obesity were found to have Cushing's syndrome. While, Sahin and colleagues (2013) found that 0.5% of the obese patients were diagnosed Cushing's syndrome.

Thyroid hormones play an important role in the regulation of thermogenesis, glucose metabolism and fat oxidation (Rosenbaum et al., 2000). Thyroid dysfunction results in decreased thermogenesis and decreased metabolic rate, therefore, thyroid dysfunction is associated with changes in the body weight and composition, body temperature and total and resting energy expenditure (REE) independent of physical activity (Rosenbaum et al., 2000). Many research studies have showed that hypothyroidism is associated with a higher BMI and a higher prevalence of obesity, there is also a clinical evidence suggesting that even mild thyroid dysfunction in the form of subclinical hypothyroidism is associated with body weight and represents a risk factor for overweight and obesity (Sanyal and Raychaudhuri, 2016).

Polycystic ovary syndrome (PCOS) is a highly prevalent endocrine-metabolic disorder characterized by several hormonal disturbances such as hyperandrogenism, chronic oligo anovulation, insulin resistance (IR), and hyperinsulinemia (Rojas et al., 2014). IR is a condition which occurs when the body has difficulty pulling glucose from the blood stream and converting it to energy. Women with PCOS produce high level of insulin in an attempt to maintain a normal blood glucose level, this leads to over production of androgen and weight gain (Rojas et al., 2014).

Overweight and obesity also can coexist with hypogonadism, hypothalamic disease, growth hormone deficiency, and leptin deficiency or leptin receptor defects (Maddox and Leiderman, 1969; Price et al., 1987).

Drugs

Drug-induced weight gain is a serious side effect of many commonly used drugs; it is an under-recognized driver of obesity problem. Several research studies have revealed that certain drugs associated with weight gain such as insulin secretagogues or thiazolidinedione therapy, as well as, the atypical antipsychotic drugs such as clozapine, olanzapine, risperidone, and quetiapine are known to cause marked weight gain. Weight gain is also common among antidepressants such as amitriptyline, mirtazapine, and some serotonin reuptake inhibitors (SSRIs). Furthermore, the weight gain is observed with mood stabilizers such as lithium, valproic acid, and carbamazepine. In addition to, Antiepileptic drugs (AEDs) such as valproate, carbamazepine, and gabapentin (Ness and Apovian, 2005).

To summarize, obesity is defined as "a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired" (WHO, 2016).

WHO (2016) classifies adults as obese when BMI is $>/=30$ kg/m^2, overweight when BMI is between 25 and 29.99 kg/m2.

Overweight and obesity are considered to be the main driver to the global burden of non-communicable disease and disability, affecting all ages and sociodemographic groups in developed and developing countries (Nani et al., 2006). Obesity is a leading cause to coronary diseases, neoplasm, digestive diseases, type2 diabetes, cancer, arthritis, arteriosclerosis, and many chronic disorders (Hazmi and Warsi, 2000). In addition, it affects serious social and psychological health (Nani et al., 2006).

Many Studies were conducted to assess the prevalence of overweight and obesity among university students in the developed and developing countries. Most studies have shown a high alarming level of the prevalence of overweight and obesity among university students.

Many studies have revealed that the main determinants of overweight and obesity were sociodemographic factors such as age, gender, marital status, family members, family income and parent's level of education (Karl et al., 2014; Suleiman et al., 2009). As well as, decreasing physical activity and increasing sedentary behavior, changing in sleeping patterns, and dietary behaviors such as breakfast skipping, eating patterns, food groups consumption (Issa, 2015; El-Qudah et al., 2012). In addition to physiological factors such as emotional eating, and sociocultural factors such as body image attitude (Bin Zaal et al., 2009; Al-Sendi et al., 2004). Moreover, genetic factors like childhood obesity, family history and medical profile (Suleiman et al., 2009).

In Palestine, few studies were conducted to assess the prevalence and determinants of overweight and obesity among university's students in Palestine. This study will be the first to assess the prevalence and the determinants of overweight and obesity among university's students in the GS.

<h1 align="center">Chapter 3</h1>

<h2 align="center">Methodology</h2>

Introduction

This chapter provides a detailed description of the study methodology. It begins by explaining the design of the study, the method of data collection and analysis, sampling technique, study population, and study settings. Then, it describes strategies to ensure the validity and reliability of the study instruments, ethical considerations, and finally the study limitations.

3.1 Study Design and Method

The researcher used quantitative research approach; the design of the study is cross sectional survey. Cross sectional surveys enable researchers to check the history of the past exposure to risk factors, investigators look backward from the disease to a possible cause or contributing factors.

Cross-sectional studies are carried out at one time point or over a short period (Coggon et al., 1993). In particular, cross sectional studies are commonly used to estimate the prevalence of the outcome of interest for a given population. Data could be collected at individual level including exposure to risk factors and information about the outcome of interest. Cross sectional studies do not require a follow-up; thus, they are less costly and quicker than other research designs. Finally, if the sample of cross sectional designs is drawn in a representative way, the findings of cross sectional surveys could be generalized to similar population.

Like other research studies, cross sectional survey is used as an evidence to plan for public health interventions and decision-making.

Like any research design, cross sectional studies have weakness; the main weakness is that cross sectional design is less useful in studying diseases causations, because the problems inferring temporal sequence are limited (Coggon et al., 1993).

3.2 Study population

Study population consists of all university students in the three universities. In 2015, the total number of students in the three universities was 48070 students, distributed as 17809 male students and 30261 female students.

The total number of Islamic University students was 17969 students; representing 37% of the study population (**Annex 3**), distributed as 6660 (37.3%) male students and 11309 (37%) female students. The total number of Al-Aqsa University students was 16938 students; representing 35% of the study population, distributed as 4934 (27.7%) male students and 12004 (39.6%) female students. The total number of Al-Azhar University students was 13163 students; represent 28% of the study population, distributed as 6215 (34.8%) male students and 6948 (22.9%) female students (**Annex 4**).

3.3 Study settings

This study was conducted at three universities in the Gaza Strip: Islamic University, Al-Aqsa University, and Al-Azhar University. The three universities were selected randomly. Simple random sampling technique was used to select the three universities out of five universities in the Gaza Strip.

3.4 Period of the study

The study was started after having a letter of approval from the university and obtaining the ethical approval from Helsinki committee to conduct the research. The study was performed in the year 2017; it started in January 2016 and ended in March 2017. Pilot study was conducted in January 2016, then data collection began in the mid of January

2016. Data entry and cleaning were conducted in March 2016. Coding and analysis of data were conducted in August 2016. The study final report was completed in March 2017.

3.5 Sample size

The total number of students is 48070 (Ministry of High Education (MoHE), 2014); based on previous studies, the researcher assumed that the prevalence of overweight and obesity among GS students is about 19.9%. To calculate the sample size, a confidence interval of 95% (Jalambo et al., 2011) and a margin error of 5% were accepted. The sample size was estimated to be 383 students from the three universities, the number of students was increased up to 400 students to compensate any possible non-respondent, and get a representative sample.

The total number of the study participants was 400 students, distributed as 200 male students and 200 female students. The total number of the study participants from Islamic University was 150 students, distributed as 75 male students and 75 female students. The total number of the study participants from Al-Aqsa University was 134 students, distributed as 55 male students and 79 female students. The total number of the study participants from Al-Azhar University was 136 students, distributed as 70 male students and 46 female students **(Annex 5)**.

3.6 Selection of participants

Enrollment and recruitment of the study participants was conducted by selecting the participants from each university randomly through a simple random technique. The researcher and four assistants selected each tenth student entered the gate of the university. The researcher and four assistants selected the required number of participants from each university randomly regardless the type of their college or the year of study and the physical shape of the students.

3.7 Eligibility criteria

3.7.1 Inclusion criteria

- Both male and female students who were registered at an undergraduate degree at Al-Azhar, Islamic, and Al-Aqsa universities were included.

- Students aged from 17 to 24 years old.

3.7.2 Exclusion criteria

- Students who suffer from chronic diseases

- Postgraduate students

- Pregnant female students

- Any student older than 24 years old

3.8 Study instrument

3.8.1 Interview questionnaire (Indirect method)

A face-to-face interview questionnaire was used in this study (**Annex 6**). After the questionnaire was developed according to the study objectives, it was reviewed and approved by public health and research experts to increase the validity of the content. The following components were included in the questionnaire:

- Socio-demographic variables such as age, marital status, residency, family income, family size, parent education, mother work, college type, family size, type of college, year of study and stage of studying.

- Life style variables such as physical activity, sedentary behaviors, sleeping hours and smoking.

- Physical activities were assessed by using the second version of the Global Physical Activity Questionnaire (GPAQ) that was developed by the WHO. GPAQ collects data about three main domains; activity at work, travel to and from places, and recreational activities. The questionnaire was modified according to the population specification. It was divided into three parts and composed of 15 questions. GPAQ resulted in categorizing the level of physical activity pattern into three parts: high, moderate, and low physical activity.

- Smoking: smoking habit was identified by the Behavioral Risk Factor Surveillance System (BRFSS). A valid questionnaire categorized the participants into one of the four categories: smoker, past smoker, passive smoker, and non-smoker.

- Dietary habits such as breakfast skipping, meal patterns, snacking, eating fast food, eating during watching TV, using social media and studying.

- Socio-cultural habits such as body image attitude of the participants, parents and peers, sharing food with friends and family, eating out doors, social pressure, and having a weight scale at home.

- Psychological factors such as stress, depression, socialization, being lonely, anger, happiness, sadness, anxiety and frustration. To assess this domain, the researcher has used Eating and Appraisal Due to Emotions and Stress (EADES) questionnaire.

  - The EADES questionnaire was modified according to the population specification to assess how individuals cope with and appraise stress in relation to food and eating. The participants choose only one answer per statement: strongly disagree, disagree, neutral, agree, and strongly agree.

- Medical profile such as childhood obesity, parent's obesity and brothers and sisters obesity, medication and drugs.

3.8.1.1 A Food Frequency Questionnaire (FFQ)

FFQ is a limited checklist of daily consumption of foods and beverages with a frequency response section for subjects to report how often each item was consumed over a specified period. It is inexpensive, quick to complete, can assess current or past diet and can be self-administered (**Annex 7**). The researcher constructed it, and it was reviewed and modified by nutritionists to ensure the content validity.

3.8.2 The direct method

3.8.2.1 Anthropometric measurement

Anthropometric measurements (weight, height) are essential as basic descriptive information in this study for calculating BMI to all subjects which is the most commonly used for assessing the prevalence of obesity. BMI was calculated as body weight divided by squaring the height (m2).

The researcher and assistants did these measurements and it took them around 10 minute to complete the measurement for each participant.

Weight (kg)

The researcher used a suitable weight balance measuring to nearest 0.5 kg (Seca type). This scale was standardized and calibrated at the beginning of every session of measurement by using standard five kg weight. Participants were weighted in their light clothing without shoes (after the removal of handbags, jackets, mobile phones and other personal accessories).

Height (m)

The researcher used a suitable metallic meter scale measuring to the nearest 0.5 cm, and fixed it on the wall, the researcher measured the heights of the participants without shoes, taking into account that heals, buttocks, shoulders and head are closed to vertical wall surface, and a ruler was used horizontally to take the height.

3.9 Scientific rigor

3.9.1 Reliability

Reliability is the degree to which an instrument measures the same way each time it is used under the same condition with the same participants (Luara, 1997). To assure instrument reliability, the researcher assistants were trained in the same manner on the steps of the interview and how to select the study participants, how to ask questions to insure the standardization of the questionnaire filling, and how to measure the participant's weight and height. Finally, to minimize the possible entry error, re-entry 5% of the data after finishing data entry was done.

3.9.2 Face validity

Face validity is the extent to which a test is subjectively viewed as covering the concept it purports to measure. It refers to the relevance of a test, as it appears to test participants (Holden, 2010). The questionnaire was well structured by the researcher to allow easy data collection and data entry. During the validation process, the questionnaire lay out was reviewed and formatted several times before the final version.

3.9.3 Content validity

Content validity addresses how well the items were developed to operationalize a construct that provide an adequate and representative sample of all items that might measure the construct of interest (Kimberlin and Wintersten, 2008). Content validity usually depends on the judgment of experts in the fields so, experts in nutrition, epidemiology and public

health evaluated components, context, and the content of the instruments and their feedback was taken in the account, to ensure their relevance. **(Annex 8)** has names of experts who validated the questionnaire.

3.9.4 Pilot study

Piloting process is a small experiment designed to help in identifying potential problems in the research design and to revise the methods and logistics of data collection before starting the actual fieldwork, in order to improve quality and efficacy. Moreover, the piloting allows the researcher to get the experience of dealing with the data collection instrument.

A pilot study was conducted before the actual data collection started. The researcher collected data from 30 participants to assess the validity of the questions, to test the appropriateness of the study instrument, and to improve the validity and reliability of the study.

Minor modifications were done including rephrasing some questions, and adding new questions. The 30- piloted cases were excluded from the study sample.

3.10 Data collection

The researcher and four assistants, who were trained well on how to fill the questionnaire, have collected the data. The data were collected through direct and indirect methods: the indirect method included face-to-face questionnaire, while direct method includes anthropometric measurements of weight and height.

The average time for filling the questionnaire was around 20 minutes.

It is worth mentioning that two of the assistants were male researchers and the other assistants were female researchers. The four assistants have made the data collection possible.

3.11 Response rate

The 400 questionnaires were distributed and 400 were returned. Therefore, the response rate was 100%.

3.12 Data management and statistical analysis

Data entry and statistical analysis were performed by using Statistical Package for the Social Science (SPSS) program **(version 20)**. SPSS was used to conduct data entering, data cleaning, frequency and cross tabulation, and data analysis.

The researcher was concerned in studying the obesity as the dependent variable. The independent variable branches into categorical variables as (age, locality, type of college, marital status, year of study, household income, smoking, physical activity) and the continuous variables which are (age, height, weight).

Descriptive statistics was used to describe the basic characteristics of the sample, also the researcher used percentage rate to determine the prevalence of obesity among students.

Chi-square test was used to examine the relationship between obesity and categorical variables like (age, gender, locality, type of college, marital status, year of study, household income, smoking, physical activity).

One–way analysis of variance (ANOVA) test was used to compare between means of continuous and categories variables.

3.13 Ethical and administration's consideration

- The researcher had the approval from Al-Quds University, as this research will bring benefits to the health of Gaza's people.

- The researcher had the approval from the Helsinki committee to conduct this study **(Annex 9)**.

- An official letter from the director of each of the three universities (**Annex 10, 11, 12**).

- To guarantee participants' rights of privacy and confidentiality, a covering letter (**Annex 13**) indicating that the participation is optional was provided and confidentiality was promised and maintained. All the study participants were asked for their approval to participate in the study.

- Transparency was taken into consideration during both the reporting and the analysis of data with respect to confidentiality and respecting the results.

3.14 Limitations of the study

- Personal interview questionnaire was expensive and time consuming.

- Recall bias.

- BMI fails to distinguish between fat and fat free mass (Muscle and bone).

- Difficulties in recruitment of participants and data collection from the three university

- Limited literature resources such as books and journals.

- Limited resources including funds and facilities for data collection and data entry.

- The electricity cuts for a long period.

Chapter 4

Findings

This chapter represents the main quantitative findings of this study. It outlines the main descriptive results of the study, such as demographic characteristics, physical activity, smoking status, sleeping patterns, food habits, overeating to cope with emotions, medical profile, and consumption of food groups. Additionally, this chapter underlines the main bivariate and inferential analysis that show the main determinants of overweight and obesity among university students in the Gaza Strip.

4.1 Descriptive analysis

4.1.1 BMI characteristics

Table (4.1): Distribution of study participants by BMI

Gender		BMI categories				Total
		Under weight	Normal weight	Overweight	Obese	
Male	N	5	123	30	42	200
	%	2.5	61.5	15.0	21.0	100.0
Female	N	24	90	45	41	200
	%	12.0	45.0	22.5	20.5	100.0
Total	N	29	213	75	83	400
	%	7.2	53.2	18.8	20.8	100.0
(Mean=25.14, Std=6.307)						

Regarding the BMI, the overall mean of participants BMI was 25.14, with (Std=6.307). As shown in **Table (4.1)**, more than half (53.2%) of the study participants had a normal BMI at the time of data collection and 7.2% of the study participants had underweight BMI. Surprisingly, 39% of the study participants were either obese or overweight (obese 20.8% and overweight 18.8%).

As shown in **Table (4.1)**, the prevalence of obesity was higher among male participants (21%) compared to female participants (20.5%), while the prevalence of overweight was higher among female participants (22.5%) compared to male participants (15%). Normal

weight BMI was higher among male participants (61.5%) compared to female participants (45.5%). The prevalence of underweight was higher among female participants (12.0%) compared with male participants (2.5%).

4.1.2 Socio-economic characteristics

Regarding the distribution of participants by age, **Table (4.2)** shows that about one-third of the study participants were 19 years old (31.5%), 24.5% of the study participants were 20 years old, 24.2% of the study participants were between 20 years old and 24 years, and 19.8% of the study participants were 18 years old. The overall mean age of the study participants was 19.62 years, with (Std=1.23). With regard to the distribution of participants by sex, the number of study participants was equally divided between males and females, 50% each.

Concerning the distribution of participants by governorates, **Figure (4.1)** shows that the most common governorate was Gaza, which represents 54.8% of the total study sample, followed by North Gaza with a 23.3% of the study sample, and by 13.5% from the mid zone. Finally, with a 5.8% and 2.8% of the total sample from Khan Yonis and Rafah, respectively.

Figure (4.1): Distribution of study participants by governorates
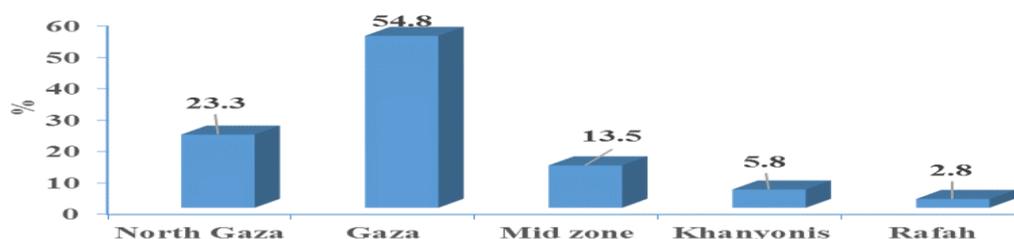
Table (4.2): Summary of socio-economic characteristics of study participants

Demographic Data	Number	%
Age		
18 Years old	79	19.8
19 Years old	126	31.5
20 Years old	98	24.5
Between 20 years old and 24 years	97	24.2
Total	**400**	**100.0**
(Mean=19.62 years, Std=1.23)		
Marital Status		
Never Married, single	378	94.5
Married	22	5.5
Total	**400**	**100.0**
Faculty		
Health profession (Medicine, Dentistry, Pharmacy, Nursing, and Health science)	60	15.1
Engineering and Science	99	24.5
Art and Education	143	35.8
Economics and Administrative Sciences	91	22.8
Others	7	1.8
Total	**400**	**100.0**
Family member		
6 members and less	121	30.3
From 7 to 9 members	210	52.5
10 members and above	69	17.3
Total	**400**	**100.0**
(Mean=7.43 members, Std=2.26)		
Father's years of schooling		
Less than 12 years	37	9.3
12 years	127	31.8
16 years	161	40.3
More than 16 years	75	18.8
Total	**400**	**100.0**
(Mean=14.35 years, Std=3.07)		
Mother's years of schooling		
Less than 12 years	44	11.0
12 years	166	41.5
16 years	162	40.5
More than 16 years	28	7.0
Total	**400**	**100.0**
(Mean=13.53 years, Std=2.87)		
Household income		
1800 ILS* and less	91	22.8
From 1801 to 2100 ILS	91	22.8
From 2101 to 3990 ILS	94	23.5
>/=4000 ILS	124	31.0
Total	**400**	**100.0**
(Mean=2947 ILS, Std=1706.1)		

*New Israeli Shekel

Regarding the marital status, as shown in **Table (4.2)**, the vast majority of participants (94.5%) were never married before, at the time of data collection, while 5.5% of the study participants were married at the time of data collection.

Concerning the distribution of the study participants by university name, **Figure (4.2)** shows that 37.5% of the study participants were from Islamic University of Gaza, a total of 33.5% and 29% of the study sample were from Al-Aqsa University and from Al-Azhar University, respectively.

Figure (4.2): Distribution of study participants by university name
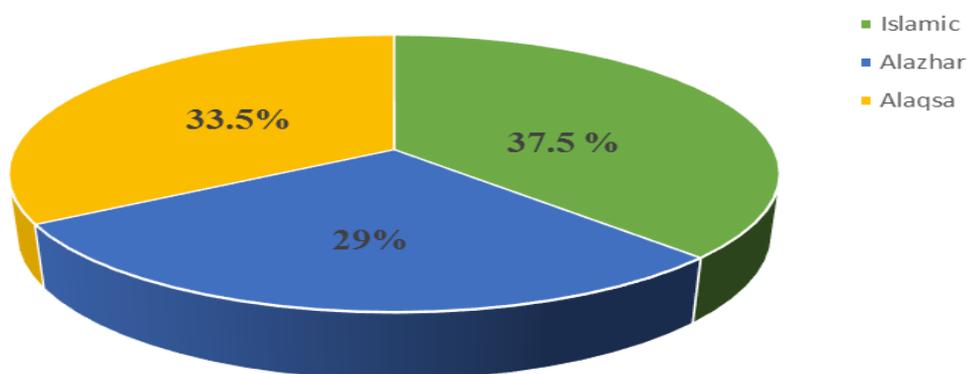
Regarding the distribution of the study participants by college, **Table (4.2)** shows that the majority of students were studying in Art and Education colleges with 35.8% of the total sample. Followed by Engineering and Science colleges with 24.8% of the total sample. Economics and Administrative Sciences colleges with 22.8% of the total sample. Finally, Health profession colleges such as Medicine, Dentistry, Pharmacy, Nursing, and Health science with 15.1% of the total sample, and 1.8% from other colleges.

With regard to distribution of the study participants by the studying year, **Figure (4.3)** shows that 31.3% of the study participants were in the second year of their university studies, followed by 23% of the study participants who were in the first year of their

university studies. A total of 23% of the study participants were in the third year of their university studies. Finally, 20.3% of the study participants were in their fourth and fifth year of their university studies.

Figure (4.3): Distribution of study participants by studying year
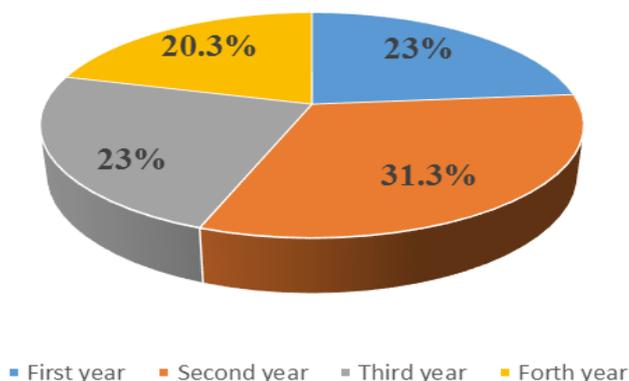
Concerning the participant's family member's number, as illustrated in **Table (4.2)**, the most common family member group was the family member group between 7 to 9 members, which represents about half of the study sample (52.5%). The second reported family group was 6 members and less, which represents (30.3%). Finally, the last reported family member group was 10 members and above, with about 17.3%. The overall mean family member number of the study participants was 7.43 members, with (Std=2.26).

Regarding the study participants' father's years of schooling, **Table (4.2)** shows that the overall mean of the study participants father's years of schooling was 14.35 years with (Std=3.07). Among the study participants, fathers who have 16 years of schooling were 40.3%, while 31.8% of fathers that have 12 years of schooling, 18.8% who have more than 16 years of schooling, finally only 9.3% of fathers that have less than 12 years of schooling. The overall mean father's years of schooling of the study participants was 14.35 years, with (Std=3.07).

With regard to the study participants' mother's years of schooling, **Table (4.2)** shows that the overall mean of the study participants mother's years of schooling was 13.53 years with (Std=2.87). Almost, there was an equal distribution of mother's years of schooling between having 12 years and 16 years of schooling with (41.5% for 12 years and 40.5% for 16 years). Mothers who have less than 12 years of schooling were 11%. Finally, 7% of mothers of the study participants have more than 16 years of schooling. The overall mean mothers' years of schooling of the study participants was 13.53 years, with (Std=2.87).

Regarding the study participants' household income, **Table (4.2)** shows that 31% of the study participants have household income equal or greater than 4000 ILS (New Israeli Shekel). Followed by 23.5% of the study participants who have household income between 2101 and 3990 ILS. 22.8% of the study participants have household income between 1801 and 2100 ILS. 22.8% of the study participants have household income 1800 ILS and less. The overall mean household income of the study participants was 2947 ILS, with (Std=1706.1).

4.1.3 Life style characteristics
4.1.3.1 Physical activity characteristics

Physical activities were assessed by using the second version of the Global Physical Activity Questionnaire (GPAQ) that was developed by the WHO. GPAQ collects data about three main domains; activity at work, travel to and from places, and recreational activities. It was divided into three parts and composed of 15 questions. GPAQ resulted in categorizing the level of physical activity pattern into three parts: high, moderate, and low physical activity.

Table (4.3) shows that no one of the study participants had any work that involved vigorous-intensity activity like carrying heavy loads, digging or construction work.

Table (4.3): Summary of physical activity involved working and travelling to and from places characteristics of study participants

Physical Activity	Number	%
vigorous-intensity activity involved working like carrying heavy loads, digging or construction work		
No	400	100.0
Total	**400**	**100.0**
Travel to and from places		
Walking or bicycling for at least 10 minute continuously to get to and from places		
Yes	184	46.0
No	216	54.0
Total	**400**	**100.0**
Number of times of walking or bicycling for at least 10 minute continuously to get to and from places per week		
From 1 to 3 days	62	33.7
More than 3 days	122	66.3
Total	**184**	**100.0**
(Mean=4.49, Std=1.65)		
Duration of walking or bicycling for travel per day		
Less than 30 Minutes.	51	27.7
30 Minutes	81	44.0
More than 30 Minutes	52	28.3
Total	**184**	**100.0**
(Mean=36.79, Std=23.77)		

By asking the study participants if they walk or cycle for at least 10 minutes continuously to get to and from places, unfortunately, **Table (4.3)** shows that more than half of the study participants (54%) have never walked or used a bicycle for at least 10 minutes continuously to get to and from places. While, 46% of them walk or cycle for at least 10 minutes continuously to get to and from places.

Regarding the number of days of walking or cycling per week. As shown in **Table (4.3)**, among participants who walk or cycle for at least 10 minutes continuously to get to and from places, most of the participants (66.3%) walk or cycle for more than 3 days weekly. While 33.7% of the participants walk or cycle from 1 to 3 days weekly. As illustrated in **Table (4.3)**, the mean number of days of walking or cycling per week was 4.49 days, with (Std=1.65).

With regard to the number of minutes of walking or cycling per day, of the total number of study participants who walk or cycle, 44% of the participants walk or cycle for 30 minutes daily. A total of 28.3% of the participants walk or cycle for more than 30 minutes daily. Finally, 27.7% of the participants walk or cycle for more than 30 minutes daily. As shown in **Table (4.3)**, the mean number of minutes of walking or cycling per day was 36.79 minute, with (Std=23.77).

By asking the study participants if they do any vigorous-intensity sports or recreational activities like running or football for at least 10 minutes continuously, **Table (4.4)** reveals that most (84%) of the study participants have indicated that, they have never done any vigorous-intensity sports or recreational activities. While, 16% of the study participants have indicated that they do vigorous-intensity sports or recreational activities.

Regarding the number of days of doing vigorous intensity sports or recreational activities per week, **Table (4.4)** reveals that the mean number of days of doing vigorous intensity sports or recreational activities per week was 3.3 day, with (Std=1.23). Most of the study participants who do vigorous-intensity sports or recreational activities (43.8%) do it for three days weekly. While, 31.2 % of them do it for more than 3 days weekly. Finally, 25% of the participants do it for two days weekly.

Table (4.4): Summary of recreational activities characteristics of study participants

Physical Activity	Number	%
Recreational activities		
Doing vigorous-intensity sports, or recreational activities like running or football for at least 10 minutes continuously		
Yes	64	16.0
No	336	84.0
Total	**400**	**100.0**
Number of days of doing vigorous intensity sports, or recreational activities per week		
2 days	16	25.0
3 days	28	43.8
Above 3 Days	20	31.2
Total	**64**	**100.0**
(Mean=3.30, Std=1.23)		
Duration of doing vigorous-intensity sports, or recreational activities per day		
Less than 60 Minutes.	13	20.3
60 Minutes	33	51.6
More than 60 Minutes	18	28.1
Total	**64**	**100.0**
(Mean=66.92, Std=28.68)		
Doing moderate-intensity sports, or recreational activities like brisk walking, cycling, swimming, and volleyball for at least 10 minutes continuously		
Yes	108	27.0
No	292	73.0
Total	**400**	**100.0**
Number of days of doing moderate-intensity sports or recreational activities per week		
2 and less days	28	25.9
From 3 to 4 Days	52	48.2
More than 4 Days	28	25.9
Total	**108**	**100.0**
(Mean=3.36, Std=1.69)		
Duration of doing moderate-intensity sports, fitness or recreational activities per day		
Less than 30 minutes	12	11.1
From 30 to 59 Minutes	45	41.7
60 Minutes and More	51	47.2
Total	**108**	**100.0**
(Mean=45.19, Std=21.22)		

Concerning the number of minutes of doing vigorous intensity sports or recreational activities per day. As shown in **Table (4.4)**, the mean number of minutes of doing

vigorous intensity sports or recreational activities per day was 66.92 minute with (Std= 28.68). 51.6% of study participants who do vigorous-intensity sports or recreational activities do it for 60 minutes daily. Followed by, 28.1% of them who do it for more than 60 minutes daily. Finally, a total of 20.3% of the participants do it for less than 60 minutes daily.

By asking the study participants if they do any moderate-intensity sports or recreational activities like cycling, swimming, and volleyball for at least 10 minutes continuously, **Table (4.4)** shows that more than two-thirds (73%) of the study participants have indicated that, they have never done any moderate-intensity sports or recreational activities, while, 27% of the study participants have indicated that they do moderate-intensity sports or recreational activities.

Regarding the number of days of doing moderate-intensity sports or recreational activities per week, **Table (4.4)** reveals that the mean number of days of doing moderate-intensity sports or recreational activities per week was 3.36 day, with (Std=1.69). A total of 48.2% of the study participants who do moderate-intensity sports or recreational activities do it for 3 to 4 days per week, while, 25.9% of them do it for 2 days and less per week. Additionally, 25.9% of the participants do it for more than 4 days per week.

With regard to the number of minutes of doing moderate-intensity sports or recreational activities per day. As shown in **(Table 4.4)**, the mean number of minutes of doing vigorous intensity sports or recreational activities per day was 45.19 minutes, with (Std=21.22). About half of the study participants (47.2%) do moderate-intensity sports or recreational activities for more than 60 minutes per day. Followed by, 41.7% who do it for 30 to 59 minutes per day. Finally, 11.1% of them do it for less than 30 minutes per day.

4.1.3.2 Smoking characteristics

Table (4.5): Summary of smoking characteristics of study participants

Smoking	Number	%
At the present time, are you a smoker		
Yes	49	12.2
No	351	87.8
Total	**400**	**100.0**
Number of daily cigarettes		
Less than 10	12	24.4
From 10 to 19	21	42.9
20 >/=	16	32.7
Total	**49**	**100.0**
(Mean=13.20 , Std=1.23)		
Do you smoke water pipes?		
Yes	76	19.0
No	324	81.0
Total	**400**	**100.0**
How many times do you smoke water pipes on average		
Once per day	48	63.2
Twice and more per day	28	36.8
Total	**76**	**100.0**

By asking the study population, if they smoke at the time of data collection, most of the study participants (87.8%) were non-smokers at the time of data collection. On the other hand, 12.2% of the study participants were smokers at the time of data collection. All non-smoker participants, also have never smoked before. A total of 98% of the smokers were males, thus, the prevalence of smoking among male university students is 24%.

Regarding the number of daily cigarettes, 42.9% of smoker participants smoke from 10 to 19 cigarettes per day. 32.7% of smoker participants smoke 20 cigarettes or more per day. Finally, 24.5% of smoker participants smoke less than 10 cigarettes per day. The mean number of daily cigarettes was 13.20, with (Std=1.23).

Table (4.5) shows that most of the study participants (81%), were not water pipe smokers, while 19% of the participants were water pipe smokers. 63.2% of the participants who smoke water pipe smoke it once per day and 36.8% of the participants who smoke water

pipe smoke it twice or more per day. A total of 93.4% of the water pipe smokers were

males.

4.1.3.3 Sleeping pattern characteristics

Table (4.6): Summary of sleeping pattern characteristics of study participants

Sleeping Pattern	Number	%
How many hours do you sleep at night on average?		
Less than 7 hours	154	38.5
7 to 8 hours	183	45.8
More than 8 hours	63	15.8
Total	**400**	**100.0**
(Mean=6.92 , Std=1.98)		
How many hours do you sleep at daytime on average?		
Do not sleep at daytime	126	31.6
From 1 to 2 hours	182	45.6
More than 2 hours	91	22.8
Total	**399**	**100.0**
(Mean=1.61 , Std=1.557)		

Concerning the average number of sleeping hours at night, as shown in **Table (4.6)**, 45.8%

of the study participants sleep more than 8 hours daily, 38.5% of the participants sleep less

than 7 hours daily, and finally, 15.8% of the participants sleep between 7 to 8 hours per

day. The mean number of sleeping hours at night per day was 6.92 hours, with (Std=1.98).

Regarding the average number of sleeping hours at the daytime, as illustrated in **Table

(4.6)**, 45.6% of the study participants sleep from one to two hours daily, 31.6% of the

participants do not sleep at the daytime, and finally, 22.8% of the participants sleep more

than 2 hours daily. The mean number of sleeping hours at the daytime per day was 1.61

hour, with (Std=1.557).

4.1.3.4 Sedentary behaviors characteristics

4.1.3.4.1 Sitting and studying characteristics

Table (4.7): Summary of sitting and studying characteristics of study participants

Sedentary behaviors	Number	%
Daily Average time spend sitting		
3 hours and less	154	38.5
4 to 5 hours	128	32.0
More than 5 hours	118	29.5
Total	**400**	**100.0**
(Mean=4.47, Std=2.57)		
Study while		
Moving from place to place	180	45.0
Sitting on the desk	112	28.0
Sitting in the bed	108	27.0
Total	**400**	**100.0**
Daily average of studying hours		
One hour and less	147	36.8
Two hours	119	29.8
Three hours and more	134	33.4
Total	**400**	**100.0**
(Mean=2.23, Std=1.35)		
Eating while studying		
Always	122	30.8
Sometimes	135	34.1
Never	139	35.1
Total	**396**	**100.0**

Table (4.7) shows the selected sitting and studying variables that could be used to assess the level of physical activities among study participants.

Concerning the daily average time spend sitting or reclining, the overall mean number of hours that the study participants spend sitting or reclining on a typical day was 4.47 hours with (Std=2.57). As shown in **Table (4.7)**, more than one-third of the study participants (38.5%) have spent 3 hours or less sitting or reclining on a typical day. Another one-third of about the study (32%) have spent from 4 to 5 hours sitting or reclining on a typical day. Finally, 29.5% of the study participants have spent more than 5 hours sitting or reclining on a typical day, as shown in **Table (4.7)**.

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By asking the study participants about the studying position, **Table (4.7)** shows that 45% of the study participants were studying while moving/walking from place to place. As well as, 28% of the study participants were studying while sitting at their desks. Unfortunately, about one-third (27%) of the study participants were studying while sitting on their bed.

Regarding the daily average of studying hours, **Table (4.7)** shows that the overall mean number of daily hours of studying was 2.23 with (Std=1.35). More than one-third of the study participants were studying daily for one hour or less (36.8%), followed by 33.5% who were studying daily for three hours and more, finally 29.8% of the study participants were studying daily for two hours.

By asking the study participants if they eat while studying, 35.1% of the study participants indicated that they do not eat while studying. Along with 30.8% of study participants who indicated that they always eat while studying, a total of 34.1% of the study participants indicated that they sometimes eat while studying, as shown in **Table (4.7)**.

Concerning the types of food eaten while studying, of the total number of students who were eating while studying, **Figure (4.4)** shows that the majority of participants (66.4%) used to have hot drinks with sugar while studying. Unfortunately, more than half of the study participants used to eat chips and snacks while studying which represents 63.9%, as well as, more than one-third of the participants used to have Soda drinks while studying which represents 34.9%. About 24% of the participants used to have nuts while studying. Furthermore, 18.7% of the participants used to have fruits and vegetables while studying. Finally, only 9.1% of the participants used to have popcorn while studying.

Figure (4.4): Distribution of study participants by types of food eaten while studying
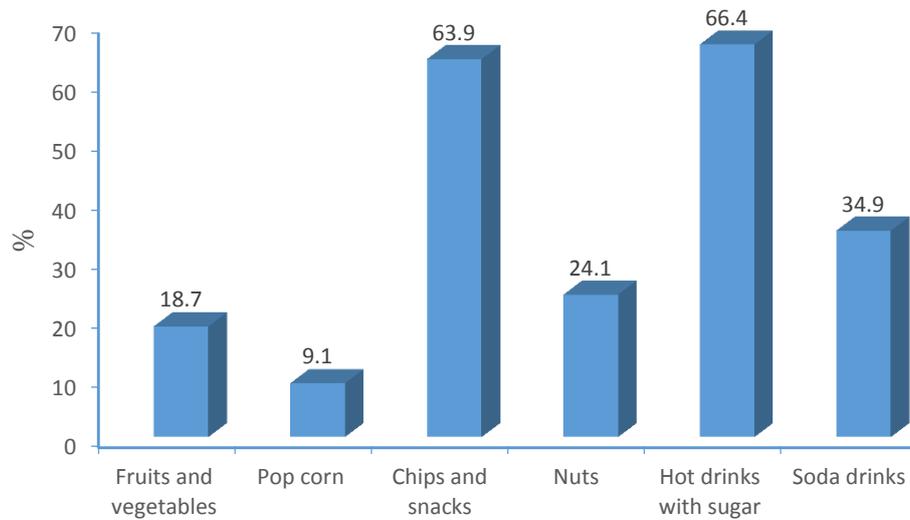
4.1.3.4.2 Watching TV characteristics

Table (4.8): Summary of Watching TV characteristics of study participants

Sedentary behaviors	Number	%
Daily average of watching TV hours		
Less than one hour	139	34.8
One	92	23.1
Two	100	25.1
Three and above	68	17.0
Total	**399**	**100.0**
(Mean=1.32 , Std=1.27)		
Frequency of eating while watching TV		
Always	58	22.0
Sometimes	119	45.1
Never	87	33.0
Total	**264**	**100.0**

Concerning the daily average of watching TV hours, **Table (4.8)** illustrates that about 35% of the study participants watch TV for less than one hour per day. Moreover, 23.1% of the study participants watch TV for one hour per day. Finally, 17% of the study participants watch TV for more than 3 hours per day. The overall mean of the daily average of watching TV hours per day was 1.32 with (Std=1.27).

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Of the total number of students who watch TV, as shown in **Table (4.8)** about 45% of the participants sometimes eat while watching TV. While, 33% of the participants have never eaten while watching TV. Moreover, 22% of the study participants always eat while watching TV.

Among participants who always or sometimes eat while watching TV, unsurprisingly, as reported in **Figure (4.5)**, more than half of the study participants (59.6%) eat chips and snacks; about half of the study participants (48.2%) drink hot drinks with sugar and about 32% of the students eat nuts, 27% drink Soda drinks, while 18.1% of the students eat fruits and vegetables and 12% eat popcorn.

Figure (4.5): Distribution of study participants by types of food eaten while watching TV
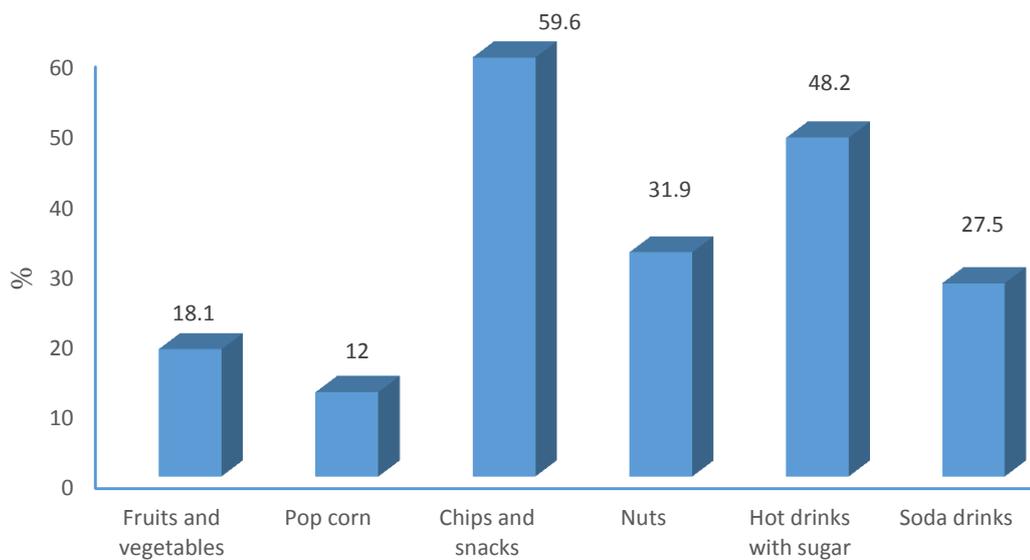
4.1.3.4.3 Using social media and playing video games characteristics

Table (4.9): Summary of using social media and playing video games characteristics of study participants

Sedentary behaviors	Number	%
Use social media (Facebook, twitter, what's up viber etc.)		
Yes	379	94.8
No	21	5.2
Total	**400**	**100.0**
Daily average of hours using social media		
Two hours and less	115	30.3
Three hours	80	21.1
Four hours	78	20.6
More than 4 hours	106	28.0
Total	**379**	**100.0**
(Mean=3.71 , Std=2.00)		
Frequency of eating while using social media		
Always	62	16.4
Sometimes	123	32.5
Never	194	51.2
Total	**379**	**100.0**
Play video games on smart phone or computer		
Yes	59	14.9
No	338	85.1
Total	**397**	**100.0**
Daily average hours of playing games on smart phone or computer		
Two hours and less	40	67.8
Three hours and more	19	32.2
Total	**59**	**100.0**
(Mean=1.51 , Std=1.09)		
Frequency of eating while playing video games computer		
Always	0	0.0
Sometimes	6	10.2
Never	53	89.8
Total	**59**	**100.0**

Regarding the use of social media, **Table (4.9)** shows that the vast majority of the study participants (94.8%) were using social media and 5.2% do not use social media.

Among students who use social media, 30.3% of the study participants use social media for two hours or less per day, followed by 28% of the study participants who use social media for more than 4 hours per day. Additionally, 21.1% of the study participants use social media for three hours per day and 20.6% of the study participants use social media for four

hours per day. The overall mean of the daily average of using social media hours was 3.71 with (Std=2).

Of the total number of participants who use social media, more than half of the study participants (51.2%) have never eaten while using social media. In contrary, 32.5% of the study participants sometimes eat while using social media and about 16.4% of the study participants always eat while using social media.

Among the participants who always or sometimes eat while using social media, unsurprisingly, more than two-thirds of the students (71.1%) eat chips and snacks, more than half of the participants (56.6%) drink hot drinks with sugar, about 38% have soda drinks, about 29.5% of the students have nuts, 17.2% of them eat fruits and vegetables, and 8.1% eat popcorn, as shown in **Figure (4.6)**.

Figure (4.6): Distribution of study participants by types of food eaten while using social media
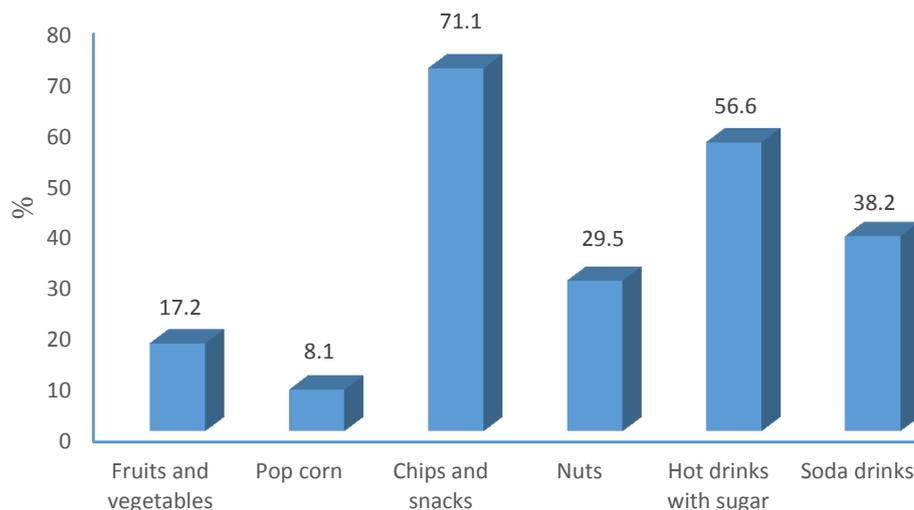
Regarding playing video games on smart phone or computer, **Table (4.9)** shows that most of the study participants (85.1%) were not playing video games on smart phones or

computers. Only, 14.9% of the study participants were playing video games on smart phones or computers.

Among the study participants who were playing video games on a smart phone or a computer, a total of 67.8% of the study participants were playing video games on smart phones or computers for two hours or less per day. About 32% of the study participants play video games on smart phones or computers for three hours or more per day. The overall mean of the daily average of playing video games on smart phones or computers hours was 1.51 with (Std=1.09).

Of the total number of participants who were playing video games on smart phones or computers, the vast majority of those participants (89.8%) have never eaten while playing video games on a smart phone or a computer.

4.1.4 Dietary habits characteristics

Table (4.10) illustrates that only 56.2% of the study participants have a breakfast on daily basis, and 29.8% of the study participants have a breakfast irregularly. Unsurprisingly, 14% of the study participants never had a breakfast.

Of the total number of the study participants who always or sometimes have a breakfast, more than two-third (61.3%) of the study participants had their breakfast at home compared to 38.7% who had it at university.

Regarding having meals regularly, **Table (4.10)** shows that more than one-third (39.2%) of the study participants always have meals regularly, followed by 31% that sometimes have their meal regularly, while, 29.8% of them never had meals regularly.

Concerning the daily number of meal taken by the study participants, **Figure (4.7)** shows that more than one-third (38.1%) of the total study participants have three meals per day,

followed by 37.8% of the study participants who have two meals per day, while 22.1% study participants have more than three meals per day. Surprisingly, only 2% of the study participants have only one meal per day.

Figure (4.7): Distribution of study participants by number of meals taken per day
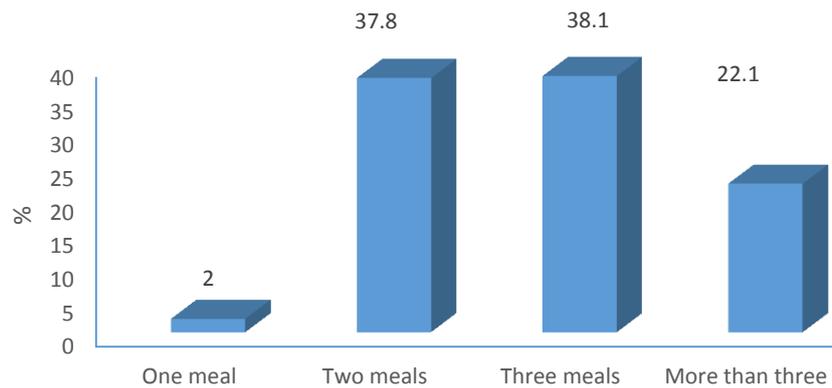
With regard to spending enough time while eating, **Table (4.10)** illustrates that about half of the total sample (47.2%) always spend enough time during eating, in addition to 28% of the study participants who sometimes spend enough time during eating, moreover, 24.8% never spent enough time during eating.

Table (4.10): Summary of dietary habits of the study participants

Dietary habits information	Number	%
Have breakfast daily		
Always	225	56.2
Sometimes	119	29.8
Never	56	14.0
Total	**400**	**100.0**
Place of having breakfast		
At home	211	61.3
At university	133	38.7
Total	**344**	**100.0**
Have meals regularly		
Never	119	29.8
Sometimes	124	31.0
Always	157	39.2
Total	**400**	**100.0**
Spending enough time while eating		
Never	99	24.8
Sometimes	112	28.0
Always	189	47.2
Total	**400**	**100.0**
Having a snack between breakfast and lunch		
Never	150	37.4
Sometimes	123	30.8
Always	127	31.8
Total	**400**	**100.0**
Regularly skip meals?		
Yes	197	49.4
No	202	50.6
Total	**399**	**100.0**
The main meal skipped		
Breakfast	118	59.9
Lunch	9	4.6
Dinner	70	35.5
Total	**197**	**100.0**
Eating late-night snacks		
Never	194	48.6
Sometimes	88	22.1
Always	117	29.3
Total	**399**	**100.0**
Eating fast food like burger, pizza		
Never	93	23.2
Sometimes	178	44.5
Always	129	32.3
Total	**400**	**100.0**

Concerning snacking between breakfast and lunch, as shown in **Table (4.10)**, more than one-third (37.4%) of the study participants never had snacks between breakfast and lunch, while 31.8% of the study participants always have snacks between breakfast and lunch, moreover, 30.8% of the study participants sometimes have snacks between breakfast and lunch.

Concerning the late-night snacks, as shown in **Table (4.10)**, about half of the sample 48.6% never had midnight snacks, compared to 29.3% and 22.1% who have snacks at night either always or sometimes, respectively.

By asking the study participants if they skip any meal, about half (50.6%) of the study participants indicated that they do not skip meals regularly; while 49.4% of them skip meals regularly, as shown in **Table (4.10)**.

Of the total number of participants who were used to skip meals regularly, unfortunately, more than one-half of the study participants (59.9%) used to skip the breakfast regularly; moreover, 35.5% of the study participants skip the dinner regularly. Finally, a total of 4.6% of the study sample skip the lunch regularly, as illustrated in **Table (4.10)**.

Concerning the reason for skipping meals, **Figure (4.8)** shows that 40.6% of the study participants mentioned that the main reason for skipping meals is that having a breakfast is not a habit for them. While 33.5% of the study participants have mentioned that not having enough time is the main reason for skipping their breakfast. Additionally, about 17.8% skip the meals due to not having appetite and 7.1% of the participants indicated that they skip the breakfast as they are on diet.

Regarding the fast food like burger and pizza, about half of the study participants (44.5%) indicated that they sometimes eat fast food and 32.3% of the study participants have

indicated that they always eat fast food, while 23.2% of the study participants indicated that they never had fast food, as shown in **Table (4.10)**.

Figure (4.8): Distribution of study participants by reason for skipping meal
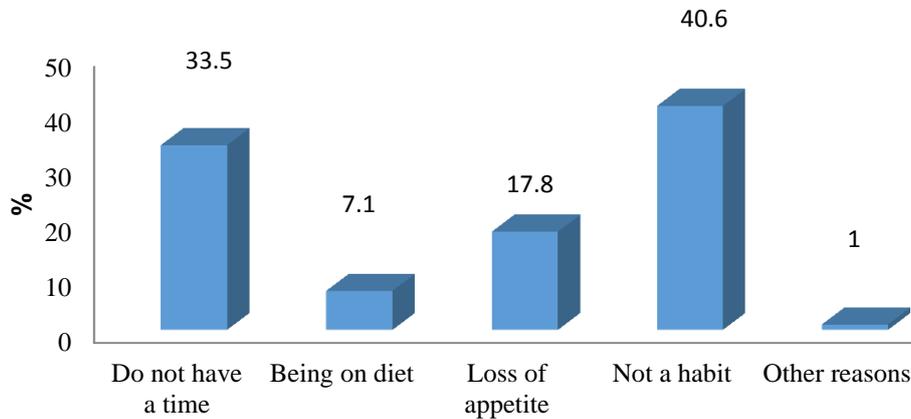
By asking the study participants, on average, how many meals per week did they eat that were not prepared at home; unfortunately, **Figure (4.9)** shows that about 28.8% of the study participants ate more than three meals per week that were not prepared at home. Followed by 27% of the study participants that eat two to three meals per week that were not prepared at home. Furthermore, 26% of the participants eat only one meal per week outside their homes. About 18% of the study participants do not have any meals that were not prepared at home. The overall mean number of weekly meals that the participants eat and they were not prepared at home was 2.75 with (Std=2.94).

Figure (4.9): Distribution of study participants by number of meals per week that were not prepared at a home
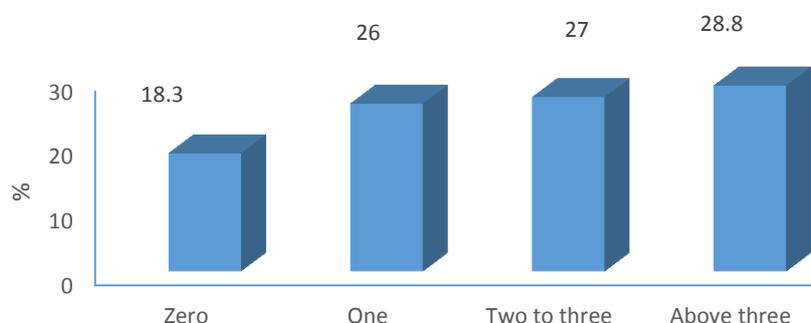
4.1.4.1 Daily consumption of food groups

Table (4.11): Daily average servings number consumption of food groups

Foods	Mean daily intake	Recommended Standard
Vegetables	1.12	3-5
Fruits	1.75	2-4
Milk	1.7	2-3
Carbohydrates	4.0	6-11
Proteins	1.59	2-3
Fats and Fried food	4.88	1
Caffeinated drinks	2.57	1
Sweets	3.13	1

The daily average of serving's number consumption of food groups were presented in **Table (4.11)**. As clearly appeared in **Table (4.11)**, the study participants consumed daily servings of vegetables, fruits, milk products, carbohydrates and protein less than the recommended servings of each food group per day. **Table (4.11)** reveals that vegetables consumed by the study participants with average of only 1.12 servings per day. As well, fruits consumed by the study participants with average of only 1.75 servings per day. Moreover, milk and milk products consumed by the study participants with average of only 1.7 servings per day. Furthermore, carbohydrates consumed by the study participants with

average of only 4 servings per day. Protein consumed by the study participants with average of only 1.59 servings per day.

On the other hand, the study participants consume daily servings of fats and sweets more than the recommended servings of each food group per day. As shown in **Table (4.11)**, findings showed that the study participants consume fats and fried food with average of 4.88 servings per day, Caffeinated drinks with average of 2.57 servings per day and sweets with average of 3.13 servings per day.

4.1.5 Psychological characteristics

4.1.5.1 Emotions and stress characteristics

The findings in **Table (4.12)** showed that 51.3% of the study participants indicated that happiness and peace of mind could not reached by eating. While, 38.3% of the study participants eat to reach happiness and peace of mind. A total of 10.5% of the participants were neutral. The mean percentage was 55.2%.

Regarding overeating when feeling stressed, 55.5% of the participants indicated that stress could not cause overeating. While, 37.8% of the participants indicated that they eat to cope with stress. About 7% of the participants were neutral. The mean percentage was 54.6%.

Regarding eating when feeling sad, 59.1% of the participants indicated that they do not cope with sadness by overeating, while, 36% of the study participants overeat while feeling sad. A total of 5% of the participants were neutral. The mean percentage was 52.6%.

Regarding eating when feeling anxious, 57.3% of the participants indicated that they do not cope with anxiety by overeating, while, 35.5% of the study participants overeat while feeling anxious. A total of 7.3% of the participants were neutral. The mean percentage was 53%.

Additionally, 58.3% of the participants indicated that they do not eat while feeling frustrated, while, 37% of the participants indicated that they eat while feeling frustrated. A total of 4.8% of the participants were neutral. The mean percentage was 53%.

With regard to eating when feeling angry, 58.3% of the participants indicated that they do not eat while feeling angry, while, 36.3% of the participants indicated that they eat while feeling angry. A total of 5.5% of the participants were neutral. The mean percentage was 52.8%.

Regarding eating when feeling lonely, 53.5% of the participants indicated that they do not eat while feeling lonely, while, 40.5% of the participants indicated that they eat while feeling lonely. A total of 6% of the participants were neutral. The mean percentage was 56.2%.

Concerning eating to avoid dealing with problems, 59% of the participants indicated that overeating could not avoid dealing with problems, while, 37.3% of the participants indicated that they eat to avoid dealing with problems. About 4% of the participants were neutral. The mean percentage was 54%.

Regarding overeating when socializing, 47% of the participants indicated that socializing do not affect their eating, while, 41.3% of the participants indicated that they overeat when they socialized. A total of 11.8% of the participants were neutral. The mean percentage was 61.2%.

Table (4.12): Participants eating habits and emotions and stress

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	W. Mean %
Eat to find happiness and peace of mind							
N	104	101	42	95	58	2.8	55.2
%	26.0	25.3	10.5	23.8	14.5		
Overeating when stressed							
N	90	132	27	97	54	2.7	54.6
%	22.5	33.0	6.8	24.3	13.5		
Eating when feeling sad							
N	99	137	20	102	42	2.6	52.6
%	24.8	34.3	5.0	25.5	10.5		
Eating when anxious							
N	103	126	29	94	48	2.7	53.0
%	25.8	31.5	7.3	23.5	12.0		
Eat when frustrated							
N	102	131	19	102	46	2.7	53.0
%	25.5	32.8	4.8	25.5	11.5		
Eat when feeling angry							
N	93	140	22	108	37	2.6	52.8
%	23.3	35.0	5.5	27.0	9.3		
Eating while feeling alone							
N	88	126	24	98	64	2.8	56.2
%	22.0	31.5	6.0	24.5	16.0		
Eating to avoid dealing with problems							
N	114	122	15	68	81	2.7	54.0
%	28.5	30.5	3.8	17.0	20.3		
Overeating in social events							
N	80	108	47	39	126	3.1	61.2
%	20.0	27.0	11.8	9.8	31.5		
Hard to stop eating when I am full							
N	161	89	70	50	30	2.3	45.0
%	40.3	22.3	17.5	12.5	7.5		
Feel upset and depressed after eating							
N	105	96	50	78	71	2.8	55.8
%	26.3	24	12.5	19.5	17.8		

As shown in the **Table (4.12)**, 62.6% of the participants indicated that it was easy to stop eating when feeling full, while, 20% of the participants indicated was hard for them to stop

eating when feeling full. A total of 17.5% of the participants were neutral. The mean percentage was 45%.

Regarding feeling upset and depressed after eating, 50.3% of the participants indicated that they do not feel upset and depressed after eating, while, 37.3% of the participants indicated that they feel upset and depressed after eating. A total of 12.5% of the participants were neutral. The mean percentage was 55.8%.

4.1.6 Socio cultural characteristics

4.1.6.1 Body image characteristics

By asking the study participants if they are satisfied with their physical look, the findings of study have revealed that more than two-third of the study participants (62%) were satisfied with their physical look, and the rest of the study participants (38%) were not .

By asking the study participants, how do they perceive themselves, **Table (4.13)** shows that more than one-half of the study participants (52.5%) perceived themselves as having normal weight. On the other hand, 28% of the study participants perceived themselves as overweight. Furthermore, some of 9.8% perceived themselves as obese. Finally, (9.8%) of the study participants perceived themselves as underweight.

Regarding the parents' perception about the weight of their offspring' from students' point of view, 46.5% of the participants' parents consider their offspring' as having normal weight, while about 27.3% of their parents consider their offspring' as overweight. Furthermore, 16% of the participants' parents consider their offspring as underweight. Finally, a total of 10.3% of the participants' parents consider them as obese.

Concerning the peers' perception about the weight of their friends (students), from the study participants point of view, about one-half of the study participants (51.3%) think that their peers consider them as normal weight. Moreover, 25.3% of the study participants

think their peers consider them as overweight. While, 15.3% of the study participants think that, their peers consider them as underweight. Finally, and unexpectedly, only 8.3% of the study sample think that their peers consider them as obese.

Table (4.13): Summary of some characteristics concern about body image of study participants

Body Image	Number	%
Satisfied with physical look		
Yes	248	62.0
No	152	38.0
Total	**400**	**100.0**
Perceiving self as		
Under weight	39	9.8
Normal weight	210	52.5
Over weight	112	28.0
Obese	39	9.8
Total	**400**	**100.0**
Parents consider you As		
Under weight	64	16.0
Normal weight	186	46.5
Over weight	109	27.3
Obese	41	10.3
Total	**400**	**100.0**
Peers consider you		
Under weight	61	15.3
Normal weight	205	51.3
Over weight	101	25.3
Obese	33	8.3
Total	**400**	**100.0**

4.1.6.2 Selected sociocultural characteristics

By asking the study participants if they think that there was a social pressure on them to be thinner, **Table (4.14)** shows that about 47% of the study participants disagreed that there was a social pressure on them to be thinner. On the other hand, about 43.2% agreed that there was a social pressure on them to be thinner. Finally, 9.8 % of the participants were neutral.

Table (4.14): Summary of some sociocultural habits of study participants

Sociocultural habits	Number	%
Do you think there is a social pressure to be thinner		
Agree	173	43.2
Neutral	39	9.8
Disagree	188	47.0
Total	**400**	**100.0**
Share eating with		
Alone	32	8.0
With family	168	42.0
With peers	200	50.0
Total	**400**	**100.0**
Prefer eating your fast food		
Do not eat	78	19.5
Home	27	6.8
University-cafeteria	131	32.8
Restaurant	87	21.8
Home, university, restaurant	77	19.3
Total	**400**	**100.0**

Table (4.14) illustrates that about half of the study participants (50%) were eating more often with their peers. Moreover, 42% of the participants were eating more often with their families. While, a total of 8% of them were eating alone.

By asking the study participants, whether they prefer to eat fast food, as shown in **Table (4.14)**, more than one-third (32.8%) of the study participants preferred eating fast food at the university cafeteria, while, 21.8% of the students preferred eating at restaurants that serve fast food. A total of 6.8% of the students preferred eating fast food at home. While, 19.3% of the study sample preferred to eat fast food at any place that have fast food.

4.1.7 Medical characteristics

Table (4.15) shows the selected medical characteristics of the study participants.

Regarding the childhood BMI, **Table (4.15)** illustrates that more than one-half of the study participants (52%) had a normal weight during the childhood period. Furthermore, about one-quarter of the study participants (25.2%) were underweight during the childhood

period.   While, 19.3% of the study participants were overweight during childhood. Moreover, 3.5% of the participants were obese during childhood.

Table (4.15): Summary of the medical profile of study participants

Medical profile	Number	%
Childhood BMI		
Under weight	101	25.2
Normal weight	208	52.0
Over weight	77	19.3
Obese	14	3.5
Total	**400**	**100.0**
Parents obesity		
Neither	287	71.8
Both	36	9.0
Father	24	6.0
Mother	53	13.3
Total	**400**	**100.0**
Have brothers or sisters overweight and/or obese		
Yes	110	27.5
No	290	72.5
Total	**400**	**100.0**

Concerning the parent's obesity, **Table (4.15)** shows that about two-thirds of the study participants (71.8%) parents were not obese. While, 13.3% of the study participants only mothers that were obese. Moreover, some of 6% of the participants only fathers that were obese. Finally, 9% of the participants' parents were not obese.

With regard to brothers' and sisters' obesity, **Table (4.15)** shows that about more than two-thirds of the study participants' siblings (72.5%) did not suffer from overweight or obesity, while, 27.5% of the study participants' siblings were overweight or obese.

4.2 Inferential analysis

4.2.1 Socio-economic factors

Table (4.16): Relationship between selected socio-economic characteristics of study participants and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Age												
18 Years old	6	7.6	42	53.1	13	16.5	18	22.8	79	100		
19 Years old	4	3.2	77	61.1	21	16.7	24	19.0	126	100		
20 Years old	9	9.2	48	49.0	23	23.4	18	18.4	98	100	9.7	0.370
Between 20 and 24 years	10	10.3	46	47.4	18	18.6	23	23.7	97	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Gender												
Male	5	2.5	123	61.5	30	15	42	21	200	100		
Female	24	12	90	45	45	22.5	41	20.5	200	100	20.5	0.00
Total	**29**	**7.2**	**123**	**53.2**	**75**	**18.8**	**83**	**20.8**	**400**	**100**		
Marital Status												
Never Married, single	29	7.7	197	52.1	72	19.0	80	21.2	378	100		
Married	0	0.0	15	72.8	3	13.6	3	13.6	22	100	1.4	0.237
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Studying Years												
First year	5	5.5	50	54.3	17	18.5	20	21.7	92	100		
Second year	5	4.0	74	59.2	23	18.4	23	18.4	125	100		
Third year	9	9.7	46	50.0	19	20.7	18	19.6	92	100	21.7	0.040
Fourth and fifth year	10	11	43	47.2	16	17.6	22	24.2	91	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Number of Family members												
6 members and less	1	6.6	64	52.9	24	19.8	25	20.7	121	100		
From 7 to 9 members	17	8.1	115	54.8	36	17.1	42	20.0	210	100	1.7	0.943
10 members and above	4	5.8	34	49.3	15	21.7	16	23.2	69	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Monthly family income												
1800 ILS and less	10	11.0	48	52.7	19	20.9	14	15.4	91	100		
From 1801 to 2100 ILS	10	11.0	56	61.5	13	14.3	12	13.2	91	100		
From 2101 to 3990 ILS	4	4.3	43	45.7	22	23.4	25	26.6	94	100	17.9	0.036
>/=4000 ILS	5	4.0	66	53.2	21	16.9	32	25.9	124	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		

- P value < 0.05–is statistically significant

Table (4.16) reveals that the prevalence of overweight was higher among female participants (22.5%) compared to male participants (15%). In contrary, the prevalence of obesity was higher among male participants (21%) compared to female participants

(20.5%). It is interesting to mention that the prevalence of underweight was higher among female participants (12.0%) compared to male participants (2.5%). As shown in the **Table (4.16)**, there was a high statistically significant relationship between gender and categories of BMI with (X^2=20.5, P=0.000).

Regarding the relationship between studying year and categories of BMI, as shown in **Table (4.16)**, the highest prevalence rates (41.8%) of overweight and obesity were reported among study participants who were in the fourth or fifth year of their studying. While, 40.3% of the study participants who were in the third year of their studying were overweight or obese. About 40% of the study participants who were in the first year of their studying were overweight or obese. The lowest prevalence of both overweight and obesity (36.8%) was noticed among study participants who were in the second year of their studying. The above differences were statistically significant with (X^2=21.7, P=0.040).

As clearly evident in **Table (4.16),** the highest prevalence of both overweight and obesity (50%) was reported among study participants who come from families with average monthly income ranges from 2101ILS to 3990ILS. A total of 42.8% of the study participants who come from families with an income of equal to or more than 4000ILS were either obese or overweight. **Table (4.16)** shows that relationship between monthly family income and categories of BMI was statistically significant with (X^2=17.9, P=0.036), as the percentage of students who were obese and overweight increases by increasing their families' income. All the other variables in **Table (4.16)** were statistically not significant.

4.2.2 Life style variables

4.2.2.1 Physical activity and smoking

Table (4.17): Relationship between selected life style variables and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Physical activity												
High	1	2.9	32	91.4	0	0.0	2	5.7	35	100		
Moderate	9	8.7	79	76.7	7	6.8	8	7.8	103	100	75.8*	0.000
Low	19	7.3	102	38.9	63	26.0	73	27.8	262	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Cigarette smoking												
Yes	0	0.0	32	65.3	6	12.2	11	22.5	49	100		
No	29	8.3	181	51.6	69	19.7	72	20.5	351	100	6.9*	0.075
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Water pipe smoking												
Yes	0	0.0	46	60.5	13	17.1	17	22.4	76	100		
No	29	9.0	167	51.5	62	19.1	66	20.4	324	100	7.4*	0.045
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		

* Fisher chi-square

* P value < 0.05–is statistically significant

Findings of Fisher Chi-Square test show a high significant relationship between physical activity and categories of BMI. The relationship was highly statistically significant with (X^2=75.8, P=0.000). The highest prevalence of overweight and obesity (53.8%) was among study participants who had low physical activity level. In contrast, 14.6% of the study participants who had moderate physical activity level were either overweight or obese. Finally, the lowest prevalence of overweight and obesity (5.7%) was reported among study participants who had high physical activity level.

With regard to water pipe smoking and its relationship with categories of BMI, as shown in **Table (4.17)**, there was a statistically significant relationship between water-pipe smoking and categories of BMI with (X^2=7.4, P=0.045). The prevalence of overweight and obesity was equal among study participants who smoke water pipe compared and study participants do not smoke water pipe. Interestingly, students who smoke water pipe tend to

be normal weight, as shown in **Table (4.17)**. All the other variables in **Table (4.17)** were statistically not significant.

4.2.2.2 Sleeping pattern

Table (4.18): Relationship between sleeping pattern of study participants and categories of BMI

Sleeping pattern	BMI	N	Mean	Std	F	Sig.
Average number of sleeping hours at night	Underweight	29	6.72	1.645	22.594	0.000
	Normal	213	7.59	1.775		
	Overweight	75	6.36	2.084		
	Obese	83	5.77	1.823		
	Total	**400**	**6.92**	**1.981**		
Average number of sleeping hours at the day time	Underweight	29	1.59	1.500	12.883	0.000
	Normal	212	1.21	1.481		
	Overweight	75	1.96	1.555		
	Obese	83	2.33	1.458		
	Total	**399**	**1.61**	**1.557**		

* P value < 0.05–is statistically significant

Regarding the average of daily number of sleeping hours at night and its relationship with categories of BMI, **Table (4.18)** shows a high statistical significant relationship between the average of daily number of sleeping hours at night and categories of BMI, with (F=22.594, P=0.000). One–way ANOVA reveals that overweight and obese groups had the lowest mean scores of sleeping hours at night with 6.36 hours and 5.77 hours, respectively. Bonferroni Post-Hoc test has revealed that the average number of daily sleeping hours at night was higher by 1.8 hours among students with normal body weight compared to obese students. The difference was statistically significant, statistics are not shown.

Concerning the average of daily number of sleeping hours at the daytime and its relationship with of categories BMI, **Table (4.18)** shows a high statistical significant relationship between the average of daily number of sleeping hours at the daytime and categories of BMI, with (F=12.883, P=0.000). ANOVA test shows that overweight and

obese groups had the highest mean scores of sleeping hours at the daytime with 1.96 hours and 2.33 hours, respectively. Bonferroni Post-Hoc test has revealed that the average of daily number of sleeping hours at the daytime was lower by 1.1 hours among students with normal body weight compared to obese students. The difference was statistically significant, statistics are not shown.

4.2.2.3 Sedentary behaviors

Table (4.19): Relationship between selected sedentary behaviors of study participants and categories of BMI

Sedentary behavior	BMI	N	Mean	Std	F	Sig.
Daily average time spend sitting or reclining	Underweight	29	4.72	1.944		
	Normal	213	3.77	2.002		
	Overweight	75	5.68	3.037	29.926	0.000
	Obese	83	6.37	2.507		
	Total	**400**	**4.74**	**2.573**		
Daily average time of studying hours	Underweight	29	2.62	1.522		
	Normal	213	2.00	1.268		
	Overweight	75	2.47	1.408	4.459	0.004
	Obese	83	2.46	1.355		
	Total	**400**	**2.23**	**1.350**		
Daily average time of watching TV hours	Underweight	29	1.38	1.265		
	Normal	212	1.11	1.094		
	Overweight	75	1.48	1.369	4.658	0.03
	Obese	83	1.67	1.499		
	Total	**399**	**1.32**	**1.270**		
Daily average of hours using social media	Underweight	28	3.43	2.044		
	Normal	201	3.32	1.679		
	Overweight	69	4.26	2.133	7.190	0.000
	Obese	81	4.31	2.354		
	Total	**379**	**3.71**	**2.000**		
Daily average of hours playing games on smart phone or computer	Underweight	5	1.40	.548		
	Normal	29	1.69	1.039		
	Overweight	12	1.63	1.464	1.320	0.277
	Obese	13	1.04	.320		
	Total	**59**	**1.51**	**1.019**		

* P value < 0.05–is statistically significant

Regarding daily average time of spend sitting or reclining and its relationship with BMI categories, as shown in the **Table (4.19),** there was a high statistical significant relationship

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between daily average time of spend sitting or reclining and categories of BMI, with (F=29.926, P=0.000). ANOVA reveals that overweight and obese groups had the highest mean scores of average time spent while sitting or reclining, with 5.68 and 6.37 hours per day, respectively. Bonferroni Post-Hoc test has revealed that the average number of daily sitting or reclining hours was higher by 2.6 hours among obese students compared to normal body weight. The difference was statistically significant, statistics are not shown. Concerning the daily average number of studying hours and its relationship with BMI categories, **Table (4.19)** shows a statistical significant relationship between daily average number of studying hours and BMI categories, with (F=4.459, P=0.004). ANOVA test shows that underweight groups had the highest mean scores of studying hours per day (2.62 hours). Overweight and obese groups mean scores of studying hours per day were 2.47 hours and 2.46 hours, respectively. Bonferroni Post-Hoc test has revealed that the daily average number of studying hours was lower by 0.453 hours among students with normal body weight compared to obese students. The difference was statistically significant, statistics are not shown.

Concerning the daily average number of watching TV hours and its relationship with BMI categories, **Table (4.19)** shows a statistical significant relationship between daily average number of watching TV hours and categories of BMI, with (F=4.658, P=0.003). ANOVA test shows that overweight and obese groups had the highest mean scores of watching TV hours per day1.48 and 1.67, respectively. Bonferroni Post-Hoc test has revealed that the daily average number of watching TV hours was lower by 0.566 hours among students with normal body weight compared to obese students. The difference was statistically significant, statistics are not shown.

Regarding the daily average number of hours using social media and its relationship with BMI categories, **Table (4.19)** reveals a high statistical significant relationship between

daily average number of using social media hours and categories of BMI, with (F=7.190, P=0.000). ANOVA test shows that the overweight and obese groups had the highest mean scores of using social media per day 4.26 and 4.31, respectively. Bonferroni Post-Hoc test has revealed that the daily average number of using social media hours was lower by 0.985 hours among students with normal body weight compared to obese study participants. The difference was statistically significant, statistics are not shown. All the other variables in **Table (4.19)** were statistically not significant.

Table (4.20): Relationship between studying and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Study position												
Moving from place to place	15	8.3	141	78.3	15	8.4	9	5.0	180	**100**		
Sitting on the desk	7	6.3	47	42.0	26	23.2	32	28.5	112	**100**	105.7	0.000
Sitting in the bed	7	6.5	25	23.1	34	31.5	42	38.9	108	**100**		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**400**	**100**		
Eat while study												
Always	5	4.1	28	23.0	32	26.2	57	46.7	122	**100**		
Sometimes	13	9.6	77	57.0	25	18.5	20	14.9	135	**100**	102.1	0.000
Never	11	7.9	104	74.8	18	12.9	6	4.4	139	**100**		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.8**	**83**	**20.6**	**396**	**100**		
Types of food eaten while study (Always and Sometimes)												
Fruits and vegetables	3	6.7	20	44.4	9	20.0	13	28.9	**45**	**100**	0.5	0.898
Pop corn	1	4.6	5	22.7	12	54.5	4	18.2	**22**	**100**	15.5	0.001
Chips and snacks	8	5.2	29	18.8	46	29.9	71	46.1	**154**	**100**	88.3	0.000
Nuts	7	12.1	16	27.6	15	25.9	20	34.4	**58**	**100**	6.2	0.101
Hot drinks	8	5.0	76	47.5	27	16.9	49	30.6	**160**	**100**	15.8	0.001
Soda Drinks	4	4.8	18	21.4	21	25.0	41	48.8	**84**	**100**	23.7	0.001

* P value < 0.05–is statistically significant

Concerning the studying position and its relationship with BMI categories, **Table (4.20)** shows that there was a high statistical significant relationship between studying position and categories of BMI with (X^2=105.7, P=0.000). The highest prevalence (70.4%) of overweight and obesity was among study participants who were studying while sitting in the bed. Moreover, 51.7% of the study participants who were studying while sitting on the studying desk were overweight or obese. Finally, the lowest prevalence (13.4%) of

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overweight and obesity was among study participants who were moving from place to place.

Regarding eating while studying and its relationship with BMI categories, as illustrated in **Table (4.20)**, there was a high statistical significant relationship between eating while studying and categories of BMI with (X^2=102.1, P=0.000). The prevalence of overweight and obesity was higher among study participants who always (72.9%) and sometimes (33.4%) eat during studying, compared with who never (17.3%) eating while studying.

As shown in **Table (4.20)**, there is a high statistical significant relationship between eating popcorn while studying and BMI categories with (X^2=15.5, P=0.046). The table also revealed, a high statistical significant relationship between having Soda drinks and hot drinks with sugar while studying and BMI categories with (X^2=23.7, P=0.001), (X^2=15.8, P=0.001) respectively. Moreover, there is a high statistical significant relationship between eating chips and snacks while studying and BMI categories with (X^2=88.3, P=0.000). All other variables in **Table (4.20)** were statistically not significant.

Regarding the habit of eating while watching TV and its relationship with BMI categories, as shown in the **Table (4.21)**, there was a high statistical significant relationship between eating while watching TV and categories of BMI, with (X^2=55.8, P=0.001). The highest prevalence (72.4%) of overweight and obesity was among study participants who always eat while watching TV followed by 46.2% of the study participants who sometimes eat while watching TV. The lowest prevalence (16.1%) of overweight and obesity was among study participants who never eaten while watching TV.

Concerning the types of food eaten while watching TV and its relationship with BMI categories, as shown in **Table (4.21)**, there was a high statistical significant relationship between eating chips and snacks while watching TV and categories of BMI with (X^2=52.4, P=0.001). The table also revealed a statistical significant relationship between having

Soda drinks and hot drinks with sugar while watching TV and BMI categories with (X^2=9.3, P=0.0), (X^2=1.8, P=0.008) respectively.

Regarding eating while using social media and its relationship with BMI categories, as shown in the **Table (4.21)**, there was a high statistical significant relationship between eating while using social media and categories of BMI with (X^2=88.2, P=0.000). The highest prevalence (77.4%) of overweight and obesity was among study participants who always eat while using social media, followed by 52.5% of the study participants who sometimes eat while using social media. The lowest prevalence (19.1%) of overweight and obesity was among study participants who never been eaten while using social media. As shown in **Table (4.21)**, there is a high statistical significant relationship between eating chips and snacks while using social media and BMI categories with (X^2=21.6, P=0.001). ll other variables in **Table (4.21)** were statistically not significant.

Table (4.21): Relationship between watching TV, using social media and playing video games and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Eating while watching TV												
Always	6	10.3	10	17.3	17	29.3	25	43.1	58	100		
Sometimes	5	5.1	58	48.7	25	21.0	30	25.2	119	100	55.8	0.001
Never	8	9.2	65	74.7	11	12.6	3	3.5	87	100		
Total	**20**	**7.6**	**133**	**50.4**	**53**	**20.0**	**58**	**22.0**	**264**	**100**		
Types of food eaten while watching TV (Always and Sometimes)												
Fruits and vegetables	2	6.6	11	36.7	6	20.0	11	36.7	30	100	0.4	0.935
Pop corn	0	0.0	9	45.0	4	20.0	7	35.0	20	100	1.8*	0.593
Chips and snacks	4	4.0	18	18.2	32	32.3	45	45.5	99	100	52.4	0.001
Nuts	3	5.7	21	39.6	12	22.6	17	32.1	53	100	0.1	0.987
Hot drinks	3	3.8	41	51.3	13	16.3	23	28.6	80	100	11.8	0.008
Soda Drinks	2	4.3	10	21.7	13	28.3	21	45.7	46	100	9.3	0.025
Eat while using social media												
Always	2	3.2	12	19.4	20	32.2	28	45.2	62	100		
Sometimes	11	9.0	47	38.5	25	20.5	39	32.0	122	100	88.2	0.000
Never	15	7.7	142	73.2	24	12.4	13	6.7	194	100		
Total	**28**	**7.4**	**201**	**53.2**	**69**	**18.3**	**80**	**21.1**	**378**	**100**		
Types of food eaten while using social media (Always and Sometimes)												
Fruits and vegetables	2	6.7	13	43.3	7	23.3	8	26.7	30	100	3.3	0.347
Pop corn	0	0.0	47	42.3	25	22.5	39	35.2	111	100	1.5*	0.546
Chips and snacks	7	5.6	26	21.1	33	26.8	57	46.3	123	100	21.6	0.001
Nuts	4	7.8	18	35.3	13	25.5	16	31.4	51	100	1.7	0.636
Hot drinks	6	6.1	36	36.7	21	21.5	35	35.7	98	100	3.9	0.263
Soda Drinks	3	4.5	17	25.8	19	28.8	27	40.9	66	100	3.0	0.391
Play video games on smart phone or computer												
Always	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
Sometimes	2	33.3	2	33.3	1	16.7	1	16.7	6	100	5.3	0.148
Never	3	5.7	27	50.9	11	20.8	12	22.6	53	100		
Total	**5**	**8.5**	**29**	**49.2**	**12**	**20.3**	**13**	**22.0**	**59**	**100**		

 * Fisher chi-square

 P value < 0.05–is statistically significant

4.2.3 Dietary habits

4.2.3.1 Skipping breakfast

Table (4.22): Relationship between skipping breakfast and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Have breakfast daily												
Always	16	7.1	159	70.7	28	12.4	22	9.8	225	**100**		
Sometimes	11	9.2	40	33.6	31	26.1	37	31.1	119	**100**	74.9	0.000
Never	2	3.6	14	25.0	16	28.6	24	42.8	56	**100**		
Total	**29**	**7.3**	**213**	**53.2**	**75**	**18.8**	**83**	**20.7**	**400**	**100**		
Place of having breakfast												
At home	18	8.5	168	79.6	15	7.2	10	4.7	211	**100**	126.1	0.000
At university	9	6.8	31	23.3	44	33.1	49	36.8	133	**100**		
Total	**29**	**7.3**	**213**	**53.2**	**75**	**18.8**	**83**	**20.7**	**344**	**100**		

* P value < 0.05–is statistically significant

Regarding having breakfast, as shown in **Table (4.22)**, the highest prevalence of overweight and obesity (71.4%) was reported among study participants who never had breakfast, followed by 57.1% of the study participants who sometimes had breakfast. While, the lowest prevalence of overweight and obesity (22.2%) was reported among study participants who always had breakfast.

Findings of Chi-Square test revealed a significant relationship between having breakfast and BMI categories. The relationship was highly statistically significant with (X^2=74.9, P=0.000).

With regard to the place of having breakfast, the prevalence of overweight and obesity was greatly higher among study participants who had breakfast at university (69.9%), compared to 11.9% of the study participants who had breakfast at home. As shown in the **Table (4.22)**, there was a high statistically significant relationship between the place of having breakfast and obesity with (X^2=126.1, P=0.000).

4.2.3.2 Meals pattern

Concerning to the daily number of meals taken by the study participants, as shown in the **Table (4.23)**, there was a high statistically significant relationship between daily meals number of meals and BMI categories with (X^2=86.1, P=0.000). The highest prevalence (75%) of overweight and obesity was among the study participants who take only one meal per day. While, 65.5% of the study participants take two meals per day were overweight or obese, followed by 23.7% of the study participants who take three meals per day were overweight or obese. Finally, the lowest prevalence (18.2%) of overweight and obesity was among the study participants who take more than three meals per day.

Regarding regularly skipping meals and its relationship with BMI categories, as clearly appeared from **Table (4.23),** there was a high statistically significant relationship between regularly skipping meals and BMI categories with (X^2=74.9, P=0.000). The prevalence of overweight and obesity was greatly higher among study participants regularly skip meals (59.4%), compared to 20.3% of the study participants do not skip meals regularly.

With regard to the main meal that participants skip and its relationship with BMI categories, as shown in the **Table (4.23)**, there was a high statistically significant relationship between the main meal that participant skip and BMI categories with (X^2=32.5, P=0.000). The highest prevalence (74.6%) of overweight and obesity was among study participants used to skip breakfast, followed by 58.3% of the study participants used to skip lunch were overweight or obese. Finally, the lowest prevalence (34.7%) of overweight and obesity was among study participants used to skip dinner. The other variables in **Table (4.23)** were statistically not significant.

Table (4.23): Relationship between meals pattern and BMI categories of study participants

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Number of meals per day												
One meal	0	0.0	2	25.0	4	50.0	2	25.0	8	100		
Twice	11	7.3	41	27.2	48	31.8	51	33.7	151	100		
Three	12	7.9	104	68.4	15	9.9	21	13.8	152	100	86.1*	0.000
More than three	6	6.8	66	75.0	7	8.0	9	10.2	88	100		
Total	**29**	**7.3**	**213**	**53.4**	**74**	**18.5**	**83**	**20.8**	**399**	**100**		
Skip meal regularly												
Yes	18	9.1	62	31.5	54	27.4	63	32.0	197	100		
No	11	5.4	150	74.3	21	10.4	20	9.9	202	100	74.9*	0.000
Total	**29**	**7.3**	**212**	**53.1**	**74**	**18.8**	**83**	**20.8**	**399**	**100**		
The main meal skipped												
Breakfast	7	5.9	23	19.5	38	32.2	50	42.4	118	100		
Lunch	0	0.0	5	41.7	3	25.0	4	33.3	12	100	32.5*	0.000
Dinner	11	15.3	36	50.0	15	20.8	10	13.9	72	100		
Total	**18**	**8.9**	**64**	**31.7**	**56**	**27.7**	**64**	**31.7**	**202**	**100**		
What is the reason for not having this meal												
Do not have a time	4	6.1	16	24.2	22	33.3	24	36.4	66	100		
Diet	2	14.3	4	28.6	3	21.4	5	35.7	14	100		
Loss of appetite	6	16.2	16	43.2	11	29.7	4	10.9	37	100	16.1*	0.272
Not a habit	6	7.3	27	32.9	19	23.2	30	36.6	82	100		
Other	0	0.0	1	33.3	1	33.3	1	33.4	3	100		
Total	**18**	**8.9**	**64**	**31.7**	**56**	**27.7**	**64**	**31.7**	**202**	**100**		

* Fisher chi-square

* P value < 0.05–is statistically significant

4.2.3.3 Snacking

Concerning snacking between breakfast and lunch and its relationship with BMI categories, as shown in **Table (4.24)**, the highest prevalence (72.4%) of overweight and obesity was among study participants who always had snacks between breakfast and lunch. While, 35% of the study participants sometimes had snack between breakfast and lunch were overweight or obese. Finally, the lowest prevalence (15.4%) of overweight and obesity was among study participants who never had snacks between breakfast and lunch. The differences were statistically significant, with (X^2=107.0, P=0.000).

Concerning late-night snacks and its relationship with BMI categories, **Table (4.24)** reveals that there was a high statistical significant relationship between mid-night snaking and BMI categories with (X^2=164.7, P=0.000). The highest prevalence (82.9%) of overweight and obesity was among study participants who always had late-night snacks, followed by 39.7% of the study participants who sometimes had late-night snacks were overweight or obese. Finally, the lowest prevalence (13.4%) of overweight and obesity was among study participants who never had late-night snacks.

Table (4.24): Relationship between snacking and categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Taking snack between breakfast and lunch												
Never	14	9.3	113	75.3	15	10.0	8	5.4	150	100		
Sometimes	7	5.7	73	59.3	25	20.3	18	14.7	123	100	107.0	0.000
Always	8	6.3	27	21.3	35	27.6	57	44.8	127	100		
Total	**29**	**7.3**	**213**	**53.4**	**74**	**18.5**	**83**	**20.8**	**400**	**100**		
Eating late-night snacks												
Never	16	8.2	152	78.4	16	8.2	10	5.2	194	100		
Sometimes	7	8.0	46	52.3	23	26.1	12	13.6	88	100	164.7	0.000
Always	6	5.1	14	12.0	36	30.8	61	52.1	117	100		
Total	**29**	**7.3**	**212**	**53.1**	**75**	**18.8**	**83**	**20.8**	**399**	**100**		

* P value < 0.05–is statistically significant

4.2.3.4 Having fast food and the related sociocultural factors

Table (4.25) illustrates that there was a high statistical significant relationship between having junk food like burger and pizza and BMI categories with (X^2=135.6, P=0.000). The highest prevalence (78.3%) of overweight and obesity was among study participants who always ate junk food. While, 25.3% of study participants sometimes ate junk food were overweight or obese. Finally, the lowest prevalence (12.9%) of overweight and obesity was among study participants who never had junk food.

Concerning the number of meals per week that were not prepared at a home and its relationship with BMI categories, the highest prevalence (82.6%) of overweight and obesity was among study participants who eat more three meals per week that were not

prepared at home. Followed by, 36.1% of the study participants who eat two to three meals per week that were not prepared at home were overweight or obese. Moreover, 13.7% of the study participants who never had meals that were not prepared at home were overweight or obese. Finally, the lowest prevalence (13.5%) of overweight and obesity was among study participants who eat one meal per week that was not prepared at home. As shown in the **Table (4.25)**, there was a high statistical significant relationship between number of meals per week that were not prepared at a home and BMI categories with $(X^2=184.7, P=0.000)$.

Regarding the place of preference of eating fast food and its relationship with BMI categories, as shown in the **Table (4.25)**, there was a high statistical significant relationship between place of eating fast food and BMI categories with $(X^2=107.4, P=0.001)$. The highest prevalence (68.7%) of overweight and obesity was among participants who preferred eating fast food at university, while the lowest prevalence (8.9%) of overweight and obesity was among participants who did not eat fast food.

According with whom participants eat much and its relationship with categories of BMI, as shown in **Table (4.25)**, the highest prevalence (58.5%) of overweight and obesity was among study participants who eat much with peers. Followed by 37.5% of the study participants who eat much alone were overweight or obese. While, the lowest prevalence (17.3%) of overweight and obesity was among study participants who eat much with family. The above differences were statistically significant with $(X^2=69.7, P=0.001)$.

Table (4.25): Relationship of having fast food and the related sociocultural factors

with the categories of BMI

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Eating Junk food like burger and pizza												
Never	7	7.5	74	79.6	7	7.5	5	5.4	93	100		
Sometimes	14	7.9	119	66.8	28	15.7	17	9.6	178	100	135.6	0.000
Always	8	6.2	20	15.5	40	31.0	61	47.3	129	100		
Total	29	7.3	213	53.3	75	18.7	83	20.7	400	100		
Average number of meals per week that were not prepared at a home												
Zero	4	5.5	59	80.8	8	11.0	2	2.7	73	100		
One	12	11.5	78	75.0	10	9.6	4	3.9	104	100		
Two to three	10	9.3	59	54.6	17	15.7	22	20.4	108	100	184.7	0.000
Above three	3	2.6	17	14.8	40	34.8	55	47.8	115	100		
Total	29	7.3	213	53.3	75	18.7	83	20.7	400	100		
Preference of eating fast food												
Don't eat	8	10.3	63	80.8	5	6.3	2	2.6	78	100		
Home	2	7.4	19	70.4	2	7.4	4	14.8	37	100		
University	8	6.1	33	25.2	43	32.8	47	35.9	131	100		
Restaurant	6	6.9	66	75.9	8	9.2	7	8.0	87	100	107.4	0.001
Home, University, Restaurant	5	6.5	32	41.6	17	22.1	23	29.8	77	100		
Total	29	7.3	213	53.3	75	18.7	83	20.7	400	100		
With whom do you eat much												
Alone	3	9.4	17	53.1	4	12.5	8	25.0	32	100		
With family	12	7.1	127	75.6	16	9.6	13	7.7	168	100	69.7	0.001
With peers	14	7.0	69	34.5	55	27.5	62	31.0	200	100		
Total	29	7.3	213	53.3	75	18.7	83	20.7	400	100		

* P value < 0.05–is statistically significant

4.2.3.5 Daily number of food groups servings

Table (4.26): Relationship between the daily number of food servings and categories of BMI

Question	BMI	N	Mean	Std	F	Sig.
Vegetables	Underweight	29	1.02	0.90		
	Normal	213	1.24	1.19		
	Overweight	75	1.09	1.55	1.845	0.138
	Obese	83	0.87	1.26		
	Total	**400**	**1.12**	**1.27**		
Fruits	Underweight	29	1.84	1.73		
	Normal	213	1.84	1.63		
	Overweight	75	1.80	3.15	0.698	0.554
	Obese	83	1.46	1.99		
	Total	**400**	**1.75**	**2.07**		
Milk	Underweight	29	1.74	1.54		
	Normal	213	1.14	1.04		
	Overweight	75	1.73	2.42	4.005	0.008
	Obese	83	1.51	1.39		
	Total	**400**	**1.37**	**1.51**		
Carbohydrates	Underweight	29	3.39	2.20		
	Normal	213	2.81	1.84		
	Overweight	75	5.31	2.78	45.586	0.000
	Obese	83	5.91	2.98		
	Total	**400**	**3.97**	**2.69**		
Proteins	Underweight	29	1.84	0.94		
	Normal	213	1.50	0.81		
	Overweight	75	1.68	1.10	1.696	0.167
	Obese	83	1.64	0.97		
	Total	**400**	**1.59**	**0.92**		
Fats	Underweight	29	4.66	3.66		
	Normal	213	2.92	3.04		
	Overweight	75	7.26	4.39	48.831	0.000
	Obese	83	7.85	4.39		
	Total	**400**	**4.88**	**4.28**		
Caffeinated drinks	Underweight	29	2.31	2.14		
	Normal	213	2.65	1.89		
	Overweight	75	2.75	1.90	1.219	0.303
	Obese	83	2.28	1.67		
	Total	**400**	**2.57**	**1.87**		
Sweets	Underweight	29	3.67	3.62		
	Normal	213	2.25	2.22		
	Overweight	75	4.16	2.76	17.975	0.000
	Obese	83	4.28	2.91		
	Total	**400**	**3.13**	**2.76**		

* P value < 0.05–is statistically significant

Regarding the daily number of servings from milk products and its relationship with BMI

categories, as shown in the **Table (4.26)**, there was a statistical significance relationship

between daily number of consumed servings from milk products and BMI categories with (F=4.005, P=0.008). Bonferroni Post-Hoc test has revealed that the daily number of servings from milk product was lower by 0.20 servings among obese students compared to students with normal body weight. The difference was statistically significant.

As shown in the **Table (4.26)**, there was a high statistical significant relationship between the number of daily servings from carbohydrates and BMI categories with (F=45.586, P=0.000). ANOVA shows that overweight and obese groups had the highest mean scores of daily servings number consumption of carbohydrates 5.31 and 5.91 respectively. Bonferroni Post-Hoc test has revealed that the daily number of servings consumed from carbohydrates was higher by 0.305 servings among obese students compared to normal body weight students. The difference was statistically significant.

Regarding the daily servings number consumption of fats and fried foods and its relationship with BMI categories, **Table (4.26)** revealed that, unsurprisingly, there was a high statistical significant relationship between daily number of servings consumed from fats and fried foods and BMI categories with (F=48.831, P=0.000). ANOVA shows that overweight and obese students had the highest mean scores of daily number of servings consumed from fats and fried foods with 7.26 and 7.85, respectively. Bonferroni Post-Hoc test has revealed that the daily number of servings consumed of fats was higher by 0.475 servings among obsess students compared to students with normal body weight. The difference was statistically significant.

With regard the daily number of servings consumed from sweets and its relationship with BMI categories, as clearly appeared in the **Table (4.26)**, there was a high statistical significant relationship between daily number of servings consumed from sweets and BMI categories with (F=17.975, P=0.000). Bonferroni Post-Hoc test has revealed that the daily

number of servings consumed from sweets was higher by 0.335 servings among obese students compared to students with normal body weight. The difference was statistically significant. The other variables in **Table (4.26)** were statistically not significant.

4.2.4 Psychological factors

4.2.4.1 Emotions and stress

Table (4.27): Relationship between eating due to emotions and stress and categories of BMI

	BMI	N	Mean	Std	F	Sig.
Eating due to emotions and stress	Underweight	29	55.25	17.7	80.416	0.000
	Normal	213	43.77	13.9		
	Overweight	75	64.82	17.7		
	Obese	83	71.71	15.9		
	Total	**400**	**54.35**	**19.4**		

* P value < 0.05–is statistically significant

Table (4.27) showed a high statistical significance relationship between eating due to emotions and stress and categories of BMI with (F=80.416, P=0.000). One-way ANOVA test revealed that overweight and obese groups had the highest mean scores of 64.82 and 71.71, respectively.

Bonferroni Post-Hoc test has revealed that the mean score was lower by 27.9 among students with normal body weight compared to obese students. The difference was statistically significant, statistics are not shown.

4.2.5 Sociocultural factors

4.2.5.1 Body image

Regarding the participants' satisfaction with their physical look and its relationship with BMI categories, **Table (4.28)** shows that there was a high statistical significant relationship between satisfaction with physical look and categories of BMI with (X^2=154.4, P=0.000). The prevalence of overweight and obesity was higher among study participants who do not

feel satisfied their physical look (77.6%) compared to students who feel satisfied with their physical look (16.1%).

Table (4.28) shows that there was a high statistical significant relationship between participants' perception about themselves and BMI categories with (X^2=354.8, P=0.000).

Table (4.28) shows that 9.5% of the study participants who perceived themselves as normal weight were overweight or obese. As well, about 42% of the study participants who perceived themselves as overweight were obese.

Concerning participant's parent's perception about their physical look and its relationship with BMI categories, **Table (4.28)** revealed that 10.8% of the study participants who their parents perceived them as normal were overweight or obese. Furthermore, 43.1% of the study participants who their parents perceived them as overweight were obese. As shown in the **Table (4.28)**, there was a high statistical significant relationship between participant's parents perception about their physical look and BMI categories with (X^2=371.9, P=0.000).

Table (4.28) illustrated that, 17.6% of the participants who their peers perceived them as normal were either overweight or obese. As well as 45.5% of the participants who their peers perceived them as overweight were obese. As shown in the **Table (4.28)**, there was a high statistical significant relationship between participant's peers perception of their physical look and BMI categories with (X^2=325.5, P=0.000).

Table (4.28): Relationship between body image of the study participants and BM

categories

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Being satisfied with physical look												
Yes	22	8.9	186	75.0	25	10.1	15	6.0	248	**100**		
No	7	4.6	27	17.8	50	32.9	68	44.7	152	**100**	154.4	0.000
Total	**29**	**7.3**	**213**	**53.2**	**75**	**18.8**	**83**	**20.7**	**400**	**100**		
Self-perception												
Under weight	16	41.0	23	59.0	0	0.0	0	0.0	39	**100**		
Normal	13	6.2	177	84.3	15	7.1	5	2.4	210	**100**		
Over weight	0	0	13	11.6	52	46.4	47	42.0	112	**100**	354.8*	0.000
Obese	0	0.0	0	0.0	8	20.5	31	79.5	39	**100**		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.7**	**83**	**20.7**	**400**	**100**		
Parents-perception												
Under weight	22	34.4	42	65.6	0	0.0	0	0.0	64	**100**		
Normal weight	7	3.8	159	85.4	16	8.6	4	2.2	186	**100**		
Over weight	0	0.0	12	11.0	50	45.9	47	43.1	109	**100**	371.9*	0.000
Obese	0	0.0	0	0.0	9	22.0	32	78.0	41	**100**		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.7**	**83**	**20.7**	**400**	**100**		
Peers-perception												
Underweight	22	36.1	39	63.9	0	0.0	0	0.0	61	**100**		
Normal weight	7	3.4	162	79.0	28	13.7	8	3.9	205	**100**		
Over weight	0	0.0	12	11.9	43	42.6	46	45.5	101	**100**	325.5*	0.000
Obese	0	0.0	0	0.0	4	12.1	29	87.9	33	**100**		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.7**	**83**	**20.7**	**400**	**100**		

* Fisher chi-square

* P value < 0.05–is statistically significant

4.2.6 Medical profile

Regarding childhood BMI and its relationship with BMI categories, as shown in **Table (4.29)**, the highest prevalence (78.6%) of overweight and obesity was among study participants who were obese during childhood, followed by, 75.4% of the study participants who were overweight during childhood period were overweight or obese in adulthood. Moreover, 29.8% of the study participants who had normal BMI during childhood were overweight or obese in adulthood. The lowest prevalence (26.7%) of overweight and obesity was among study participants who were underweight during childhood. Findings of Chi-Square test showed a high statically significant relationship

between childhood BMI and BMI categories. The relationship was highly statistically significant with (X^2=70.7, P=0.000).

Table (4.29): Relationship between selected medical profile variables of the study participants and BM categories

	Underweight		Normal		Overweight		Obese		Total		X^2	Sig.
	No.	%	No.	%	No.	%	No.	%	No.	%		
Childhood BMI												
Under weight	8	7.9	66	65.4	16	15.8	11	10.9	101	**100**		
Normal weight	17	8.2	129	62.0	28	13.5	34	16.3	208	100		
Over weight	3	3.9	16	20.7	28	36.4	30	39.0	77	100	70.7	0.000
Obese	1	7.1	2	14.3	3	21.4	8	57.2	14	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.7**	**83**	**20.7**	**400**	**100**		
Parents obesity												
Neither	23	8.0	187	65.2	34	11.8	43	15.0	287	100		
Both	1	2.8	6	16.7	17	47.2	12	33.3	36	100		
Father	1	4.2	6	25.0	9	37.5	8	33.3	24	100	75.4	0.000
Mother	4	7.5	14	26.4	15	28.3	20	37.8	53	100		
Total	**29**	**7.3**	**213**	**53.3**	**75**	**18.7**	**83**	**20.7**	**400**	**100**		
Obesity and overweight among brothers and sisters												
Yes	8	7.3	32	29.1	31	28.2	39	35.4	110	100		
No	21	7.2	181	62.4	44	15.2	44	15.2	290	100	39.6	0.000
Total	29	7.3	213	53.3	75	18.7	83	20.7	**400**	100		

* P value < 0.05–is statistically significant

Regarding parent's obesity and its relationship with BMI categories, **Table (4.29)** revealed that the highest prevalence (80.5%) of overweight and obesity was among study participants who had obese parents, followed by, 70.8% of the study participants who had obese father only were overweight or obese. Moreover, 66.1% of the study participants who had obese mother only were overweight or obese. Finally, the lowest prevalence (26.8%) of overweight and obesity was among study participants who had non-obese parents. Findings of Chi-Square test showed a high statistically significant relationship between parent's obesity and BMI categories. The relationship was highly statistically significant with (X^2=75.4, P=0.000).

With regard to the relationship between brothers' and\or sisters' obesity and BMI categories, as clearly appeared in **Table (4.29)**, there was a high significant relationship between brothers and\or sisters' obesity and obesity BMI categories. The relationship was highly statistically significant with (X^2=39.6, P=0.000). The prevalence of overweight and obesity was higher among study participants who had overweight and\or obese brothers or sisters (63.6%) compared to study participants who do not have overweight or obese brothers and\ or sisters (30.4%).

Chapter 5

Discussion

This cross-sectional study aims at assessing the prevalence of overweight and obesity among university students in the Gaza Strip. It underlines the main determinants of overweight such as sociodemographic factors, physical activity, smoking status, sleeping patterns, sedentary behaviors, dietary habits, body image, overeating as a way of coping with negative emotions, selected sociocultural habits and medical profile. The following discussion summarizes and merges the key findings from the quantitative tools. It also lays a groundwork for future applied researches in the domain of overweight and obesity.

Prevalence of overweight and obesity among university students in the Gaza Strip:

The findings of the study have revealed that above half (53.3%) of the study's participants had normal BMI, where only 7.3% of the study's participants were considered underweight. Unexpectedly, the findings of the study have also revealed that 18.8% of the study's participants were overweight while 20.8% were obsess with BMI >/=30. Comparing the findings of this study to studies conducted in different other countries, it can be concluded that the prevalence rates of overweight (18.8%) and obesity (20.8%) in this study are considered high and alarming; for instance, among Iranian university students, the prevalence of both overweight and obesity were 12.4% (Nojomi and Najamabadi, 2006). Moreover, a study that was conducted to assess the prevalence of overweight and obesity among the students of 22 universities from 22 countries from different regions have shown that 22% of students were either overweight or obese (Karl et al., 2014).

Inconsistent with the findings of this study, El Kassas and colleagues (2015) found that the prevalence of overweight and obesity was 26.6% among Beirut Arab University students. Additionally, many studies have revealed lower prevalence rates of overweight and

obesity, as found in Bangladesh; the prevalence was rated at 20.8% (Sultana et al., 2011); in Oman, it was 28.2% (Al-Kilani et al., 2012), in Malaysia, it was 20% (Gopalakrishnan et al., 2012), and in Turkey, it was 29% (Kutlu and Memetoglu, 2013).

Interestingly, the findings of this study are inconsistent with most of the studies that were conducted in Gaza and West Bank. For instance, Al-Sabbah (2012) found that the prevalence rates of overweight and obesity among students from Al-Najah National University in West Bank were 20.1% and 4.6%, respectively (Al-Sabbah, 2012). Bayyari and colleagues (2013) found that 14% of female Palestinian college students in the West Bank were either overweight or obese. Additionally, Lubbad and colleagues (2011) found that, 17.1% and 2.9% of pharmacy college students in Al-Azhar University were overweight and obese, respectively.

On the other hand, the findings of this study are consistent with several studies that were conducted in the United Arab Emirates, Jordan, Egypt, Kuwait, and Saudi Arabia (Musaiger, 2006; Suleiman et al., 2009; Bakr et al., 2002; AI-Isa, 1999; Al Qauhiz, 2010; Issa, 2015).

The findings of the study have revealed that the prevalence of obesity was higher among male students compared to female students. These findings are consistent with the findings of other research (Karl et al., 2014; Al-Sabbah, 2012). Further research studies are recommended to explore the gender variation in determinants of overweight and obesity among university students.

High prevalence rate of overweight and obesity are a real public health problem among the university students in the Gaza Strip. A preventive policy is needed to raise students' awareness about obesity and its negative consequences on health. Health education should focus on obesity as a main driver to NCDs-mainly Type 2 DM, hypertension and cardiovascular diseases. At the state policy-making level, policy makers should put the

issue of obesity on their agenda and make sure to develop preventative strategies to promote healthy life-styles among university students to reduce the likelihood of developing NCDs in the future. There is an urgent need to conduct qualitative research studies to deeply understand the causes of obesity and underweight among university students in the Gaza.

Life style: physical activity, sleep pattern, and sedentary behaviors

Regarding physical activity, the findings of the study have revealed a high statistically significant inverse relationship between physical activity and obesity. These findings are consistent with the results of other research studies (Al–Sabbah, 2012; Suleiman, 2009; Ulijaszek, 2007; Krebs et al., 2007; Huang et al., 2003; Al-Isa, 1999). While, the findings are inconsistent with Lubbad and colleagues (2011) study. It is a fact that physical activity is a major protective factor of obesity. Universities need to invest more in promoting physical activities as a way to prevent obesity. Universities should try to organize sport activities and sport competition to encourage students to become more physically active.

Regarding sleeping patterns, the findings of this study have revealed a statistical significant relationship between the average of the daily number of sleeping hours at night and obesity. These findings are consistent with the findings of other research studies (Bawazeer et al., 2009; Park, 2011; Cappuccio et al., 2008; Shigeta et al., 2001; Vorona et al., 2005). Kjeldsen and colleagues (2014) have revealed that shorter durations of sleep during night lead to bad dietary habits that involve consuming food containing high calories, which in return contributes to weight gain. It is highly recommended to conduct further research to deeply explore the relationship between weight gains and sleeping problems.

Concerning sedentary behaviors, there is a wide agreement that sedentary behaviors such as watching Television, surfing the internet and social media are major contributing factors to obesity as proven by different studies (Hu, 2003; Must and Tybor, 2005; Miller, 2010;

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Owen et al., 2010). The findings of this study have revealed a high statistically significant relationship between obesity and the daily average time that is spent sitting, the daily average of watching TV hours, and the daily average of hours visiting social media websites. These findings are consistent with the findings of other research studies (French et al., 2001; Bakr et al., 2002; Caroli et al., 2004; Suleiman et al., 2009; Musaiger, 2011). Additionally, this study revealed a high statistically significant association between obesity and eating while watching TV and surfing social media. It also revealed a high statistical significant relationship between eating chips & snacks and having soda drinks while watching TV, and obesity. These findings are consistent with the findings of other research studies (Bakr et al., 2002; Suliman et al., 2009; Musaiger, 2011). Similarly, Al-Sendi (2002) reported that 57% of obese adolescents consumed their main meals (lunch and supper) while watching television. In the Arab Gulf Countries, it was found that chocolates, sweets, potato chips, soft drinks, and fried nuts were the main foods items consumed while watching television by students (Musaiger, 2007).

Eating while watching TV and surfing social media websites may lead to overeating because the person cannot control the amount of consumed food (Yahia et al., 2008). Students tend to eat high calorie intake food while studying and watching TV. Furthermore, exposure to food advertisements, especially junk food commercials, soft drinks, snacks, chips, sweets, and chocolates, affect students' food choices and encourage their intake of high-energy foods (Madanat, 2007).

Regarding the studying position, this study revealed a high statistically significant relationship between daily studying hours, eating during studying, eating chips and snacks, having soda drinks, and having hot drinks while studying were significantly associated with obesity. Studies covering the same topic were difficult to find. Nowadays, fast and junk food are becoming part of our daily food intake. Thus, it is highly recommended to

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conduct both qualitative and quantitative research to explore the impact of eating such food on body weight while studying.

From a researcher's perspective, as students moved from high school to the university life, they have to adapt to the new social, academic, and psychological environment, which witnesses dramatic lifestyle changes, including an increase in sedentary behaviors and a decrease in physical activity.

Eating habits and food consumption

It is well-known that healthy eating habits play a protective role against obesity and other diseases as well. The findings of this study have shown that breakfast is the main meal that students often skip. The findings have revealed a high statistical relationship between obesity and skipping breakfast. These findings are consistent with many previous research studies (Keski-Rahkonen et al., 2003; Kerkadi, 2003; Berkey et al., 2003; Smith, 2003; Kumar et al., 2004; Bin Zaal et al., 2009; Szajewska and Ruszczyn, 2010). Whereas, these findings are inconsistent with (Lubbad et al., 2011).

Additionally, the findings have shown a higher weight status among students having breakfast at university; the relation is a high statistical relationship. These findings are consistent with Bin Zaal and colleagues (2009) who found a high statistical relationship between having breakfast at school and adolescent obesity in Dubai.

From a researcher's perspective, students who missed their breakfast tend to consume greater amounts of food at lunch and snacking high-energy foods thereby gaining excess weight. The majority of university students prefer eating breakfast at university due to running for lectures. The university cafeteria, where students share their breakfast, contains many different types of food which are characterized with high calorie food such as Falafel sandwiches, fried potatoes, pizza, and highly sweetened beverages.

Regarding fast food consumption, the findings of this study revealed a statistical significant relationship between junk food such as burger sandwiches and pizza, and obesity. These findings are consistent with the findings of other studies (Bin Zaal et al., 2009; Lubbad et al., 2011; El-Qudah et al., 2012).

Regarding frequent snacking, the findings of this study have shown a high statistical significant relationship between morning snacking, late-night snaking and obesity. These findings are congruent with the results of other research study results (Bin Zaal et al., 2009; Forslund et al., 2005; Jahns and Popkin, 2001).

From a researcher's perspective, snacking could be a main feature of adolescent food consumption. Thus, it may contribute to weight gain mainly due to the increase in the consumption of high calorie foods during the time between meals and by increasing the intake frequency of these snacks. Snacks contribute to about 20–75% of total energy intake in Western countries (Swinburn et al., 2004).

Regarding food groups consumption, the findings of this study have revealed that the study's participants consume daily servings of vegetables, fruits, dairy, carbohydrates and proteins less than the recommended servings of other food groups while they consume daily servings of fats and sweets more than the recommended servings of other food groups. These findings are consistent with the findings of Lubbad and colleagues (2011) who showed that university students consumed less amounts of fruits, vegetables and dairy than the recommended daily number of servings, while they consumed fried foods and sweets more than the recommended daily number of servings. Additionally, King and colleagues (2007) revealed that one of three university students eat at least three servings of vegetables per day and about 42.2% of them eat at least two servings of fruits per day. Similarly, Huang and colleagues (2002) found a low intake of fruit and vegetables in most

USA college students. The findings of this study are inconsistent with Yahia and colleagues (2008) study.

Additionally, the findings of this study have revealed an inverse statistical significant relationship between the daily number of servings consumed from dairy, and obesity. These findings are consistent with the other research study results (Lubbad et al., 2011; Skinner et al., 2003; Weinberg et al., 2004 and Zemel et al., 2004). Furthermore, the findings have shown a positive statistical significant relationship between the daily number of servings that consist of carbohydrates, sweets, fats, and fried foods, and obesity. These findings are consistent with the findings of other research studies (El-Qudah et al., 2012; Lubbad et al., 2011). Similarly, Okeyo (2009) found that there was a statistical significant difference between all categories of BMI in terms of their daily fried chips consumption; chips are low nutrient but high in fats which provide 38 KJ per one gram consumed. Potato chips also contain large amounts of sodium in the form of salt. High sodium intake is directly linked to an increase in blood pressure (Okeyo, 2009).

From a researcher's perspective, further research studies need to be conducted to deeply exam the impact of bad eating habits among university students in the Gaza Strip on their body weight.

Relationship between obesity and overweight and body image

Failure of overweight or obese students to perceive themselves as such, alarms a new problem that should be considered. The findings of this study have revealed that 38% of the study's participants were not satisfied with their physical looks. Additionally, about 78% of participants who were not satisfied with their physical looks were actually obese. Results have shown a high statistical significant relationship between satisfaction with the person's physical look and obesity.

These findings are consistent with Malete and colleagues (2013) who found a positive association between BMI and body image dissatisfaction among youth. On the other hand, these findings are found to be inconsistent with Al Sabbah and colleagues, (2008) who reported that about 32.1% of students were dissatisfied with their weights. Of those adolescents, two-thirds were not actually characterized as overweight.

Regarding participants' body-image perception, the findings of this study have revealed that self-perception, parents-perception and peers-perception of the students' body's images were significantly associated with obesity. These findings are consistent with Al-Sendi and colleagues (2004) study.

Students tend to underestimate their weight status, which is especially noteworthy among the overweight and obese. Body dissatisfaction forms a serious problem to them. Those students become fixated on trying to change their body shapes, which can lead to unhealthy diet practices and exercises. These practices don't usually achieve the desired outcome (physical or emotional satisfaction) and can result in intense feelings of disappointment, shame and guilt, as well as an increase in the risk of developing an eating disorder as well as an increased risk of developing overweight and obesity (WHO, 2000).

This study is the first study to discuss the relationship between body-image attitude and obesity among university students in Palestine. Further research studies are recommended to explore the relationship between body-image attitude and obesity among university students in Palestine.

Psychological factors: increased food eating due to negative emotions and stress

The findings of this study have revealed a high statistical significant relationship between eating due to feeling negative and stress, and obesity. A total of 38.3% of the study's participants increase their food intake as a defense mechanism; to reach happiness and peace of mind, while 37.8% of them indicated that they eat to cope with stress.

Additionally, 36% of students overeat while feeling sad, 37% while feeling frustrated, 36.3% while feeling angry and 40.5% while feeling lonely and 37.3% of the students eat to avoid dealing with life problems. Unfortunately, 41.3% of the university students indicated that they overeat when they socialize more. In addition, 37.3% of the students indicated that they feel upset and depressed after overeating.

The findings of this study are consistent with Ganasegeran and colleagues (2012) study and Bakr and colleagues (2002) study, which found that obese medical students eat more when they feel stressed compared to non-obese students. The findings of this study are inconsistent with Bin Zaal and colleageus (2009) study.

From a researcher's perspective, university students' lives are rich with many stressful events, including exams. Students tend to overeat as a way of coping with their negative feelings and stress. They may eat a large box of candy or a carton of ice cream in an attempt to reach happiness and peace of mind. Unfortunately, many students link between happiness and certain types of food such as chocolate, chips, pasta and pizza. Perhaps they eat a carton of chips as an attempt to escape problems and loads of studying. As they try to self-medicate and self-regulate mood by coping with their negative emotions by overeating, these feelings will become worse and will not be eliminated, which in turn leads to overeating and obesity (Garaulet et al., 2012). Generally, most people eat without control during social occasions like weddings, parties, feasts, and holidays in which friends gather and consume plenty of high calorie foods.

This study is the first study to assess the relationship between psychological factors and obesity among university students in Palestine. There is a gab in the literature about the relationship between psychological factors and obesity among university students. Further research is recommended to explore the relationship between psychological factors and obesity among university students. Universities should invest in promoting healthy

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techniques that students could use in dealing with stress and negative feelings, raising self-esteem and self-confidence among university students. The healthy techniques may involve mediation, exercise, and stress coping mechanisms.

Medical profile

Regarding parents' obesity, the findings of this study have revealed a statistically significant relationship between parents' obesity, and obesity among university students. The findings are consistent with the findings of other research studies (London Susan Mayor, 2005; Suleiman et al., 2009).

Additionally, the findings have revealed a statistically significant relationship between childhood obesity and obesity among university students. The findings are consistent with Biro and Wien (2010) who have revealed that overweight children are more prone to becoming overweight adults. Moreover, Deshmukh-Taskar and colleagues (2006) have reported that half of overweight adults were overweight as children. This study is the first to explore the relationship between childhood obesity and adult obesity in Palestine. The researcher suggests further research studies to explain this relationship.

Chapter 6

Conclusion and recommendations

6.1 Conclusion

Overweight and obesity are considered serious issues among all age categories and socioeconomic groups of the developed and developing countries. Many studies have shown that the prevalence of overweight and obesity among university students in EMR has reached an alarming level. This cross-sectional study aimed at assessing the prevalence and the determinants of overweight and obesity among university students in the Gaza Strip in order to help improve the health status of university students by proposing possible interventions. The students of the study sample were selected from Al-Azhar University, Al-Aqsa University, and Islamic University randomly according to a simple random technique. The findings of the study have shown that obesity is a problem among the university students in the GS. By comparing with global studies, the prevalence rates of overweight (18.8%) and obesity (20.8%) in this study were high and alarming. The study revealed that the prevalence of overweight was higher among female participants (22.5%) compared to male participants (15%). On contrary, the prevalence of obesity is higher among male participants (21%) compared to female participants (20.5%). Additionally, the prevalence of underweight was higher among female participants (12.0%) compared to male participants (2.5%).

With regard to the socio-economic factors, obesity is significantly associated with gender, family income and the study year. On the other hand, overweight and obesity were not significantly associated with age, marital status, number of family members in a household and parents' years of schooling/academic level.

Regarding life style factors, the study has revealed a statistical significant relationship between overweight and obesity, and physical inactivity. Additionally, a statistically significant relationship has been identified between overweight and obesity, and water-pipe smoking. While, cigarette-smoking was not significantly associated with overweight and obesity. Moreover, the findings of the study showed that the average number of sleeping hours at night was negatively associated with overweight and obesity. While, the average number of sleeping hours during daytime was positively associated with overweight and obesity. There was also a statistically significant relationship between obesity and daily average time spent sitting or reclining, daily average time of studying hours, study position, eating while studying, and eating chips, popcorn, soda drinks and hot drinks while studying. Additionally, the study revealed that overweight and obesity are significantly associated with daily average time of watching TV hours, eating while watching TV, and eating chips, soda drinks and hot drinks while watching TV. Moreover, there was a significant relationship between overweight and obesity, and daily average hours of surfing social media applications, eating while visiting social media and eating chips and snacks while on social media.

Regarding the dietary habits, the study revealed a statistically significant relationship between skipping breakfast, and overweight and obesity. Additionally, the place of having breakfast was significantly associated with overweight and obesity, as the prevalence of overweight and obesity was greatly higher among students who had breakfast at the universities cafeterias than the students who had breakfast at home.

The study findings also revealed a statistically significant relationship between daily number of meals and overweight and obesity. Additionally, taking snacks between breakfast and lunch and late-night snacking is significantly associated with overweight and obesity. Moreover, the findings showed a statistically significant relationship between

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overweight and obesity and having fast food and the average number of meals per week that are not home-made.

Regarding the psychological factors, the study findings showed a high statistical significant relationship between eating due to negative emotions and stress, and overweight and obesity.

With regard to the socio-cultural factors, the study revealed that self-perception, parents-perception and peers-perception of the student's body image were significantly associated with overweight and obesity. Additionally, the prevalence of overweight and obesity was higher among students who do not feel satisfied with their physical looks. Moreover, the prevalence of overweight and obesity was the highest among students who preferred eating fast food at university and among students who preferred eating with their peers.

Regarding the medical factors, the study findings revealed a statistical significant relationship between childhood obesity and overweight, and obesity among university students. Additionally, parents, sisters and brothers' obesity were significantly associated with overweight and obesity among university students.

6.2 General recommendations

1. There is a dire need to conduct health education campaigns that aim to increase students' awareness about obesity and its impact on morbidity and mortality.

2. Universities should play an integral part of the fight against obesity epidemic through conducting university-based prevention programs that encourage students to eat better, be more active, and achieve healthier weights.

3. There is a need to educate university students about the importance of monitoring their weight and to train students on weight measurements techniques.

4. At the national level, conducting mass media campaigns that focus on the importance of healthy eating habits are highly needed, in addition to promote physical activity by establishing public sport halls.

5. Universities can include healthier food offerings in the cafeteria and eliminate marketing of unhealthy foods.

6. To improve activity, universities can develop safe walking areas within campuses to promote active recess time.

7. Universities need to promote wellness and fitness programs for faculty and students through building gymnastic areas within university campuses.

8. Universities need to provide students with training courses that promote positive behaviors, including stress management.

6.3 Recommendations for further research

1- Conduct more research including both qualitative and quantitative methods to deeply explore the associated factors with overweight and obesity among larger samples representing all Palestinian university students.

2- Conduct more community-based studies on overweight and obesity among preschoolers, schoolchildren, and adolescents using standardized age ranges and a standardized cut-off for measuring overweight and obesity.

3- Conduct more studies to deeply explore the gender variation in determinants of overweight and obesity among university students.

4- Conduct more studies to explore the temporal association between overweight and sleep problems, and future studies to determine whether altering sleep or obesity has an impact on the other or not.

5- Conduct studies to investigate the relationship between body image attitude, and overweight and obesity among all age groups.

6- Conduct studies to explore the associated psychological factors with overweight and obesity, and clarify the psychological consequences of obesity among students.

7- Conduct studies to assess the economic costs of obesity.

References

Abdeen, ZC., Dkeideek, S., Qasrawi, R., Ghannam, I., and Al-Sabbah, H. (2012). Overweight and Obesity among Palestinian Adults: Analyses of the Anthropometric Data from the First National Health and Nutrition Survey (1999-2000). *Journal of Obesity*, 213547(12)

Abdul-Rahim, HF., Abu-Rmeileh, NM., Husseini, A., Holmboe-Ottesen, G., Jervell, J., Bjertness, E. (2001). Obesity and selected co-morbidities in an urban Palestinian population. *International Journal of Obesity*, 25: 1736–1740

Abudayya, A., Thoresenb, M., Abed, Y., Holmboe-Ottesena, G. (2007). Overweight, stunting, and anemia are public health problems among low socioeconomic groups in school adolescents (12-15 years) in the North Gaza Strip. *Nutrition Research*, 27, 762–771

Abudayya, AH., Stigum, H., Shi, Z., Abed, Y., Holmboe, G. (2009). Sociodemographic correlates of food habits among school adolescents (12-15year) in north Gaza Strip. *BMC Public Health*, 9(185)

Adam, T., Epel, E. (2007). Stress, eating and the reward system. *Physiol Behav*, 91:449–458

AI-Isa, AN. (1999). Obesity among Kuwait University students: an explorative Study. The *Journal of the Royal Society for the Promotion of Health*, 119(4): 223-227

Al Qauhiz, NM. (2010). Obesity among Saudi Female University Students: Dietary Habits and Health Behaviors. J Egypt Public Health Assoc, 85(1-2):45-59

Anderson, JW., Hanna, TJ., Peng, X ., Kryscio, RJ. (2000). Whole grain foods and heart disease risk. *Journal of the American College of Nutrition*, 19(3): 291S–299S.

Al Sabbah, H., Vereecken, C., Abdeen, Z., Coats, E., Maes, L. (2008). Associations of overweight and of weight dissatisfaction among Palestinian adolescents: findings

from the national study of Palestinians schoolchildren (HBSC-WBG2004). *Journal of human nutrition and dietetics*, 22 (1): 40-49

Al- Sharafi, BA., Gunaid, AA. (2014). Prevalence of obesity in patients with type 2 diabetes mellitus in Yemen. *Int J Endocrinol Metab*., 12(2): e13633

Al-Ansari, M., Al Mannai, M., Musaiger, A. (2000). Body weight of university students in Bahrain. Bahrain Medical Bulletin, 22(3)

Aljouni, K., Jaddou, H., Batieha, A. (1988). Obesity in Jordan. *International journal of obesity,* 22:624-628

Al-Kandari, Y. (2006). Prevalence of obesity in Kuwait and its relation to sociocultural variables. *Obes. Rev*, 7, 147-154

Al-Rethaiaa, AS., Fahmy, AA., Al-Shwaiyat, NM. (2010). Obesity and eating habits among college students in Saudi Arabia: A cross sectional study *Nutr J*, 9: 39

Al-Sabbah, H. (2012). Overweight and obesity among university students in Palestine, in International Conference and Exhibition on Nutritional Science and Therapy, 2 (79)

Al-Sendi, AM., Shetty, P., Musaiger, AO. (2004). Body weight perception among Bahraini adolescents. Child: Care, *Health and Development*, 30(4): 369–376

Al-Tawil, NG., Abdulla, MM., Abdul-Ameer, AJ. (2007). Prevalence of and factors associated with overweight and obesity among a group of Iraqi women. East. *Mediterr Health J*, 13,420-429

Arafa, MR. (2005). Obesity in Saudi Arabia. *Saudi Med J.,* 26(5), 824-9

Ardoin, M. (2010). Adolescent obesity bad for health; also bad for economy, National Security. National Center for Children in Poverty. Retrieved January 10, 2017, from: http://www.nccp.org/media/releases/pdf/release_126.pdf

Arnold, M., Jiang, L., Stefanick, ML., Johnson, KC., Lane, DS., LeBlanc, ES., Prentice, R., Rohan, TE., Snively BM., Vitolins, M., Zaslavsky, O.,Soerjomataram, I., Anton-Culver, H. (2016). Duration of adulthood overweight, obesity, and cancer risk in the women's health Initiative: A Longitudinal Study from the United States. *PloS Med*., 13(8): e1002081

Arroyo, I M., Rocandio, AM., Ansotegui, A L., Pasual, AE., Salces, B I., Rebato, O E. (2006). Diet quality, overweight and obesity in universities students. Nutr Hosp, 21(6):673-679

Bakr, EM., Ismail, NA., Mahaba, HM. (2002). Impact of life style on the nutritional status of medical students at Ain Shams University. *J. Egypt. Public Health Assoc,* 77:29-49

Banwell, C., Lim, L., Seubsman, SA., Bain, C., Dixon, J., Sleigh, A. (2009). Body mass index and health-related behaviours in a national cohort of 87,134 Thai Open University students. *J Epidemiol Community Health,* 63, 366–372

Bauman, A., Bull, F., Chey, T., Craig, CL., Ainsworth, BE., Sallis, JF., Bowles, HR., Hagstromer, M., Sjostrom, M., Pratt, M. (2009). The IPS group. The international prevalence study on physical activity: Results from 20 countries. *Int J Behav Nutr Phys Act*, 6(21):1479-5868

Bawazeer, NM., Al-Daghri, NM., Valsamakis, G., Al-Rubeaan, KA., Sabico, S., Huang, TK., Mastorakos, G., Kumar, S. (2009). Sleep duration and quality associated with obesity among Arab children*, Obesity*, 17(12): 2251–2253

Bayyari, WD., Henry, LJ., Jones, C. (2013). Dieting behaviors, obesity and predictors of dieting among female college students at Palestinian universities. *East Mediterr Heal J*, 19, 30-36.

Bazzano, LA., He, J., Ogden, LG., Loria, CM., Vupputuri, S., Myers, L., Whelton, PK.(2002). Fruit and vegetable intake and risk of cardiovascular disease in US adults: the first   National Health and Nutrition Examination Survey epidemiologic follow-up. Am J Clin Nutr, 76:93-99

Bel, S., Michels, N., De Vriendt, T., Patterson, E., Cuenca-Garc, M., Diethelm, K., Gutin, B. (2013). Association between self-reported sleep duration and dietary quality in European adolescents. *British Journal of Nutrition,* 110, 959.

Berkey, CS., Rockett, HR., Gillman, MW., Field, AE., Colditz, G.A. (2003). Longitudinal study of skipping breakfast and weight change in adolescents. Int J Obes, 27: 1258-1266.

Bertsias, G., Mammas, I., Linardakis, M., Kafatos, A. (2003). Overweight and obesity in relation to cardiovascular disease risk factors among medical students in Crete, Greece. *BMC Public Health, 3:3*

Bin Zaal, AA., Musaiger, AO., D'Souza, R. (2009). Dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates. *Nutr Hosp*., 24(4):437-444

Biro, FM., Wien, M. (2010). Childhood obesity and adult morbidities, *Am J Clin Nutr.* 91(5): 1499S–1505S

Bodur, S., Uguz, M., fiahin, N. (2010). Behavioral risk factors for overweight and obesity in Turkish adolescents. *Nobel Med,* 6(3), 79-83.

Boo, NY., Chia, GJ., Wong, LC., Chew, RM., Chong, W., Loo, RC. (2010). The prevalence of obesity among clinical students in a Malaysian medical school. *Singap Med J*, 51, 126–132.

Buckworth, J., Nigg, C. (2004). Physical activity, exercise, and sedentary behavior in college students. *J Am Coll Heal*, 53(1):28–34

Byyny, RL., LoVerde, M., Lloyd, S., Mitchell, W., Draznin, B. (1992). Cytosolic calcium and insulin resistance in elderly patients with essential hypertension. *Am J Hyperten*, 5:459–464

Calamaro, CJ., Park, S., Mason, T., Marcus, CL., Weaver, TE., Pack, A., Ratcliffe, SJ. (2010). Shortened sleep duration does not predict obesity in adolescents. *Journal of Sleep Research*, 19, 559–566

Calderon-Guzman, D., Hernandez-Garcia, E., Barragan-Mejia, G. (2011). Obesity and lung disease in city children. *Acta Pediatr Mex*, 32, 115-118

Cappuccio, FP., Taggart, FM., Kandala, NB., Currie, A., Peile, E., Stranges, S., Miller, MA. (2008). Meta-analysis of short sleep duration and obesity in children and adults. *Sleep Health*, 31, 619–626

Carlos, M., Eely, M., Wolney, C., Barry, P. (2004). Socioeconomic status and obesity in adult populations of developing countries: a review. Bulletin of the world health organization, 82(112): 940-946

Caroli, M., Argentieri, L., Cardone, M., Masi, A. (2004). Role of television in childhood obesity prevention. *International Journal of Obesity*, 28(3): S104–S108

Carruth, BR., Skinner, JD. (2001). The role of calcium and other nutrients in moderating body fat in preschool children. *Int J Obes Relat Metab Disord*, 25:559-566

Carson, KL., Wenrich, TR. (2002). Health and nutrition beliefs, attitudes, and practices of undergraduate college students: a needs assessment. *Top Clinical Nutrition*, 17, 52-70.

Carter, R., Moodie, M., Markwick, A., Magnus, A., Vos, T., Swinburn, B., Haby, MM. (2009). Assessing Cost- Effectiveness in Obesity (ACE-Obesity): an overview of the ACE approach, *economic methods and cost results*, 4:419

Cataldo, CB., DeBruyne, LK. Whitney, EN. (2003). Nutrition and Diet Therapy. Belmore, California, USA: Peter Marshall, 6

Cavalli-Soforza, LT., Rosman, A., de Boer, AS., Darnton-Hill, I. (1996): Nutritional aspects of changes in disease patters in Western Pacific Region. Bulletin of World Health Organization, 74(3): 307 -318

Center for Disease Control and Prevention (2016). Adult obesity causes and consequences. Retrieved October 16, 2015 from:

https://www.cdc.gov/obesity/adult/causes.html

Center for Disease Control and Prevention, CDC (2014). Overweight and obesity. Retrieved Feb 7, 2015 from CDC: http://www.cdc.gov/obesity/adult/defining.html

Chaudhry, MA., Ahmad, F., Ashraf, MZ. (2012). Frequency of overweight and obesity in students of medical College Lahore. *Ann Pak Inst Med Sci,* 8, 137–140

Chen, X., Beydoun, MA., Wang, Y. (2008). Is sleep duration associated with childhood obesity? A systematic review and meta-analysis. *Obesity,* 16, 265–274

Cleveland, LE., Moshfegh, AJ., Albertson, AM., Goldman, JD. (2000). Dietary intake of whole grains. *J Am Coll Nutr,* 19:331S-338S

Coggon, D., Rose, G., Barker, D. (1993). Epidemiology of the uninitiated, London, British Medical Journal Publishing group

Constantine, T., Vojtech, H., Arnaud, B., Nick, F., Martin, F., Elisabeth, MV., Dragan, M., Maximo, M. (2008). Management of Obesity in Adults: European Clinical Practice Guidelines. *The European Journal of Obesity*, 1, 106.

Crombie, AP., Ilich, JZ., Dutton, GR., Panton, LB., Abood, DA. (2009). The freshman weight gain phenomenon revisited. *Nutr Rev*, 67(2):83–94

Cusatis, DC. Shannon, BM. (1996). Influences on adolescent eating behaviour. *J Adolesc Health*, 18, 27–34

Cusatis, DC., Chinchilli, VM., Johnson-Rollings, N., Kieselhorst, K., Stallings, VA., Lloyd, T. (2000). Longitudinal nutrient intake patterns of US adolescent women: the Penn State Young Women's Health Study. *J Adolesc Health*, 26, 194 –204

Davies, KM., Heaney, RP., Recker, RR., Lappe, JM., Barger-Lux, MJ., Rafferty, K., Hinders, S. (2000). Calcium intake and body weight. *J Clin Endocrinol Metabol*, 85:4635–4638

Demory-Luce, D., Morales, M., Nicklas, T., Baranowski, T., Zakeri, I., Berenson, G. (2004). Changes in food group consumption patterns from childhood to young adulthood: The Bogalusa Heart Study. *JAMA,* 104, 1684-1691

Deshmukh-Taskar, P., Nicklas, TA., Morales, M., Yang, SJ., Zakeri, I., Berenson, GS. (2006). Tracking of overweight status from childhood to young adulthood: the Bogalusa Heart Study. *Eur J Clin Nutr*, 60: 48–57

Draznin, B., Sussman, K., Kao, M., Lewis, D., Sherman, N. (1987). The existence of an optimal range of cytosolic free calcium for insulin-stimulated glucose transport in rat adipocytes. *J Biol Chem,* 262:14385–14388

Draznin, B., Sussman, KE., Eckel, RH., Kao, M., Yost, T., Sherman, NA. (1988). Possible role of cytosolic free calcium concentrations in mediating insulin resistance of obesity and hyperinsulinemia. *J Clin Invest,* 82:1848–1852

Eapen, V., Mabrouk, AA., Bin-Othman, S. (2006). Disordered eating attitudes and symptomatology among adolescent girls in the United Arab Emirates. *Eating Behaviors*, 7(1): 53–60

Earl, R. (2004). Guidelines for Dietary Planning. In Krause's Food, Nutrition, and Diet Therapy. West Philadelphia, Pennsylvanian: Saunders Company, 11, 363-389

El-Gilany, AH., Badawi, K., El-Khawaga, G., Awadalla, N. (2011). Physical activity profile of students in Mansoura University, Egypt. *East Mediterr Health J.* 17(8):694-702

El-Kassas, G., Itani, L., El Ali, Z. (2015). Obesity risk factors among Beirut Arab University students in Tripoli-Lebanon. *Nutrition and food sciences,* 5(6):421-429

Ellulu, M., Rahma, A., Abed, Y. (2014). Updates of Overweight and Obesity Status and Their Consequences in Palestine. *Pakistan Journal of Nutrition* 13(2), 116-121

El-Qudah, JM. (2008). Food consumption patterns and prevalence of obesity in an adult population in Amman, Jordan. *Aust. J. Basic Appl. Sci.*, 2(4): 1165-1171.

El-Qudah, J., Al-Omran, H., Abu-Alsoud, B., Al-Shek Yousef, T. (2012). Nutritional status among a sample of Saudi college students. *Current Research Journal of Biological Sciences,* 4(5), 557-562

Escott-Stump, S. Earl, R. (2008). Guidelines for Dietary Planning. In Krause's Food, Nutrition, and Diet Therapy. West Philadelphia, Pennsylvanian: Saunders Company, 12, 337-361

Faith, MS., Allison, DB., Geliebter, A. (1997). Emotional eating and obesity: Theoretical considerations and practical recommendations. Overweight and weight management: The health professional's guide to understanding and practice. Gaithersburg, MD: Aspen, 439–465

Farooqi, IS., O'Rahilly, S. (2007). Genetic factors in human obesity. *Obesity Review*, 8 (s1): 37–40

Ferro-Luzzi, A., Puska, P. (2004): Sounding the alarm: obesity scourge spreads unchecked. *Global Health and Environment Monitor,* 12(1)

Finkelstein, EA., Graham, WC., Malhotra, R. (2014). Lifetime direct medical costs of childhood obesity. *Pediatrics*, 133(5): 854-862

Forslund, HB., Torgerson, JS., Sjöström, L., Lindroos, AK. (2005) Snacking frequency in relation to energy intake and food choices in obese men and women compared to a reference population. *Int J Obes* 2005, 29 (6): 711-719

Fouad, MF., Rastam, S., Ward, KD., Maziak, W. (2006). Prevalence of obesity and its associated factors in Aleppo. *Syria Prev Control*, 2, 85-94

French, SA., Story, M., Jeffery, RW. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health*, (22): 309–335

Fried, M., Hainer, V., Basdevant, A. (2007). Inter-disciplinary European guidelines on surgery of severe obesity. *Int J Obes (Lond),* 31 (4): 569–77

Ganasegeran, K., Al-Dubai, S., Qureshi, A., Al-abed, A., AM, R., Aljunid, S. (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: a cross-sectional study. *Nutrition Journal,* 11:48

Ganley, RM. (1989). Emotion and eating in obesity: A review of the literature. *International Journal of Eating Disorders*, 8:343–361

Garaulet, M., Canteras, M., Morales, E., López-Guimera, G., Sánchez-Carracedo, D., Corbalán-Tutau, D. (2012) Original Validation of a Questionnaire on Emotional Eating for Use in Case of Obesity; the Emotional Eater Questionnaire (EEQ). *Nutrición Hospitalaria*, 27(2), 645-651

Gharib, NM. (2006). Assessment of nutritional status of schoolchildren in Bahrain. School Nutrition, 6-18, PhD Thesis. University of Cambridge, UK

Ghrayeb, FA., Rusli, MA., Al Rifai, A., Ismail, M. (2013). Prevalence of overweight and obesity among adolescents in Tarqumia, Palestine. *CJBAS*, 1(1):49-57

Giacaman, R. (2009). Health status and health services in the occupied Palestinian territory. *The lancet*, 373, 873-849

Gillum, F. (2006). Frequancy of attendance at religious services, overweight and obesity in American women and men: the third national health and nutrition examination survey. *Annals of Epidemiology*, 16(9):655-660

Gopalakrishnan, S., Ganeshkumar, P., Prakash, MV., Amalraj, CV. (2012). Prevalence of overweight/obesity among the medical students, *Malaysia. Med J Malays*, 67, 442–444

Gower, B., Hand, CE., Crooks, ZK. (2008). The relationship between stress and eating in college-aged students. *Undergraduate Research Journal for the Human Sciences*, 7: 1

Grujic, V., Martinov, M., Nikolic, E., Niciforovic, O. (2005). Epidemiology of obesity in adult population of Vojvodina. *Medical Preg* 58(5-6):292_5

Hazmi, M., Warsy, S. (2000). Prevalence of overweight and obesity in diabetic and non-diabetic Saudis. *Eastern Mediterranean Health Journal*, 6(2\3):276-282

Haskell, WL., Lee, IM., Pate, RR., Powell, KE., Blair, SN., Franklin, BA., Macera, CA., Heath, GW., Thompson, PD., Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc*, 39: 1423–1434

Haslam, DW. James, WP. (2005). Increasing fruit and vegetable consumption as an obesity prevention Obesity. *Lancet*, 366(9492):1197-1209

Hingorjo, MR., Syed, S., Qureshi, MA. (2009). Overweight and obesity in students of a dental college of Karachi: Lifestyle influence and measurement by an appropriate anthropometric index. *J Pak Med Assoc*, 59: 528–532

Holden, RB. (2010). Face Validity. The Corsini Encyclopedia of Psychology. Hoboken, New Jersey: Wiley, 4, 637–638

Hu, FB. (2003). Sedentary lifestyle and risk of obesity and type 2 diabetes. *Lipids*, 38(2):103–8

Huang, T., Harris, KJ., Lee, RE., Nazir, N., Born, W., Kaur, H. (2002) Assessing overweight, obesity, diet, and physical activity in college students. *J Am Coll Health*, 52:83-86

Huon, G., Lim, J. (2000).The emergence of dieting among female adolescents: age, body mass index, and seasonal effects. *Int J Eat Disord*, 28 (2): 221-225

Iannotti, RJ., Janssen, I., Haug, E., Kololo, H., Annaheim, B., Borraccino, A. (2009) Interrelationships of adolescent physical activity, screen-based sedentary behavior and social and psychological health. *Int J Public Health*, 54(2):191–8

International Agency for Research on Cancer. (2002). IARC handbooks of cancer prevention: weight control and physical activity. Lyon, France: IARC Press, 6

International Agency for Research on Cancer. (2016). IARC Handbooks of Cancer Prevention Body Fatness. Lyon, France: *IARC Press*, 16

International Association for the Study of Obesity, IASO (2004). *IASO Annual Review* 2003 – 2004. London

International Diabetes Federation, IDF (2006). The IDF consensus worldwide definition

 of metabolic syndrome. Brussels. Retrieved April 10, 2015 from :

 http://www.hndc.gr/infb/Metabolic%20syndrome.IDF%20booklet.pdf

Issa, LF. (2015). Prevalence and risk factors of obesity and overweight among Taif

 University Students, Taif, Saudi Arabia. *International Journal of Public Health and*

 Epidemiology, 4 (1), 098-106

Jahns, L., Popkin, BM. (2001). The increasing prevalence of snacking among US

 children from 1977 to 1996. *Journal of Pediatrics,* 138 (4): 493-498

Jalambo, MO. Hamed, AT. Abed Y. (2011). Anemia and Risk Factors among Female

 Secondary Students in the Gaza Strip, Master Thesis. Al Azhar University, Gaza

James, M., Elizabeth, K. (2001). Obesity and Disease Management: Effects of Weight

 Loss on Comorbid Conditions. *Obesity research*, 9(4):326-334

Jingya, B., Ye, H., Jing, W., Xi, H., Tao, H. (2013). Quantitative analysis and comparison

 of BMI among Han, Tibetan, and Uygur university students in Northwest China. *Sci*

 World J. Retrieved December 22, 2016 from:

 https://www.hindawi.com/journals/tswj/2013/180863/

Juhee, C., Hee, J. (2006). Assessing overweight and obesity risk among Korean

 Americans in California using World Health Organization BMI criteria for Asians.

 Preventing chronic disease, 3(2)

Kaplan, HI., Kaplan, H. (1957). The psychosomatic concept of obesity. *Journal of*

 Nervous & Mental Disease, 125:181–200

Karl, P., Pengpid, S., Alafia, T., Özcan, N., Carolina Mantilla, C., Rahamefy, N., Wong,

 M., Gasparishvili, A. (2014). Prevalence of Overweight/Obesity and Its Associated

Factors among University Students from 22 Countries. *Int. J. Environ. Res. Public Health,* 11, 7425-7441.

Keating, XFD., Guan, JM., Pinero, JC., Bridges, DM. (2005). A meta-analysis of college students' physical activity behaviors. *J Am Coll Heal*, 54(2):116–25

Kerkadi, A. (2003). Evaluation of nutritional status of United Arab Emirates University female students. *Emirates Journal of Agricultural Science*, 12(2): 42–50

Keski-Rahkonen, A., Kaprio, J., Rissanen, J., Virkkunen, M., Rose, R.J. (2003). Breakfast skipping and health compromising behaviors in adolescents and adults. *Eur J Clin Nutr*, 57(7):842-853

Khalaf, A., Ekblom, O., Kowalski, J., Berggren, V., Westergren, A., Al-Hazzaa, H. (2013). Female University students Physical Activity Levels and Associated Factors: A cross- Sectional Study in Southwestern Saudi Arabia. *Int. J. Environ. Res. Public Health*, 10, 3502-3517

Khellah, MK., El-Jabour, S., Abed, Y. (2010). Assessment of Nutritional Status among the Adult Palestinian Aged 19-59 Years in Gaza Strip, Master Thesis. Al Azhar University, Gaza

Kimberlin, CL., Wintersten, AG. (2008). Validity and reliability of measurement instruments used in research. *Am J Health Syst Pharm*, 65(23): 2276-84

King, KA., Mohl, K., Bernard, AL., Vidourek, RA. (2007). Does Involvement in Healthy Eating among University Students Differ Based on Exercise Status and reasons for Exercise. California. *Journal of Health Promotion*, 5 (3): 106-119

Kjeldsen, JS., Hjorth, MF., Andersen, R., Michaelsen, KF., Tetens, I., Astrup, A., Sjödin, A. (2014). Short sleep duration and large variability in sleep duration are independently associated with dietary risk factors for obesity in Danish schoolchildren. *International* Journal of Obesity, 38, 32–39

138

Koh-Banerjee, P., Rimm, EB. (2003). Whole grain consumption and weight gain: a
   review of the epidemiological evidence, potential mechanisms and opportunities for
   future research. *Proc Nutr Soc*, 62:9-25

Kohl, HW., Craig, CL., Lambert, EV., Inoue, S., Alkandari, JR., Leetongin, G.,
   Kahlmeier, S. (2012). The pandemic of physical inactivity: Global action for public
   health. *Lancet,* 380: 294–305

Krebs, NF., Himes, JH., Jacobson, D., Nicklas, TA., Guilday, P., and Styne D. (2007).
   Assessment of child and adolescent overweight and obesity. *Pediatrics,* 120(4):
   S193 - S228

Kruger, HS., Puoane, T., Senekal, M., van der Merwe, M. (2005). Obesity in South
   Africa: challenges for government and health professionals. *Public Health Nutrition,*
   8 (5): 491-500

Kruger, HS., Venter, CS., Vorster, HH., Margetts, BM. (2002). Physical inactivity is a
   major determinant of obesity in black women in the North West Province, South
   Africa: the THUSA study. *Nutrition*, 18(5): 422-427

Kumar, BN., Holmboe-Ottesen, G., Lien, N., Wandel, M. (2004). Ethnic differences in
   body mass index and associated factors of adolescents from minorities in Oslo,
   Norway: A cross-sectional study. *Public Health Nutr*, 7: 999-1008

Kutlu, R., Memetoglu, ME. (2013). Evaluation of cardiovascular risk factors among
   university students in Turkey: A cross-sectional survey. Russ. Open Med. J, 2, 0307

Lahmann, PH., Lissner, L., Gullberg, B. Berglund, G. (2000). Sociodemographic factors
   associated with long-term weight gain, current body fatness and central adiposity in
   Swedish women. *International Journal of Obesity*, 24 (6): 685-694

Laquatra, I. (2004). Nutrition for weight management. In Krause's food, nutrition, and
   diet therapy. Philadelphia, Pennsylvanian: Saunders Company, 11, 558-593

Lien, N., Lytle, LA., Klepp, KI. (2001). Stability in consumption of fruit, vegetables, and sugary foods in a cohort from age 14 to age 21. *Prev Med*, 33:217-226

Lin, YC., Lyle, RM., McCabe, LD., McCabe, GP., Weaver, CM. Teegarden, D. (2000). Dairy calcium is related to changes in body composition during a two-year exercise intervention in young women. *J Am Coll Nutr*, 19:754–760

Liu, S., Willett, WC., Manson, JE., Hu, FB., Rosner, B. Colditz, G. (2003). Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. Am J Clin Nutr, 78:920-927

London Susan Mayor. (2005). Obesity in children in England continues to rise. *BMJ*, 330:1044

Lubbad, T., Eljabour, S., Salama, A. (2011). Food Consumption Patterns and Dietary Habits Associated with Weight Status in Healthy Young Adult Students, Master Thesis. Al-Azhar University, Gaza

Lumeng, JC., Somashekar, D., Appugliese, D., Kaciroti, N., Corwyn, RF., Bradley, RH. (2007). Shorter sleep duration is associated with increased risk for being overweight at ages 9 to 12 years. *Pediatrics,* 120, 1020–1029

Lyon, HN., Hirschhorn, JN. (2005). Genetics of common forms of obesity: a brief overview. *American Journal of Clinical Nutrition*, 82(1): S215- S217

Lytle, LA., Seifert, S., Greenstein, J., McGovern, P. (2000). How do children's eating patterns and food choices change over time? Results from a cohort study. *Am. J. Health Promote,* 14, 222–228

Lytle, LA., Murray, DM., Laska, MN., Pasch, KE., Anderson, SE., Farbakhsh, K. (2012). Examining the longitudinal relationship between change in sleep and obesity risk in adolescents. *Health Education & Behavior,* 40(3)

Ma, Y., Bertone, ER., Stanek, EJ., Reed, GW., Hebert, JR., Cohen, NL., Merriam, PA. Ockene, IS. (2003). Association between eating patterns and obesity in a free-living US adult population. *Am J Epidemiol*, 158: 85–92

Madanat, HN., Brown, RB., Hawks, SR. (2007). The impact of body mass index and Western advertising and media on eating style, body image and nutrition transition among Jordanian women. *Public Health Nutrition*, 10(10): 1039–1046

Maddox, GL., Leiderman, V. (1969). Overweight as a social disability with medical implications. *J Med Educ,* 44:214–20

Malete, L., Motlhoiwa, K., Shaibu, S., Wrotniak, BH., Maruapula, SD., ackson, J., Compher, W. (2013). Body image dissatisfaction is increased in male and overweight/obese adolescents in Botswana. *J Obes,* 763624. Retrieved February 5, 2017 from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3619546/

Malik, J., Jaser, M., Warsy, A. (2003). Overweight and obesity in Saudi females of childbearing age. *International journal of obesity* 27:134-139

Malinauskas, BM., Raedeke, TD., Aeby, VG., Smith, JL., Dallas, MB. (2006). Dieting practices, weight perceptions, and body composition: A comparison of normal weight, overweight, and obese college females. *Nutr J* 2006, 5:11

Manninen, P., Riihimaki, H., Heliovaara, M., Soumalainen, O. (2004). Weight changes and the risk of knee osteoarthritis requiring arthroplasty. *Annals of the Rheumatic Disease*, 63(11): 1434-1437

Martinez, M., Tormo, M., Navarro, C., Ciralaque, M., Peres, D. (2001). Extremely high prevalence of overweight and obesity in Murcia, a Mediterranean region in south-east Spain. *International journal of obesity,* 25:1372-1380

Marwaha, RK., Tandon, N., Singh, Y., Aggarwal, R., Grewal, kh., Mani, K. (2006). A study of growth parameters and prevalence of overweight and obesity in schoolchildren from Delhi. *Indian Pediatrics*, 43(17)

McKeown, NM., Meigs, JB., Liu, S., Wilson, PW., Jacques, PF. (2002).Whole-grain intake is favorably associated with metabolic risk factors for type 2 diabetes and cardiovascular disease in the Framingham Offspring Study. *Am J Clin Nutr*, 76:390-398

Miles, MB., Huberman, AM. (1994). Qualitative data analysis: An expanded source book. Newbury Park, CA: Sage, 2

Miller, YD. (2010). Psychological determinants and outcomes of sedentary and physical activity behaviours. *Int J Behav Med*, 17(4):243–5

Ministry of Health, MoH (2006). Health status in Palestine, Ministry of health ". Annual Report 2005, Palestinian National Authority: Palestinian Health Information Center.

Ministry of Health, MoH (2012a). Health Report, Palestine Mid-Year 2012, Palestinian Health Information Center. Retrieved April 10, 2015 from: http://www.moh.ps/attach/502.pdf

Ministry of Health, MoH (2012b). National Nutrition Surveillance System Report. Retrieved April 10, 2015 from: http://www.moh.ps/attach/521.pdf

Ministry of Health, MoH (2014). Quarterly epidemiological report-Gaza. Retrieved April 10, 2015 from: http://www.moh.ps/attach/502.pdf

Ministry of Higher Education, MoHE (2014). Annual statistical report for institution of Palestinian higher education. Retrieved April 10, 2015 from:

http://www.mohe.pna.ps/Portals/0/MOHEResources/Docs/Statistics/Daleel2013-2014.pdf?ver=2015-05-13-090456-000

Moreno, LA., Tomas, C., Gonzalez-Gross, M., Bueno, G., Perez-Gonzalez, JM., Bueno, M. (2004). Micro-environmental and socio-demographic determinants of childhood obesity. *International Journal of Obese Related Metabolic Disorders*, 3, 16-20

Mousa, TY., Mashal, RH., Al-Domi, HA., Jibril, MA. (2010). Body image dissatisfaction among adolescent school girls in Jordan. *Body Image*, 7(1): 46–50

Mumford, DB., Whitehouse, AM., Choudry, IY. (1992). Survey of eating disorders in English-medium schools in Lahore, Pakistan. *International Journal of Eating Disorders,* 11(2): 173–184

Musaiger, A. (2011). Overweight and Obesity in Eastern Mediterranean Region: Prevalence and Possible Causes. *Journal of obesity*, 407237, 1-17

Musaiger, AO. (2006). Life style factors associated with obesity among male university students in the United Arab Emirates. *Nutrition and food science*, 33(4): 0034-6659

Musaiger, AO. (2007). Overweight and Obesity in the Arab Countries: the Need for Action. Arab Center for Nutrition, Bahrain. Retrieved January 10, 2017 from: http://www.acnut.com/v/images/stories/pdf/overweight_and_obesity_in_arab_countries.pdf

Musaiger, AO., Al-mannai, M., Tayyem, R., Al-lalla, O., Ali, EY., Kalam, F, Benhamed, MM. Saghir,S., Halahleh, I., Djoudi, Z., Chirane, M. (2012). Prevalence of Overweight and Obesity among Adolescents in Seven Arab Countries: A Cross-Cultural Study. *Journal of obesity*, 5. Retrieved January 15, 2017 from: https://www.hindawi.com/journals/jobe/2012/981390/

Musaiger, AO., Bader, Z., Al-Roomi, K., D'Souza, R. (2011). Dietary and lifestyle habits amongst adolescents in Bahrain. *Food Nutr Res*, 55: 7122

Must, A., Tybor, DJ. (2005). Physical activity and sedentary behavior: a review of longitudinal studies of weight and adiposity in youth. *Int J Obes*, 29:S84–96

Nani, A., Amini, M., Karajibani, M., Khalilian, A., Nourisaeedloo, S. (2006). Association of obesity with food habits and body image in schoolchildren of Nakhon province, Thailand. *Iranian J public health* 35(2):42-48

Nasreddine, LN., Hwalla, A., Sibai, M., Hamze and Parent-Massin, (2005). Food consumption patterns in an adult urban population in beirut, lebanon. *Pub Health Nutr*, 9(2): 194-203

Ness, R., Apovian, CM. (2005). Drug-induced weight gain. *Drugs today,* 41(8):547-55

Newell, J1., Bertagna, X., Grossman, AB., Nieman, LK. (2006). Cushing's syndrome. *Lancet,* 367(9522):1605-17

Nojomi, M., Najamabadi, S. (2006). Obesity among university students, Tehran, Iran. *Asia Pac J Clin Nutr,* 15 (4): 516-520

Nwachukwu, DC., Nwagha, UI., Obikili, EN., Ejezie, FE., Okwuosa, CN., Nweke, ML., Ezeh, CO. (2010). Assessment of body mass index and blood pressure among university students in, Enugu, South East, Nigeria. *Niger. J. Med*, 19:148–152

Okeyo, AP. (2009). Eating practices, nutritional knowledge and body weight in nursing science students at the University of Fort Hare. Department of Nutrition and Dietetics of the University of the Free State, Bloemfontein, South Africa

Owen, N., Healy, GN., Matthews, CE., Dunstan, DW. (2010). Too much sitting: the population health science of sedentary behavior. *Exerc Sport Sci Rev*, 38(3):105–13

Palestinian Central Bureau of Statistics, PCBS (2014). Health indicators, Palestinian

Central Bureau of Statistics. Retrieved December 20, 2016 from:

http://www.pcbs.gov.ps/site/lang__en/722/default.aspx

Palestinian Central Bureau of Statistics, PCBS (2015). Key indicators, Palestinian Central

Bureau of Statistics. Retrieved December 20, 2016 from:

http://www.pcbs.gov.ps/site/lang__en/507/default.aspx

Palestinian Central Bureau of Statistics, PCBS (2015). Living conditions, Palestinian

Central Bureau of Statistics. Retrieved December 20, 2016 from:

http://www.pcbs.gov.ps/site/lang__en/748/default.aspx

Palestinian Central Bureau of Statistics, PCBS (2015). Special Statistical Bulletin, on the

65th Anniversary of the Palestinian Nakba. Retrieved December 20, 2016 from:

http://www.pcbs.gov.ps/portals/_pcbs/PressRelease/Press_En_Nakba2015E.pdf

Park, J., Yoon, S., Lee, H., Jo, H., Lee, S., Kim, Y., Shin, Y. (2006). Burden of disease

attributable to obesity and overweight in Korea. *International journal of obesity*, 30:

1661- 1669

Park, S. (2011). Association between short sleep duration and obesity among South

Korean Adolescents. *Western Journal of Nursing Research*, 33, 207–223

Peeters, A., Barendregt, JJ., Willekens, F., Mackenbach, JP., Al Mamun, A., Bonneux, L.

(2003). Obesity in adulthood and its consequences for life expectancy: A life-table

analysis. *Ann. Intern. Med,* 138 (1): 24–32

Pengpid, S., Peltzer, K. (2014). Prevalence of overweight/obesity and central obesity and

its associated factors among a sample of university students in India. *Obes Res Clin

Pract,* 10, 1016

145

Pollock, C., Favret, C. (2001). Genetics and Louisiana families: A public services of the center for Acadiana genetics and hereditary health care. Retrieved October 5, 2015 from: http://www.medschool.lsuhsc.edu/genetics/AcadianPeople.pdf

Popkin, BM., Duffey, K. Gordon-Larsen, P. (2005). Environmental influences on food choice. *Phys Activit Energ Balance Physiol Behav*, 86: 603-613

Price, JH., Desmond, SM., Krol, RA., Synder, FF., O'Connel, JK. (1987). Family practice physicians' beliefs, attitudes, and practices regarding obesity. *Am J Prev Med,* 3:339–45

Public Health England (2014). Adult obesity and type 2 diabetes. Retrieved December 5, 2016 from:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3389 34/Adult_obesity_and_type_2_diabetes_.pdf

Puoane, T., Steyn, K., Bradshaw, D., Laubscher, R., Fourie, J., Lambert, V., Mbananga, N. (2002). Obesity in South Africa: the South African demographic and health survey. *The North American Association for the Study of Obesity,* 10: 1038-1048

Rey-López, JP., Vicente-Rodríguez, G., Biosca, M., and Moreno, LA.(2008). Sedentary behavior and obesity development in children and adolescents. *Nutrition, metabolism and cardiovasculer diseases*, 18(3): 242-251

Rojas, J., Chávez, M., Olivar, L., Rojas, M., Morillo, J., Mejías, J., Calvo, M., Bermúdez, V. (2014). Polycystic Ovary Syndrom, Insulin Resistance, and Obesity: Navigating the Pathophysiologic Labyrinth. *International journal of reproductive medicine*, 719050:17

Romaguera, D., Tauler, P., Bennasar, M., Pericas, J., Moreno, C., Martinez, S. (2011).
Determinants and patterns of physical activity practice among Spanish university
students. *J Sports Sci*, 29(9):989–97

Rosenbaum, M., Hirsch, J., Murphy, E., Leibel, RL. (2000). Effects of changes in body
weight on carbohydrate metabolism, catecholamine excretion, and thyroid
function. *Am J Clin Nutr*, 71:1421–1432

Rouse, PC., Biddle, SJH. (2010). An ecological momentary assessment of the physical
activity and sedentary behaviour patterns of university students. *Health Educ
Journal*, 69(1):116–125

Sahin, SB., Sezgin, H., Ilkkilic, K., Gur, EU., Ayaz, J. (2013). Should all the obese
patients be screened for Cushing's syndrome? *Endocrine condition*s, 32:773

Sakamaki, R., Toyama, K., Amamoto, R., Liu, CJ., Shinfuku, N. (2005). Nutritional
knowledge, food habits and health attitude of Chinese university students-A cross
sectional study. *Nutr J,* 2005, *4*

Salwik, M., Beushlein, F. (2006). Genetics and pathophysiology of obesity. *Internist Berl*,
47(2): 120-129.

Sanlier, N., Unusan, N. (2007). Dietary Habits and Body Composition of Turkish
University Student. *Pakistan Journal of Nutrition,* 4(6), 332-338.

Sanyal, D., Raychaudhuri, M. (2016). Hypothyrodism and obesity: An intriguing link.
Indian J Endocrinal Metab, 20(4):554-557

Shigeta, H., Shigeta, M., Nakazawa, A., Nakamura, N., Yoshikawa, T. (2001). Lifestyle,
obesity, and insulin resistance. *Diabetes Care*, 24, 608

Sigmundova, D., Chmelik, F., Sigmund, E., Feltlova, D., Frömel, K. (2013). Physical

    activity in the lifestyle of Czech university students: Meeting health

    recommendations. *European Journal of Sport Science*, 13(6):744–50

Silliman, K. (2004). A survey of dietary and exercise habits and perceived barriers to

    following a healthy lifestyle in a college population. *Californian Journal of Health*

    Promotion, 2(2):10-19

Sims, R., Gordon, S., Garcia, W., Clark, E., Monye, D., Callender, C. (2008). Perceived

    stress and eating behaviors in a community-based sample of African

    Americans. *Eating Behaviors,* 9:137–142

Sjoberg, A., Hallberg, L., Hoglund, D., Hulthen, L. (2003). Meal pattern, food choice,

    nutrient intake and lifestyle factors in the Goteborg Adolescence Study. *Eur J Clin*

    Nutr, 57:1569-1578

Skinner, JD., Bounds, W., Carruth, BR., Ziegler, P. (2003). Longitudinal calcium intake is

    negatively related to children's body fat indexes. *J Am Diet Assoc*, 103:1626-1631.

Smith, A. (2003). Breakfast, stress and catching colds. *J Fam Health Care*, 13(2): 2

Steffen, LM., Jacobs, DR., Murtaugh, MA., Moran, A., Steinberger, J., Hong, CP.,

    Sinaiko, AR. (2003). Whole grain intake is associated with lower body mass and

    greater insulin sensitivity among adolescents. *Am J Epidemiol*, 58:243-250

Snell, EK., Adam, EK., Duncan, G J. (2007). Sleep and the body mass index and

    overweight status of children and adolescents. *Child Development,* 78, 309–323

Smolin, LA.,Grosvenor, MB. (2008). American Society for Nutritional Sciences. *Journal*

    of Nutrition, 135:1183-1189

Story, M., Neumark-Sztainer, D., French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *J Am Dietetic Assoc,* 102, 40-51

Strum, R. (2002). The effects of obesity, smoking and drinking on medical problems and costs. Obesity outranks both smoking and drinking in its deleterious effects on health and health costs. *Health Affairs*, 21(2):245-253

Suleiman, AA., Alboqai, OK., Yasein, N., El-Qudah, JM., Bataineh, MF., Obeidat, BA. (2009). Prevalence of and factors associated with overweight and obesity among Jordan University students. *Journal of biololgical sciences*, 9(7): 738-745

Sultana, N., Nahar, S., Debnath, BC., Rahman, MZ., Naher, MQ., Malik, SUF. (2011). Prevalence of obesity among the medical students in Sylhet. *Jalalabad Med J*, *8*: 12–15

Sundquist, J., Johansson, SE. (1998). The influence of socioeconomic status, ethnicity and lifestyle on body mass index in a longitudinal study. *International Journal of Epidemiology*, 27:57-63

Swinburn, BA., Caterson, I., Seidell, JC., James, WB. (2004). Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health Nutrition,* 7(1): 123–146

Syvaoja, HJ., Tammelin, TH., Ahonen, T., Kankaanpaa, A., Kantomaa, MT. (2014). The associations of objectively measured physical activity and sedentary time with cognitive functions in school-aged children. *Plos One*, 9(7): 103-559

Szajewska, H., Ruszczyn, M. (2010). Systematic review demonstrating that breakfast consumption influences body weight outcomes in children and adolescents in Europe. *Critical Reviews in Food Science and Nutrition*, 50 (2): 113–119

Talata, MA., El Shahatb, E. (2016). Prevalence of overweight and obesity among preparatory school adolescents in Urban Sharkia Governorate, Egypt. *Egyptian Pediatric Association Gazette*, 64(1):20-25

Tayyem, RF., Bawadi, HA., Salameh, MA. (2008). Dietary and physical activity profiles of a sample of college students in Jordan. *Jordan J Agric Sci,* 4(1): 52-64

Teleman, AA., Waure, CD., Soffiani, V., Poscia, A., Di Pietro, ML. (2015). Physical activity and health promotion in Italian university students. *Ann Ist Super Sanita, 51*(2): 106-110

Temple, NJ., Steyn, K., Hoffman, M., Levitt, NS. Lombard, CJ. (2001). The epidemic of obesity in South Africa: a study in disadvantaged community. *Ethnicity and Disease*, 11(3): 431-437

Teychenne, M., Ball, K., Salmon, J. (2010). Sedentary behavior and depression among adults: a review. *Int J Behav Med,* 17(4): 246–54

Thayer, R. (2001). Calm Energy: How people regulate mood with food and exercise. Oxford: Oxford University Press.

Tiryakioglu, O., Ugurlu, S., Yalin, S., Yirmibescik, S., Caglar, E., Yetkin, DO., Kadioglu, P. (2010). Screening for Cushing's syndrome in Obese Patients. *Clinics,* 65(1): 9-13

Tjepkema, M. (2005). Adult obesity in Canada: Measured height and weight. Retrieved December 5, 2016 from: http://aboutmen.ca/application/www.aboutmen.ca/asset/upload/tiny_mce/page/link/Adult-Obesity-in-Canada.pdf

Torres, S., Nowson, C. (2007). Relationship between stress, eating behavior and obesity. *Nutrition*, 23(11–12): 887–894

150

Trogdon, JG., Finkelstein, EA., Hylands, T., Dellea, PS., Kamal-Bahl SJ. (2008). Indirect costs of obesity: a review of the current literature. *Obes Rev*, 9(5): 489–500

Trujillo-Hernández, B., Vásquez, C., Almanza-Silva, JR., Jaramillo-Virgen, ME., Mellin-Landa, TE., Valle-Figueroa, OB., Pérez-Ayala, R., Millán-Guerrero, RO., Prieto-Díaz-Chávez, E., Newton-Sánchez, O. (2010). The frequency of risk factors associated with obesity and being overweight in university students from Colima, Mexico. *Rev. Salud Publica*, 12: 197–207

Tsai, AG., Williamson, DF., Glick, HA. (2012). Direct medical cost of overweight and obesity in the United States: a quantative systematic review. *Obese Review*, 12(1): 50-61

Tukan, S., Ahmad, M., Takruri, R. (2006). Obesity and Overweight in Young Adult Females of Northern Badia of Jordan. *Mal J Nutr*, 12(2): 157-166

Ulijaszek SJ. (2007). A disorder of convenience. *Obesity Reviews, 8*(s1): 183–187

UNRWA, (2011). The Annual Report of the Department of Health 2010, Palestine

UNRWA, (2016). Retrieved January 5, 2017 from: https://www.unrwa.org/where-we-work/gaza-strip

Van Cauter, RE. (2010). Role of sleep and sleep loss in hormonal release and metabolism. *Endocrine Developmen*t, 17: 11–21

Vargas, M., Becerra, F., Prieto, E. (2008). Anthropometric evaluation of university students in Bogotá, Colombia. Rev. *Salud Pública*, 10: 433–442

Vella-Zarb, RA., Elgar, FJ. (2009). The 'freshman 5': a meta-analysis of weight gain in the freshman year of college. *J Am Coll Heal*, 58(2): 161–6

Vorona, RD., Winn, MP., Babineau, TW., Eng, BP., Feldman, H R., Ware, JC. (2005). Overweight and obese patients in a primary care population report less sleep than patients with a normal body mass index. *Archives of Internal Medicine*, 165: 25–30

Wang, L., Slawson, DL., Relyea, G., Southerland, JL., Wang,Y. (2014). Prevalence of and Risk Factors for Adolescent Obesity in Southern Appalachia. *Prev Chronic Dis*, 11: E222

Wang, Y., Beydoun, MA., Liang, L., Caballero, B., Kumanyika, SK. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity*, 16: 2323–2330

Weinberg, LG., Berner, LA., Groves, JE. (2004). Nutrient contributions of dairy foods in the United States, Continuing Survey of Food Intakes by Individuals, 1994-1996, 1998. *J Am diet Assoc*, 104: 895-902

Weingarten, H., Elston, D. (1991). Food cravings in a college population. *Appetite, 17*: 167–175

Whitlock, G., Lewington, S., Sherliker, P. (2009). Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. *Lancet*, 373 (9669): 1083–96

World Health Organization, WHO (2000). Obesity and managing the global epidemic. Technical Report Series (894). Geneva, Switzerland

World Health Organization, WHO (2005). The challenge of obesity in the WHO European Region, Copenhagen, Denmark

World Health Organization, WHO (2007). The challenge of obesity in the WHO European Region and the strategies for response, Copenhagen, Denmark

World Health Organization, WHO (2010). Global recommendations on physical activity

for health. Retrieved January 8, 2015 from:

http://www.who.int/dietphysicalactivity/global-PA-recs-2010

World Health Organization, WHO (2011). Waist circumference and waist–hip ratio, report

of a WHO expert consultation.Geneva, Switzerland. Retrieved April, 2015 from

http://www.who.int/nutrition/publications/obesity/WHO_report_waistcircumference_and_

waisthip_ratio/en/

World Health Organization, WHO (2013a). Global action plan for the prevention and

control of non-communicable diseases 2013-2020. Geneva, Switzerland. Retrieved

April 10, 2015 from: http://www.who.int/mediacentre/factsheets/fs355/en/

World Health Organization, WHO (2013b). Health conditions in the occupied Palestinian

territory, sixty-sixth world health assembly, and provisional agenda item.

World Health Organization, WHO (2014), Health topics, Physical activity. Retrieved

April 10, 2015 from: http://www.who.int/topics/physical_activity/en/

World Health Organization, WHO (2015), overweight and Obesity. Retrieved April 10,

2015 from: http://www.who.int/mediacentre/factsheets/fs311/en/

World Health Organization, WHO (2015). Health topic, risk factors. Retrieved April 10,

2015 from: http://www.who.int/topics/risk_factors/en/

World Health Organization, WHO (2016). Obesity and overweight. Retrieved January,

2017 from: http://www.who.int/topics/risk_factors/en/

Yahia, N., Achkar, A., Abbass, A., Rizk, S. (2008). Eating habits and obesity among

Lebanese University students. *Nutrition Journal,* 7(32)

Yao, M., Roberts, SB. (2001). Dietary energy density and weight regulation. *Nutr Rev*; 59:247–58

Yunsheng, M., Bertone ER., Stanek, EJ., Reed, GW., Hebert, JR., Cohen, NL., Merriam, PA.,Ockene, IS. (2003). Association between eating patterns and obesity in free-living US adult population. *Am J Epidemiol,* 158: 85-92

Zabut, B., Holi, N., Aljeesh, Y. (2007). Parental Obesity Compared with Serum Leptin and Soluble Leptin Receptor Levels among Obese Adults in the Gaza Strip Obesity, leptin and soluble leptin receptor levels, Master Thesis. Islamic University, Gaza

Zemel, MB., Thompson, W., Milstead, A., (2004). Dietary calcium and dairy products accelerate weight and fat loss during energy restriction in obese adults. Obes Res, 12(4):582-90

Zlot, A., Newell, A., Silvey, K., Arail, K. (2007). Addressing the Obesity Epidemic: A Genomics Perspective. *Preventing chronic disease*, 4

Annexes

Annex (1): Palestine map

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Annex (2): Gaza Strip map

Annex (3): Number of students representing the study population from the three universities

University Name	Number	Percent from the theoretical population
Islamic University	17969	37
Al-Aqsa University	16938	35
Al-Azhar University	13163	28
Total	**48070**	**100**

Annex (4): Students stratified by gender among the four universities

University Name	Male		Female	
	N	%	N	%
Islamic University	6660	37.3	11309	37
Al-Aqsa University	4934	27.7	12004	39.6
Al-Azhar University	6215	34.8	6948	22.9
Total	**17809**	**100**	**30261**	**100**

Annex (5): Distribution of sample size among the three universities

University Name	Male	Female
Islamic University	75	75
Al-Aqsa University	55	79
Al-Azhar University	70	46
Total	**200**	**200**

Annex (6): Questionnaire (Arabic and English version)

دراسة محددات زيادة الوزن والبدانة بين طلاب الجامعات في قطاع غزة

1. رقم الاستبانة....

2. التاريخ ....

	1. المعلومات الشخصية	
3	العمر (سنوات)	...... سنة
4	الجنس	1. ذكر 2. انثى
5	مكان السكن	1. شمال غزة 2. غزة 3.منطقة الوسطى 4.خانيونس 5. رفح
6	الحالة الاجتماعية	1. أعزب 2. متزوج 3. مطلق 4. أرمل
7	اسم الجامعة	1. الجامعة الإسلامية 2. جامعة الازهر 3. جامعة الأقصى
8	اسم الكلية	1. الطب 2. طب الاسنان 3. الصيدلة 4. التمريض 5. المهن الطبية 6. الهندسة 7 .العلوم 8. الزراعة والبيئة 9. الفنون 10. التعليم 11. حقوق 12. اقتصاد وعلوم إدارية 13.أخرى
9	السنة الدراسية	1. الأولى 2. الثانية 3. الثالثة 4. الرابعة 5. الخامسة 6. السادسة
	2. الحالة الاقتصادية	
10	عدد افراد الأسرة	.... فرد
11	عدد سنوات تعليم الأب	...... سنة
12	عدد سنوات تعليم الام	.... سنة
13	معدل دخل الأسرة الشهري	.... شيكل
14	هل تعمل بجانب الدراسة؟	1. نعم 2. لا (اذهب للسؤال 22)
15	ماهي مهنتك؟	....
	3. نمط الحياة	
	النشاط البدني	

الكود	الإجابة	السؤال	الرقم
			العمل
	1. نعم 2. لا (اذهب للسؤال 19)	هل يشمل عملك نشاطا شديد الكثافة مما يسبب زيادة كبيرة في معدل التنفس او معدل دفات القلب لمدة 10 دقائق مستمرة على الأقل مثال (حمل أثقال، حفر، أعمال بناء)	16
	...... يوم	أسبوعيا، كم عدد الأيام التي تقوم فيها بأنشطة شديدة الكثافة خلال عملك؟	17
	.... دقيقة	يوميا، كم من الوقت تمكث خلال قيامك بأنشطة شديدة الكثافة خلال عملك؟	18
	1. نعم 2. لا (اذهب للسؤال 22)	هل يشمل عملك نشاطا متوسط الكثافة مما يسبب زيادة قليلة في معدل التنفس او معدل دفات القلب	19

	لمدة 10 دقائق مستمرة على الأقل مثل (المشي السريع او حمل أحمال خفيفة)		
20	أسبوعيا، كم عدد الأيام التي تقوم فيها بأنشطة متوسطة الكثافة خلال عملك	...... يوم	
21	يوميا، كم من الوقت تمكث خلال قيامك بأنشطة شديدة الكثافة خلال عملك؟	.... دقيقة	

التنقل من مكان لآخر

22	هل تمشي أو تستخدم الدراجة الهوائية للتنقل من مكان لآخر لمدة 10 دقائق مستمرة على الاقل؟	1. نعم	2. لا (اذهب للسؤال 25)
23	أسبوعيا كم عدد الأيام التي تمشي أو تستخدم الدراجة الهوائية للتنقل من مكان الى آخر لمدة 10 دقائق مستمرة على الأقل؟	...... يوم	
24	يوميا، كم من الوقت تمكث في المشي أو ركوب الدراجة الهوائية للتنقل؟	...... دقيقة	

الأنشطة الترفيهية

25	هل تقوم بممارسة رياضة شديدة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة كبيرة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة القدم، الجري، كرة السلة)؟	1. نعم	2. لا (اذهب للسؤال 28)
26	أسبوعيا، كم عدد الأيام التي تقوم فيها بممارسة رياضة شديدة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة كبيرة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة القدم، الجري، كرة السلة)؟	.... يوم	
27	يوميا، كم من الوقت تمكث خلال قيامك بممارسة رياضة شديدة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة كبيرة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة القدم، الجري، كرة السلة)؟	.... دقيقة	
28	هل تقوم بممارسة رياضة متوسطة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة قليلة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة الطائرة، المشي السريع، ركوب الدراجة، السباحة)؟	1. نعم	2. لا (اذهب للسؤال 31)
29	أسبوعيا، كم عدد الأيام التي تقوم فيها بممارسة رياضة متوسطة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة قليلة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة الطائرة، المشي السريع، ركوب الدراجة، السباحة)؟	.... يوم	
30	يوميا، كم من الوقت تمكث خلال قيامك بممارسة رياضة متوسطة الكثافة أو أحد الأنشطة الترفيهية التي تسبب زيادة قليلة في دقات القلب لمدة 10 دقائق مستمرة مثل (كرة الطائرة، المشي السريع، ركوب الدراجة، السباحة)؟	.... دقيقة	

التدخين

31	هل أنت مدخن في الوقت الحالي؟	1. نعم (...... سيجارة يوميا) (اذهب للسؤال 32) 2. لا (اذهب للسؤال 33)	
32	كم كان عمرك عندما بدأت التدخين يوميا؟	..... سنة	
33	هل دخنت قبل ذلك؟	1. نعم (......شهر) (....... سيجارة يوميا) 2. لا	
34	هل تدخن النرجيلة؟	1. نعم	2. لا (اذهب للسؤال 36)

35	كم مرة تدخن تقريبا النرجيلة يوميا؟	.... مرة	

ساعات النوم

36	كم عدد ساعات النوم في الليل تقريبا؟	.... ساعة	
37	كم عدد ساعات النوم خلال النهار تقريبا؟	.... ساعة	

العادات والسلوك اليومي

38	كم عدد الساعات تقريبا التي تقضيها وانت جالس يوميا	.... ساعة	
39	كيف تدرس؟	1. وأنت تنتقل من مكان لآخر 2. وانت جالس على المكتب 3. في السرير	
40	كم عدد الساعات تقريبا التي تقضيها في الدراسة يوميا؟	.... ساعة	
41	هل تأكل خلال الدراسة	1. دائما 2. أحيانا 3. مطلقا (اذهب للسؤال 43)	
42	ماذا تأكل خلال الدراسة؟	1. خضروات وفواكه 2. ذرة نفاشة 3. رقائق بطاطس مقلية 4. مكسرات 5. مشروبات ساخنة 6. مشروبات غازية	
43	كم عدد الساعات تقريبا التي تقضيها في مشاهدة التلفاز يوميا؟	...... ساعة	
44	هل تأكل خلال مشاهدة التلفاز	1. دائما 2. أحيانا 3. مطلقا (اذهب للسؤال 46)	
45	ماذا تأكل خلال مشاهدة التلفاز؟	1. خضروات وفواكه 2. ذرة نفاشة 3. رقائق بطاطس مقلية 4. مكسرات 5. مشروبات ساخنة 6. مشروبات غازية	
46	هل تستخدم مواقع التواصل الاجتماعي (الفيس بوك، الواتس اب، الفايبر)	1. نعم 2. لا (اذهب للسؤال 50)	
47	كم عدد الساعات تقريبا التي تقضيها في استخدام مواقع التواصل الاجتماعي (الفيس بوك، الواتس اب، الفايبر) يوميا	.... ساعة	
48	هل تأكل خلال استخدام مواقع التواصل الاجتماعي (الفيس بوك، الواتس اب، الفايبر)	1. دائما 2. أحيانا 3. مطلقا (اذهب للسؤال 51)	
49	ماذا تأكل خلال استخدام مواقع التواصل الاجتماعي (الفيس بوك، الواتس اب، الفايبر)	1. خضروات وفواكه 2. ذرة نفاشة 3. رقائق بطاطس مقلية 4. مكسرات 5. مشروبات ساخنة 6. مشروبات غازية	
50	هل تلعب العاب الفيديو على الهاتف الجوال أو جهاز الكمبيوتر	1. نعم 2. لا (اذهب للسؤال 54)	
51	كم عدد الساعات تقريبا التي تقضيها في العاب الفيديو على الهاتف الجوال او جهاز الكمبيوتر يوميا؟	.... ساعة	
52	هل تأكل خلال استخدام ألعاب الفيديو على الهاتف الجوال أو جهاز الكمبيوتر؟	1. دائما 2. أحيانا 3. مطلقا (اذهب للسؤال54)	
53	ماذا تأكل خلال استخدام ألعاب الفيديو على الهاتف	1. خضروات وفواكه 2. ذرة نفاشة	

					الجوال أو جهاز الكمبيوتر؟	
	4. مكسرات		3. رقائق بطاطس مقلية			
			5. مشروبات ساخنة 6. مشروبات غازية			

				4. العادات الغذائية	
			1. دائما	هل عادة تتناول وجبة الفطور	54
			2. أحيانا		
			3. مطلقا (اذهب للسؤال56)		
			1. في المنزل	اين تتناول وجبة الفطور	55
			2. في الجامعة		
	2. وجبتان		1. وجبة واحدة	كم وجبة تتناول يوميا	56
	4. أكثر من ثلاثة		3. ثلاث وجبات		
3. دائما	2. أحيانا	1. مطلقا		هل تتناول الوجبات في الموعد المحدد لها بانتظام	57
3. دائما	2. أحيانا	1. مطلقا		هل تأخذ الوقت الكافي اثناء تناول الطعام	58
3. دائما	2. أحيانا	1. مطلقا		هل تتناول وجبة خفيفة (سناك) بين وجبة الفطور والغذاء	59
2. لا (اذهب للسؤال 63)		1. نعم		هل تهمل أي من الوجبات بانتظام	60
3. العشاء	2. الغداء	1. الفطور		ماهي الوجبة التي تهملها عادة	61
2. رجيم		1. لا يوجد وقت كافي		ما هو سبب اهمالك لتلك الوجبة	62
4. غير معتاد		3. فقدان الشهية			
		5. أخرى			
3. دائما	2. أحيانا	1. مطلقا		هل تتناول وجبات خفيفة (سناك) في منتصف الليل	63
3. دائما	2. أحيانا	1. مطلقا		هل تتناول وجبات سريعة (بيتزا، شاورما، برجر)	64
			....	في المعدل كم عدد الوجبات التي تتناولها أسبوعيا والتي لم يتم تحضيرها بالمنزل	75

	5. المعلومات الاجتماعية والثقافية

	الشكل الخارجي

		2. لا		1. نعم	هل انت راض عن شكلك الخارجي	76
	2. طبيعي الوزن		1. قليل الوزن		ماذا تعتقد نفسك؟	77
	4. سمين		3. لديك وزن زائد			
	2. طبيعي الوزن		1. قليل الوزن		والديك يعتقدون أنك	78
	4. سمين		3. لديك وزن زائد			
	2. طبيعي الوزن		1. قليل الوزن		زملاؤك وأصدقاؤك يعتقدون أنك	79
	4. سمين		3. لديك وزن زائد			

	علاقة تناول الطعام بالضغط النفسي والمشاعر

لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة	السؤال	
					هل تأكل لكي تجد السعادة	80
					أكل كثيرا عندما أشعر بضغط نفسي	81
					أكل كثيرا عندما أشعر بالحزن	82
					أكل كثيرا عندما أشعر بالقلق	83
					أتناول الطعام عندما أشعر بالإحباط وخيبة الامل	84
					أتناول الطعام عندما أشعر بالغضب	85
					أتناول الطعام عندما أشعر بالوحدة	86
					أتناول الطعام لكي أهرب من حل المشكلات	87
					أكل كثيرا عندما أكون اجتماعيا	88
					من الصعب التوقف عن تناول الطعام عندما اشعر بالامتلاء	89

							أشعر بالاستياء والإحباط بعد تناول الطعام	90

العادات الاجتماعية

							هل تعتقد انه يوجد ضغط اجتماعي لكي تكون أنحف	91
	1. لوحدي 2. مع العائلة 3. مع الأصدقاء							92	مع من تتناول الطعام أكثر من الطبيعي
	2. المنزل 4. المطعم	1. لا أتناولها 3. الجامعة 5. المنزل والجامعة والمطعم					أين تفضل أكل الوجبات السريعة	93

6. المعلومات الطبية

2. طبيعي الوزن	1. قليل الوزن 3. لديك وزن زائد 4. سمين		خلال فترة الطفولة كنت	94
2. الاثنان معا 4. الأم فقط	1. لا أحد منهم 3. الأب فقط		هل والديك يعانون من السمنة	95
2. لا	1. نعم		هل لديك اخوان واخوات يعانون من زيادة الوزن أو السمنة	96
2. لا (اذهب للسؤال 99)	1. نعم		هل تعاني من أحد الامراض المزمنة	97
2. قلب وأوعية دموية	1. مرض السكري 3. ارتفاع نسبة الدهون والكولسترول 4. فشل كلوي 5. امراض الجهاز التنفسي 6. أمراض وراثية 7. سرطان		ما هو المرض الذي تعاني منه	98
2. نعم اسم الدواء............ عدد المرات .... فترة الاستخدام	1. لا		هل تتناول أيا من الادوية بصفة مستمرة	99
2. نعم اسم الدواء..........	1. لا		هل تتناول أي من الادوية الغير مسموح بتناولها	100

7. القياسات البشرية

......	الوزن (كجم)	101
......	الطول (سم)	102

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Determinants of Overweight and Obesity among University Students in the Gaza Strip: Cross sectional Study

1. Questionnaire number:

2. Date:

1. Background and demographic information		
3	Age (years)	…… year
4	Sex	1. Male 2. Female	
5	Residency	1. North Gaza 2. Gaza 3. Mid zone 4. Khan Yonis 5. Rafah	
6	Marital status	1. Single 2. Married 3. Divorced 4. widowed	
7	University name	1. Alazhar University 2. Islamic University 3. Al –Aqsa University	
8	College	1. Medicine 2. Dentistry 3. Pharmacy 4. Nursing 5. Health science 6. Engineering 7. Science 8. Agriculture and Environment 9. Arts and Humanities 10. Education 11. Law 12. Economics and Administrative Sciences 13. Other	
9	Studying year	1. First year 2. Second year 3. Third year 4. Fourth year 5. Fifth year 6. Sixth year	
2. Socioeconomic information		
10	Family member number	…….. members

11	Father's years of schooling	.... year	
12	Mother's years of schooling	.... year	
13	The average monthly household income	.... shekel	
14	Do you work besides studying?	1. Yes 2. No, if No, skip to Q23)	
15	What is your occupation?	-------------------	

<table>
<tr><td colspan="4" style="background-color:#9dc183">3. Life style information</td></tr>
<tr><td colspan="4" style="background-color:#f5c396">Physical Activity</td></tr>
<tr><td></td><td>Question</td><td>Response</td><td>Code</td></tr>
<tr><td colspan="4" style="background-color:#d3d3d3">Work</td></tr>
</table>

	Question	Response	Code
16	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like for at least 10 minutes continuously? Ex:[carrying heavy loads, digging or construction work	1. Yes 2. No (If No skip to Q19)	P1
17	In a typical week, on how many days do you do vigorous intensity activities as part of your work?	No. of days:.........	P2
18	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hrs : Min ....:........	P3
19	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously?	1. Yes 2. No (If No skip to Q22)	P4
20	In a typical week, on how many days do you do moderate intensity activities as part of your work?	No. of days:.........	P5
21	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hrs : Min ....:........	P6

Travel to and from places

22	Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	1. Yes 2. No (If No skip to Q25)	P7
23	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	No. of days:.........	P8
24	How much time do you spend walking or bicycling for travel on a typical day?	Hrs : Min ....:........	P9

Recreational activities

25	Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football,] for at least 10 minutes continuously?	1. Yes 2. No (If No skip to Q28)	P10
26	In a typical week, on how many days do you do vigorous intensity sports, fitness or recreational (leisure) activities?	No. of days:.........	P11
27	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hrs : Min ....:........	P12
28	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking,(cycling, swimming, and volleyball) for at least 10minutes continuously?	1. Yes 2. No (If No, skip to Q31)	P13
29	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?	No. of days:.........	P14
30	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	Hrs : Min ....:........	P15

Smoking

31	At the present time, are you a smoker?	1. Yes (.....Cigarettes\day) (If Yes pass to Q 32) 2. No (If No pass to Q33)	

32	How old were you when you started smoking daily?	…….. year	
33	Have you ever smoked?	1. Yes (.......months) (.....Cigarettes\day) 2. No	
34	Do you smoke Water pipe?	1. Yes 2. No (If No, skip to Q36)	
35	How many times do you smoke Water Pipe daily on average?	……… time	

Sleeping Pattern

36	How many hours do you sleep at night on average?	…….....……. hours	
37	How many hours do you sleep at daytime on average?	…….....……. hours	

Sedentary behaviors

38	How much time do you usually spend sitting or reclining on a typical day?	……………. hours	
39	Do you study while?	1. Moving from place to place 2. Sitting on the desk 3. Sitting in the bed	
40	How many hours do you study daily on average?	……….. hours	
41	Do you usually eat while studying?	1. Always 2. Sometimes 3. Never (if never, skip to Q43)	
42	What do you eat while studying?	1. Fruits and vegetables 2. Pop corn 3.Chips and snacks 4. Nuts 5.Cookies 6. Hot drinks 7. Soda drinks	
43	How many hours do you watch TV daily on average?	…….....……. hours	
44	Do you eat while watching TV?	1. Always 2. Sometimes 3. Never (if never, skip to Q46)	

45	What do you eat while watching TV?	1. Fruits and vegetables 2. Pop corn 3.Chips and snacks 4. Nuts 5. Hot drinks 6. Soda drinks	
46	Do you use social media (Facebook, twitter, what's up viber etc.)?	1. Yes 2. No (If No, skip to Q50)	
47	How many hours do you use social media (Facebook, twitter, what's up viber etc.) daily on average?	……..……. hours	
48	Do you eat while using social media (facebook, twitter,what's up viber etc.)?	1. Always 2. Sometimes 3. Never (if never, skip to Q 50)	
49	What do you eat while using social media (facebook, twitter,what's up, viber etc.)?	1. Fruits and vegetables 2. Pop corn 3.Chips and snacks 4. Nuts 5. Hot drinks 6. Soda drinks	
50	Do you play video games on smart phone or computer daily on average?	1. Yes 2. No (If No, skip to Q54)	
51	How many hours do play video games on smart phone or computer daily on average?	……..……. hours	
52	Do you eat while playing video games on smart phone or computer?	1. Always 2. Sometime 3. Never (if never, skip to Q54)	
53	What do you eat while playing video games on smart phone or computer?	1. Fruits and vegetables 2. Pop corn 3.Chips and snacks 4. Nuts 5. Hot drinks 6. Soda drinks	
4. Dietary habits information			
54	How often do you have breakfast?	1. Never (If never skip Q 56) 2. Sometimes 3. Always	
55	Where do you have your breakfast?	1. At home 2. At university	

56	How many meals do you have daily?	1. One meal 2. Two meals 3. Three meals 4. More than three	
57	Do you have meals regularly?	1. Never 2. Sometimes 3. Always	
58	Do you take enough time while eating?	1. Never 2. Sometimes 3. Always	
59	Do you take snack between breakfast and lunch?	1. Never 2. Sometimes 3. Always	
60	Do you regularly skip any meal?	1. Yes 2. No (If No skip to Q63)	
61	What is the main meal that you skip?	1. Breakfast 2. Lunch 3. Dinner	
62	What is the reason for not having this meal?	1. Do not have a time 2. Diet 3. Loss of appetite 4. Not a habit 5. Other	
63	Do you eat mid-night snack?	1. Never 2. Sometimes 3. Always	
64	Do you take Junk food like burger, pizza and shawrma?	1. Never 2. Sometimes 3. Always	
65	On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner?	……. meal	

5. Sociocultural and Environmental information

Body Image

66	Are you satisfied with your physical look?	1. Yes 2. No	
67	Do you perceived yourself as?	1. Under weight 2. Normal weight 3. Over weight 4. Obese	

| 68 | Your parents consider you? | 1. Under weight
2. Normal weight
3. Over weight
4. Obese
5. I do not know | |
| 69 | Your peers consider you? | 1. Under weight
2. Normal weight
3. Over weight
4. Obese
5. I do not know | |

Eating Due to Emotions and Stress

	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
70	Do you eat to find happiness and peace of mind?					
71	I overeat when I am stressed.					
72	I eat when I am sad.					
73	I eat when I am anxious.					
74	I eat when I am frustrated.					
75	I eat when I am angry					
76	Do you eat while feeling lonely?					
77	I eat to avoid dealing with problems.					
78	I overeat when I socialize					
79	It is hard for me to stop eating when I am full.					
80	I feel upset and depressed after eating					

Sociocultural habits

| 81 | With whom do you eat much? | 1. Alone
2. With family
3. With peers | |

82	Where do you prefer eating your fast food?	1. Do not eat 2. Home 3. University 4. Restaurant 5. Home, university and restaurant	
6. Medical profile			
83	During childhood period, you were	1. Under weight 2. Normal weight 3. Over weight 4. Obese	
84	Parents obesity	1. Neither 2. Both 3. Father 4. Mother	
85	Do you have any brothers or sisters overweight or obese?	1. Yes 2. No	
86	Do you have any chronic disease?	1. Yes 2. No (If No, skip to Q 89)	
87	What is the disease do you have?	1. Diabetes Mellitus 2. Cardovascular 3. Hyperlipidemia 4. Renal 5. Respiratory 6. Genetic 7. Cancer	
88	Do you take any medicine?	1. No 2. Yes, if yes list the names of medications …………… How often ……………. Duration ……………….	
89	Do you use any illegal drugs?	1. No 2. Yes, if yes list the names of drugs …………….	
7. Anthropometric measurements			
90	Weight (Kg)		
91	Height (cm)		

Annex (7): Food Frequency Questionnaire (Arabic and English version)

خلال ال 12 شهرا الماضية، من فضلك قل لي كم مرة اكلت كل من الأصناف التالية وكم كمية كل صنف في كل مرة

عدد الحصص الغذائية في كل مرة	شهريا	أسبوعيا	يوميا	لا أتناوله	وصف الأصناف		الرقم
					الحصة الغذائية	الصنف	
					1كوب	خضروات ورقية نية	1
					1 كوب	خضروات مطبوخة	2
					1 كوب	خضار مقلية	3
					2\1 كوب	عصير خضار	4
					1 متوسطة	فواكه	5
					4\1 كوب	فواكه مجففة	6
					2\1 كوب	عصير فواكه طبيعي	7
					2\1 كوب	عصير فواكه صناعي	8
					1كوب	حليب قليل الدسم	9
					1 كوب	حليب كامل الدسم	10
					2\1 كوب	زبادي	11
					1 كوب	زبادي قليل الدسم	12
					شريحة واحدة	جبنة صفراء	13
					1كوب ونصف	جبنة بيضاء قليلة الدسم	14
					شريحة	خبز	15
					2\1 كوب	شعيرية إيطالية (مكرونة)	16
					2\1 كوب	أرز مطبوخ	17
					2\1 كوب	حبوب	18
					2\1 كوب	البقوليات	19
					ملعقة صغيرة	زبد نباتي مدعم (مارجرين)	20
					ملعقة كبيرة	خلائط غذائية رخوة (مايونيز)	21
					ملعقة صغيرة	زيت نباتي	22
					ملعقة صغيرة	زيت زيتون	23
					ملعقة او 2 صغيرة	عصارة هلامية(صوص)	24
					3 وقية حجم الماوس	لحوم مطبوخة	25
					1	بيض	26
					3 وقية	سمك مشوي	27

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					الطعام	
					حجم الماوس		
				3 وقية حجم الماوس	سمك مقلي	28
				شريحة حجم اليد	فطيرة إيطالية (بيتزا)	29
					فلافل	30
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Food Frequency Questionnaire

Over the past 12 month, please tell me how often did you eat the following items and how much did you eat at each time.

	Item Description		Never	Daily	Weekly	Monthly	No. of servings at each time
	Item	**One Serving**					
1	Raw leafy vegetables	1 cup					
2	Cooked vegetables	1\2 cup					
3	Fried vegetables						
4	Vegetables juice	1\2 cup					
5	fruits	1 medium					
6	Dried fruit	1\4 cup					
7	Frozen fruits	1\2 cup					
8	Fruit juice	1\2 cup					
9	Fat free \Low fat milk	1 cup					
10	Whole milk	1 cup					
11	Frozen yogurt	1/2 cup					
12	Fat free \Low fat yogurt	1 cup					
13	Cheese-hard	1 slice of hard cheese					
14	cheese	2 cups cottage cheese					
15	Fat free \Low fat cheese	1 and 1\2 cup					
16	Bread	1 slice					
17	pasta	1\2 cup					
18	Cooked rice	1\2 cup					

19	cereals	1\2 cup					
20	legumes	1\2 cup					
21	Dry beans	1\2 cup					
22	Margarine	1 tsp.					
23	Mayonnaise	1 tbsp.					
24	Vegetables oil	1 tsp.					
25	Olive oil						
26	Salad dressing	1 or 2 tbsp.					
27	Cooked meat	3 oz (compu er mouse size)					
28	Eggs						
29	Grill fish	3 oz					
30	Fried fish						
31	Pizza and pastry	One slice (size of your hand)					
32	Falafel						
33	Chips and snakes	3/4 to 1 ounce (1 1/2 cups)					
34	Coffee	3/4 cup					
35	Tea	3/4 cup					
36	Green tea						
37	Juices	1/2 cup					
38	Soft drinks	1 cup					
39	Ice cream	1/2 cup					

40	chocolate	10 gm (2 squares)					
41	cake	two 13x9inch cake					
42	Nuts	1\3 cup					
43	Jelly or jam	1 tbsp.					
44	Sugar	1 tbsp.					

Annex (8): List of experts

No.	Name	Position
1.	Dr. Yehia Abed	Al- Quds university
2.	Dr. Bassam Abu Hamad	Al- Quds university
3.	Dr. Adnan El Whaidi	Ard El Insan
4.	Dr. Mazen Al Saqqa	Al- Azhar university
5.	Dr. Jehad Ahmad	Al- Azhar university
6.	Dr. Ihab Naser	Al- Azhar university
7.	Dr. Ahmed Elili	Al- Azhar university
8.	Dr. Mohamed El Lulu	Nutrition expert
9.	Dr. Amal Abu Jamea	Dar Al Shefaa hospital
10.	Gehad Okasha	MoH

Annex of (9): Helsinki approval

المجلـــس الفلسطيـــني للبحـــث الصحــــي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 03\08\2015

Number: PHRC/HC/54 /15

Name:

الاسم: شروق حسام أبو حمد

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

Determinants of Overweight and Obesity among University Students in the Gaza governorates: Cross-sectional study

The committee has decided to approve the above mentioned research.
Approval number PHRC/HC/54 /15 in its meeting on 03/08/2015

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member

Member

Chairman

Genral Conditions:-

٤٦. Valid for 2 years from the date of approval.
٤٧. It is necessary to notify the committee of any change in the approved study protocol.
٤٨. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

The subject was approved following the World Medical Association Declaration of Helsinki-Ethical principles for medical research involving human subjects, adopted by the 18th World Medical Association General Assembly, Helsinki, Finland, June 1964 and amended by the 59th WMA General Assembly, Seoul, Korea, October 2008.

E-Mail:pal.phrc@gmail.com

Gaza - Palestine

غزة ـ فلسطين
شارع النصر ـ مفترق العيون

Annex (10) Al-Aqsa university approval

Al-Quds University

Jerusalem

School of Public Health

جامعة القدس

القدس

كلية الصحة العامة

التاريخ: 2015/10/3

الرقم: ك ص ع –غ/2ت/2015

حضرة الدكتور/أيمن صبح   حفظه الله

نائب رئيس الجامعة للشئوون الأكاديمية

السلام عليكم رحمة الله،،،

الموضوع:تسهيل مهمة الطالبة شروق أبو حمد

تقوم الطالبة المذكورة أعلاه بإجراء بحث بعنوان:

Determinants of Overweight and Obesity among University Students in the Gaza governorates: Cross-sectional study

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار علم الأوبئة وعليه نرجو التكرم بالموافقة والايعاز لمن يلزم بتسهيل مهمة الطالبة بجمع البيانات الخاصة ببحثها حيث أن العينة المستهدفة للبحث قائمة بأسماء واعداد طلاب الجامعة لأخذ عينة عشوائية وأرقام هواتفهم للتواصل معهم واجراء المقابلات في عيادة جامعتكم الموقرة.

علماً بأن المعلومات ستكون متوفرة لدى الباحثة والجامعة فقط وسنطلعكم على النتائج في حينها .

و اقبلوا فائق الاحترام والتقدير،،،

د. بسام أبو حمد

منسق عام برامج الصحة العامة

فرع غزة

فرع القدس / تلفاكس 2799234-02

فرع غزة / تلفاكس 2644220-2644210-08

Annex (11): Al-Azhar university approval

Al-Quds University

Jerusalem

School of Public Health

جامعة القدس

القدس

كلية الصحة العامة

التاريخ 2015/10/3

الرقم ص ع / ع / 2015

حضرة الأستاذ عبدالخالق الفرا   حفظه الله

رئيس جامعة الأزهر

تحية طيبة وبعد...

الموضوع: تسهيل مهمة الطالبة شروق أبو حمد

تقوم الطالبة المذكورة أعلاه بإجراء بحث تحت عنوان:

Determinants of Overweight and Obesity among University Students in the Gaza governorates: Cross-sectional study

لتستكمل بحثها في نيل درجة الماجستير في الصحة العامة-مسار علم الأوبئة وعليه نرجو التكرم بالموافقة والايعاز لمن يلزم تسهيل مهمة الطالبة لجمع البيانات الخاصة بحثها حيث أن العينة المستهدفة للبحث قائمة بأسماء وأعداد طلاب الجامعة لأحد عينة الدراسة والتي تمكنها للتواصل معهم وإجراء المقابلات في عيادة جامعتكم الموقرة.

علما بأن معلومات سكون متوفرة لدى الباحثة والجامعة فقط وسنطلعكم على النتائج في حينها

و اقبلوا فائق الاحترام والتقدير ...

د. بسام أبو حمد

منسق عام برامج الصحة العامة

فرع غزة

Jerusalem Branch/Telefax 02-2799234

Gaza Branch/Telefax 08-2644220 -2644210

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فرع غزة / تلفكس 08-2644220-2644210

ص.ب. 51000

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Al-Quds University

Jerusalem

School of Public Health

جامعة القدس

القدس

كلية الصحة العامة

التاريخ: 2015/10/3

الرقم/: ك ص ع – غ//151/2015

حضرة الأستاذ الدكتور/عادل عوض الله   حفظه الله

رئيس الجامعة الإسلامية

السلام عليكم ورحمة الله،،،

الموضوع:تسهيل مهمة الطالبة شروق أبو حمد

تقوم الطالبة المذكورة أعلاه بإجراء بحث بعنوان:

Determinants of Overweight and Obesity among University Students in the Gaza governorates: Cross-sectional study

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار علم الأوبئة وعليه نرجو التكرم بالموافقة والايعاز لمن يلزم بتسهيل مهمة الطالبة بجمع البيانات الخاصة ببحثها حيث أن العينة المستهدفة للبحث قائمة بأسماء واعداد طلاب الجامعة لأخذ عينة عشوائية وأرقام هواتفهم للتواصل معهم واجراء المقابلات في عيادة جامعتكم الموقرة.

علماً بأن المعلومات ستكون متوفرة لدى الباحثة والجامعة فقط وسنطلعكم على النتائج في حينها .

و اقبلوا فائق الاحترام والتقدير،،، .

د. بسام أبو حمد

منسق عام برامج الصحة العامة

فرع غزة

نسخة:

– الملف

2015/764

Annex (13): Participation approval letter

<div dir="rtl">

نموذج موافقة

عزيزي المشارك \عزيزتي المشاركة

أنا الطالبة شروق حسام أبو حمد ملتحقة ببرنامج الصحة العامة – تخصص وبائيات بجامعة القدس أبوديس.

لقد تم اختيارك بشكل عشوائي للمشاركة في هذه الدراسة التي تهدف لدراسة محددات زيادة الوزن والسمنة بين طلاب جامعات قطاع غزة.

ستجرى هذه الدراسة كجزء من متطلبات برنامج الماجستير – كلية الصحة العامة.

إذا ابديت الموافقة على المشاركة في هذه الدراسة، عليك الإجابة على أسئلة الاستبانة مع العلم بما يلي:

- مشاركتك في هذه الدراسة طوعية يحق لك القبول أو الرفض او حتى الانسحاب في أي وقت.
- سيحتاج هذا الاستبيان لتعبئته من 15-20 دقيقة على الأقل.
- سوف يتم قياس وزنك وطولك.
- لا يوجد إجابات صحيحة وأخرى خاطئة، عبر\ي عن وجهة نظرك وقناعتك.
- السرية مكفولة ولن نسألك عن اسمك.

شكرا لتعاونك

مع فائق الاحترام والتقدير

الباحثة

شروق أبو حمد

</div>

Abstract in Arabic

<div dir="rtl">

دراسة محددات زيادة الوزن والبدانة بين طلاب الجامعات في قطاع غزة

اعداد: شروق حسام أبو حمد

اشراف: د. ختام أبو حمد

ملخص الدراسة:

تعتبر السمنة سببا رئيسيا للعبء العالمي للأمراض غير المنقولة والإعاقة حيث تؤثر على جميع الأعمار والفئات الاجتماعية في البلدان المتقدمة والنامية. على الصعيد العالمي، تعتبر السمنة مشكلة خطيرة بين طلبة الجامعات.

الهدف من الدراسة:

هدفت هذه الدراسة الي قياس معدل انتشار زيادة الوزن والسمنة ودراسة العوامل المصاحبة لزيادة الوزن والسمنة بين طلاب جامعات قطاع غزة.

منهجية الدراسة:

تعتبر هذه الدراسة وصفية تحليلية كمية، وقد تم جمع البيانات الكمية بطريقتين، الأولى من خلال اجراء مقابلات شخصية مع الطلاب لتعبئة الاستبانة المخصصة، والثانية هي قياس الوزن والطول لكل الطلاب المشاركين في الدراسة، استخدم الباحث مؤشر كتلة الجسم وفق معايير منظمة الصحة العالمية لتعريف السمنة بين الطلاب. شمل مجتمع الدراسة على 400 طالب (200 ذكور و200 اناث) تتراوح أعمارهم ما بين 18 الى 24 عام من الجامعة الإسلامية، جامعة الأقصى وجامعة الازهر، حيث تم استخدام عينة عشوائية لاختيار الجامعات المشاركة والطلاب المشاركين من كل جامعة.

وقد تم تحليل البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS) حيث أجريت التوزيعات، الترددات والنسب المئوية، الجداول، كما حسبت النسب المئوية المتوسطة والعامة والجداول المتقاطعة واستخدام Chi-Square لإيجاد العلاقات بين المتغيرات.

</div>

نتائج الدراسة:

أظهرت الدراسة وجود معدل انتشار واسع لزيادة الوزن والسمنة بين طلاب الجامعات في قطاع غزة يصل الى 18.8%، 20.8% بالتتابع.

بالإضافة الى ذلك أظهرت الدراسة علاقات ذات دلالة إحصائية بين السمنة وبعض العوامل الاقتصادية والاجتماعية مثل الجنس، السنة الدراسية معدل الدخل الشهري للأسرة. الا ان نتائج الدراسة لا تظهر علاقات ذات دلالة احصائية بين السمنة والعوامل الاقتصادية الأخرى مثل العمر، الحالة الاجتماعية، عدد أفراد الأسرة وعدد سنوات تعليم الوالدين.

ومن النتائج التي أظهرتها الدراسة وجود علاقات ذات دلالة إحصائية بين السمنة وبعض العوامل المتعلقة بنمط الحياة مثل قلة النشاط البدني، تدخين النرجيلة، قلة عدد ساعات النوم ليلا، زيادة عدد ساعات النوم نهارا، الجلوس لفترات طويلة، الدراسة لفترات طويلة، مشاهدة التلفاز واستخدام الانترنت لفترات طويلة، تناول الطعام خلال الدراسة، تناول الطعام خلال مشاهدة التلفاز واستخدام مواقع التواصل الاجتماعي مثل رقائق البطاطس المقلية والمشروبات الغازية والساخنة. بينما لا تظهر نتائج الدراسة علاقات ذات دلالة إحصائية بين السمنة وتدخين السجائر والعاب الفيديو.

بالإضافة الى ذلك أظهرت الدراسة علاقات ذات دلالة إحصائية بين السمنة وبعض العادات الغذائية مثل عدم تناول وجبة الإفطار، تناول وجبة الإفطار بالجامعة، تناول الوجبات السريعة خاصة بالجامعة وبصحبة الأصدقاء، تناول الطعام بين الوجبات وفي أوقات متأخرة ليلا، زيادة استهلاك الدهون والاطعمة المقلية والكربوهيدرات والسكريات وقلة استهلاك الأطعمة الغنية بالكالسيوم. الا ان نتائج الدراسة لا تظهر علاقات ذات دلالة احصائية بين السمنة واستهلاك الخضروات والفواكه والاطعمة الغنية بالبروتين.

أظهرت نتائج الدراسة أيضا علاقات ذات دلالة إحصائية بين السمنة والعوامل النفسية مثل زيادة تناول الطعام للتغلب على الضغط النفسي وعند الحالات الانفعالية مثل السعادة، الحزن، الغضب، الإحباط والتوتر. بالإضافة الى ذلك أظهرت النتائج علاقات ذات دلالة إحصائية بين السمنة وزيادة تناول الطعام للتغلب على المشكلات وفي المناسبات الاجتماعية المختلفة.

وقد أظهرت نتائج الدراسة علاقات ذات دلالة إحصائية بين السمنة وبعض العوامل الاجتماعية والثقافية مثل عدم الرضا عن الشكل الخارجي، التصور الذاتي لصورة جسم الطالب ووجهة نظر الوالدين والأصدقاء لصورة جسم الطالب.

بالإضافة الى ذلك، أظهرت الدراسة علاقات ذات دلالة إحصائية بين السمنة وبعض العوامل الطبية مثل السمنة خلال فترة الطفولة، السمنة عند الوالدين والسمنة عند الاخوة والاخوات.

الخلاصة:

زيادة الوزن والسمنة تعتبر مشكلة بين طلاب الجامعات في قطاع غزة، هناك حاجة لإجراء برامج التثقيف الصحي التي تهدف لدعم نمط الحياة الصحي من خلال زيادة وعي الطلاب عن التغذية السليمة وتعزيز زيادة النشاط البدني لدى فئة طلاب الجامعات. هناك أيضا حاجة ماسة لإجراء برامج التثقيف الصحي التي تهدف لزيادة وعي الطلاب عن مشكلة السمنة وأضرارها. بالإضافة الى ذلك، يجب ان تلعب الجامعات دورا أساسيا في مكافحة وباء السمنة من خلال عمل برامج وقاية جامعية تهدف لتعزيز أهمية التغذية الصحية والنشاط البدني للمحافظة على الوزن. هناك حاجة لإجراء دراسات بحثية كمية ونوعية لدراسة المتغيرات المرتبطة بالسمنة بين عينات أكبر من طلاب الجامعات الفلسطينية، بالإضافة الى اجراء دراسات بحثية لدراسة مشكلة زيادة الوزن والسمنة بين الأطفال دون سن المدرسة، أطفال المدارس والمراهقين.