An-Najah National University
Faculty of Graduate Studies

Prevalence of overweight and obesity and their associations with dietary habits among students from An-Najah National University: A cross-sectional study

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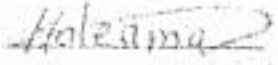
1. Dr. Haleama Al-Sabbah / Supervisor	
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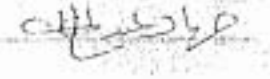
4. Dr. Jihad Abdallah / Internal examiner	

Dedication

I dedicate this work especially to my family;

Wife, sons, daughters

Parents, bropthers, sisters

Nieces, nephews

And friends with love and respect

Bassam Ali Abu Shanab

Acknowledgement

First of all, I would like to express my Special thanks and Sincere gratitude to my family; wife, sons, daughters and also to my friends for their encouragement, and support, to finish this study.

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Finally, I would like to express my special thanks to An-Najah National University Administration that gave me the chance to accomplish this work.

الإقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Prevalence of overweight and obesity and their associations with dietary habits among students from An-Najah National University: A cross-sectional study

انتشار زيادة الوزن والسمنة وارتباطاتها مع عادات الأكل بين طلاب من جامعة النجاح الوطنية: دراسة مقطعية

اقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وأن هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أية درجة علمية أو بحث علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work and has not been submitted elsewhere for any other degree or qualification.

Student's name: **اسم الطالب:**

Signature: **التوقيع:**

Date: **التاريخ:**

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Prevalence of overweight and obesity and their associations with dietary habits among students from An-Najah National University: A cross-sectional study

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Abstract

Background

Overweight and obesity are major public health problems and the most common nutritional disorders**.** The prevalence of overweight and obesity is rising at an alarming rate in both developing and developed countries. The main objective of this study is to assess the prevalence of overweight and obesity and their associations with dietary habits among students from An-Najah National University in Palestine.

Methodology

A cross-sectional study was conducted on 304 Students (50% males and 50%females), who have been chosen by convenient sampling method from An-Najah National University campus of two faculties; Faculty of Arts (152 students) and Faculty of Science (152 students). Data collection was carried out during the period between March and April 2011. Students were asked to fill in a standard questionnaire.

Food habits of the participants were assessed by using the food frequency questionnaire for selected food items. Body Mass Index (BMI) was used for the assessment of overweight and obesity. Also waist

circumference (WC) was measured to assess abdominal obesity. In addition, hemoglobin level in blood (Hb%) was tested. Statistical analysis was conducted using the Statistical Package for Social Sciences software (version 15.0). Informed consent was taken from all participants.

Results

The majority of the sampled students (70.4%) were of normal weight (78.9% of females and 61.8% of males). The prevalence rates of overweight and obesity among students from An-Najah national University were 20.1% and 4.6%, respectively. Furthermore, overweight and obesity were more common among male students compared to females (27.0%and 5.9% vs. 13.2% and 3.3%, respectively). The prevalence of abdominal obesity among students was 17.8% and was more common among female students (23.0%) compared to males (12.5%). The prevalence of anaemia among university students was 13.8%. Anaemia was more common among females (18.4%) than males (9.2%), ($P< 0.05$). In addition, about 5.3% of male students were underweight compared to 4.6% of females. The majority (68.4%) of students reported that they take meals irregularly. There were significant differences between males and females in meal patterns, ($P< 0.05$). Also there were significant differences between males and females in physical activity (69.1% of males and 55.9% of females practiced sports), and smoking (51.3% of males and 91.4% of females never smoked, while 48.7% of males and 8.6% of females were current smokers), ($P< 0.05$).

A total of 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.

Conclusions

According to results obtained, the author concluded that overweight and obesity are a problem among Arts and Science students of An-Najah National University, despite the low prevalence of overweight and obesity in the studied sample as compared to prevalence in neighboring countries. Overweight and obesity were more common among male students compared to females. The prevalence of abdominal obesity was more common among female students compared to males. Prevalence of anaemia was more common among females than male students. Results indicated that university students would benefit from nutritional and health promotion programs to reduce the tendency of overweight and obesity, particularly males, and to improve students' eating habits through educational programs which encourage increased consumption of fruits and vegetables for a good health.

Keywords

Obesity, Overweight, Dietary habits, Anemia, An-Najah National University students, Nablus, Palestine.

Chapter 1

Introduction

Chapter 1
Introduction

1.1 Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems [1]. Obesity is a leading but preventable cause of death worldwide, with increasing prevalence in adults and children, and it is one of the most serious public health problems of the 21st century [2]. Some contributing factors are said to include a global shift in diet towards increased calories, fat, salt, and sugar intake, a trend towards decreased physical activity due to the sedentary nature of modern work, transportation, and increasing urbanization [3].

Dietary habits are the major aspects of people's lifestyles that influence health, morbidity, and mortality for a range of conditions [4]. Overweight and obesity are major public health problems and the most common nutritional disorders [5], therefore, both overall and abdominal obesity are associated with non-communicable chronic diseases such as type 2 diabetes, cardiovascular and cerebrovascular diseases, digestive disorders, and cancer [6]. As obesity is one of the major health challenges worldwide, it is rapidly reaching epidemic proportions [7, 8]. Disorders related to obesity are a growing epidemic in both developing and developed countries [9- 11].

The World Health Organization (WHO) classifies adults as overweight when Body Mass Index (BMI) is 25 -29.9 kg/m^2, obese when BMI is >30 kg/$m^{2,}$ and have abdominal obesity when waist circumference (WC) > 94 cm for men and >80 cm for women, and Waist –to-Hip Ratio (WHR) of > 0.90 in men and > 0.85 in women [12]. Overweight is generally defined as having more body fat than is optimally healthy [13, 14]. The estimates in 2005 showed that more than 1 billion people worldwide were overweight and more than 300 million were obese. Prevalence is expected to increase further in almost all countries, with 1.5 billion people expected to be overweight in 2015 [15].

Several studies indicated that causes of obesity are multifactorial [16-18]. These factors may include biological and non-biological factors such as heredity, age, sex, occupation, socio-economic level, physical inactivity, eating habits and physiological factors [9, 10, 16-18]. Complications are either directly caused by obesity or indirectly through mechanisms sharing a common cause such as poor diet or a sedentary lifestyle. The strength of the association between obesity and specific conditions varies. One of the strongest is the link with Type 2 diabetes. Obesity is responsible for a large proportion of the total burden of chronic diseases, 65% of the obesity and overweight in the European region is associated with growing rates of chronic diseases such as heart disease, diabetes and cancers [8- 19]. The condition is thus affecting longevity, and in particular trends in childhood obesity are widely expected to lead to shorter life expectancy for today’s children [8- 19]. In the United States,

obesity is estimated to cause an excess 111,909 to 365,000 deaths per year [20] while 1 million (7.7%) of deaths in the European Union are attributed to excess weight [21-22]. On average, obesity reduces life expectancy by six to seven years [21, 23]. A BMI of 30–35 reduces life expectancy by two to four years, while severe obesity (BMI > 40) reduces life expectancy by 10 years [23-24].

1-2 Significance of this study

In Palestine, an increased prevalence of excessive weight is noted among all age groups in both genders. It is important to note that there has been a nutritional transition in food choices during the past years from the typical Mediterranean diet into the western fast food pattern. Therefore, obesity is responsible for a large proportion of the total burden of diseases, such as heart disease, diabetes and cancers [8- 19].

Several international and regional studies indicated that factors causing obesity are multi-factorial [16-18]. Data from the occupied Palestinian territory, (based on one study that was done in a rural community in Ramallah, are for adults aged 30-65 years and are not necessarily an indication of the national data) indicated that the prevalence of obesity and overweight in men was 58.7% and in women was 71.3% [25]. Recently, few studies have been conducted to assess the associations with overweight among Palestinian schoolchildren [26, 27], whereas there were no studies conducted to assess the prevalence of overweight and

obesity and their associations with dietary habits among university students.

To the best of my knowledge, this is the first study to be conducted in Palestine regarding prevalence of obesity, overweight and their associations with dietary habits among university students.

1.3 Study objectives

1.3.1 Main Objective

To assess the prevalence of overweight and obesity and their associations with dietary habits among students from An-Najah National University, Palestine

1.3.2 Specific objectives:

1- To assess the prevalence of overweight and obesity among An-Najah University students.

2- To describe the university students' lifestyle including: food habits, meal pattern, smoking, and physical inactivity.

3- To examine the associations between overweight and obesity by meal pattern among An-Najah University students.

4- To assess the prevalence of anaemia among university students and identify the differences between students living in dorms and students living with their families.

5- To examine the association between anemia and each of overweight, obesity among university students.

6- To assess the association between anemia and dietary habits among University students.

1.4 The questions of this study

The study aimed at answering the following questions:

1. What are the present proportions of overweight and obesity among Arts and Science students at An-Najah National University, Nablus, Palestine?

2. Are there significant relationships at the level $\alpha = 0.05$ between overweight and obesity and lifestyle factors including: food habits, meal pattern, physical activity and smoking?

3. What are the present proportions of anemia among the studied sample of university students at An-Najah National University –Nablus- Palestine?

4. Are there significant relationships at the level $\alpha = 0.05$ between overweight and obesity and anemia among the studied sample of university students?

5. Are there significant relationships at the level $\alpha = 0.05$ between dietary habits and anemia among the studied sample of university students?

Chapter 2

Literature Review

Chapter 2
Literature Review

In the United States, obesity was not considered as an issue of interest in the mid-1980s, but since then, it has become more common in 2003-2004, approximately 32.2 percent of the US adult populations were obese [28]. Almost one third of the adult Canadians are at increased risk of disability, disease, and premature death due to obesity [29]. Obesity is relatively common in Europe, especially in southern and eastern countries, and studies from repeated surveys suggested that the prevalence of obesity has been increasing in recent years [30, 31].

In the Arab countries, some studies are available (Jordan, Kuwait, Saudi Arabia and Lebanon) regarding the determinants of obesity particularly among university students. These studies plus others from developed countries, draw an alarming picture of prevalent obesity, which in turn could be an indicator for an increase in the occurrence of other chronic diseases in the region [32].The factors associated with obesity were age, sex, marital status, smoking, physical activity, parental obesity, dietary habits and socio-cultural factors [33-35].

In a study conducted in Jordan in 2009, the prevalence rates of overweight and obesity among Jordan University students (aged 17-28 years) were 28.5% and 10.2%, respectively [36]. Another study in Jordan [37], conducted on 233 females aged 20-25 years from the Jordan Northern Badia, showed that prevalences of overweight and obesity were 27.0%and 6.9%, respectively. Factors that were found to be significantly ($P<0.05$)

associated with BMI among the Badia young females included educational status, marital status, work status, smoking status and chronic diseases [37].

A study conducted on Kuwait University students in 1999 regarding the prevalence of obesity, the Grade 1 (when BMI is 30.0-34.9 kg/m^2) and Grade 2 obesity (when BMI is 35.0-39.9 kg/m^2) were found to be 32.0% and 8.9%, respectively [38]. In 2008, the prevalence of overweight and obesity among students of the Lebanese American University was higher among male students compared to females (37.5% and 12.5% vs. 13.6% and 3.2%, respectively) [39].

A study conducted on university students (aged 17 - 38 years), in Bahrain, the proportions of obesity were 11.8% in males and 7.6% in females [40]. In Saudi Arabia, a study conducted on Saudis of both genders, the overweight was significantly more prevalent in males (42.4%) compared to 31.8% of females [41]. Several regional and international studies investigated the associations of overweight and obesity with the lifestyle (meal pattern, physical activity and smoking) and anemia, among university students. A study was conducted in California State University, Chico, in 2004 to assess the diet, exercise habits and perceived barriers to following a healthy lifestyle of 471 college students [42] Sixty percent of the participants were females (aged 18-21) and 31% had BMIs > 25. The study found that breakfast was the most commonly missed meal and 63% of students snacked one to two times per day. About 58% of participants ate vegetables and 64% ate whole or canned fruit less than once per day.

The most common barrier to exercise was “lack of time.” Forty percent of men compared with 20% of women had a BMI greater than 25 [42].

A study carried out in Kuwait to explore the factors associated with overweight and obesity in a sample of 515 Kuwaiti college men revealed that 38·5 and 11·1% of the students were overweight and obese, respectively. The factors that were found to be significantly associated with overweight and obesity among men included age, marital status, exercising and dieting [43].

Regarding the associations of Iron Deficiency Anemia with overweight and obesity, iron deficiency anemia was common in overweight and obese students: A recent study in Saudi Arabia, conducted on 310 female students aged (18 - 23 years) at the Faculty of Medicine of King Abdul-Aziz University, indicated that 23.9% of students had iron deficiency anemia, [44]. There was a significant correlation between iron deficiency and iron deficiency anemia with inadequate meat intake and impaired exercise capacity [44].

A study in Bahrain in 2005, conducted on school children (2594 students aged 6-18 years) indicated that prevalence of overweight and obesity was high (girls 25.5%, boys 21.4%); 50% of girls and 36% of boys skipped breakfast meal regularly; students reported low levels of physical activity and indulged in a sedentary life style; prevalence of anemia was higher among girls (31.7%) compared to boys (22.7%), [45]. Furthermore, a study in Israel in 2001, assessed whether overweight children and

adolescents, who often have poor dietary habits, are at increased risk of iron deficiency. The study was conducted on 321 children and adolescents followed in two endocrine centers between 1999 and 2001.The study indicated that iron levels below 8 micromole/l (45 mcg/dl) were noted in 38.8% of obese children and 12.1% of overweight children, compared with 4.4% of normal-weight group ($P<0.001$), [46].

In Palestine, there is a lack of data about obesogenic factors (factors tending to cause obesity) which are important in defining and understanding high risk factors which should be targeted for future modifications in public health interventions. Also, there were no studies conducted to assess the prevalence of obesity among university students. Therefore, this study was conducted to assess the prevalence of overweight, obesity and their associations with dietary habits among students from An-Najah National University in Palestine**.**

Chapter 3

Methodology

Chapter 3
Methodology

3.1 Study Design

A cross-sectional study was conducted on a sample of 304 BA and BSC students admitted to the Faculty of Arts and the Faculty of Science at An-Najah National University (Nablus, Palestine) between 2006 and 2010.

3.2 Study Sample

A sample of 304 students was chosen from An-Najah National University campus of two faculties (Faculty of Arts and Faculty of science in a ratio of 1:1). Number of participants from each faculty was 152 (76 males + 76 females). Enrollment and recruitment of the study subjects have been done through weekly meetings with the faculty students explaining to them the aim and objective of the study. Those who agreed to participate and met the study inclusion criteria were asked to fill in and sign a consent form and invited for anthropometric measurements and blood drawings through a fixed appointment. The sample size was estimated as follows:

$$n = \frac{z^2_{\alpha/2} * P(1-p)}{\delta^2} \qquad (1)$$

$$n^* = \frac{n}{1 + \frac{n-1}{N}} \qquad (2)$$

The researcher assumed that the proportion of obesity in each faculty, P = 7% (0.07), and δ (half-width of confidence interval) is 4%

(0.04) with confidence coefficient of 95% ($Z_{\alpha/2}$ = 1.96). The calculated sample size using formula (1) was 157 from each faculty. After correction for finite population size based on formula (2) and taking into consideration that the population size (N) was 2500 in each faculty, the sample size was 148 from each faculty**.** The actual number of participants in the study was slightly larger than that calculated (304 students: 152 from each faculty) chosen by convenient sampling method and distributed as follows:

1st year: 38 students (19males + 19 females).

2nd year: 38 students (19males + 19 females).

3rd year: 38 students (19males + 19 females).

4th year: 38 students (19males + 19 females).

3.3 Inclusion and Exclusion Criteria

The study included students who were still studying at both faculties (Faculty of Arts and Faculty of science) at An-Najah National University while excluded blind students who couldn't fill in the questionnaire.

3.4 Main Measures

Obesity: Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems [1].

Overweight: Overweight is generally defined as having more body fat than is optimally healthy [47].

Body Mass Index (BMI): It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). A value of BMI < 18.5 kg/m^2 was classified as underweight, 18.5– 24.9 kg/m^2 was classified as normal weight, 25.0–29.9 kg/m^2 was classified as pre-obese (overweight), and BMI > 30 was classified as obese, [48,49].

Waist circumference (WC): Is a convenient and simple measure which is unrelated to height, correlates closely with BMI and the ratio of waist-to-hip circumference, and is an approximate index of intra-abdominal fat mass and total body fat. Furthermore, changes in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of chronic diseases, even though the risks seem to vary in different populations. There is an increased risk of metabolic complications for men with a waist circumference ≥102 cm, and women with a waist circumference ≥88 cm. [50]. Recently, waist circumference has been used in its own right as an indicator of risk associated with excess abdominal fat [51]. In this study, waist circumference was measured at a level midway between the lowest rib and the iliac crest, by a measuring tape.

Hemoglobin (Hb): Hemoglobin in the blood transports oxygen from the lungs to the rest of the body (i.e. the tissues) where it releases the oxygen for cell use, and collects carbon dioxide to bring it back to the lungs. Normal results vary, but in general are: Hb level for males: 13.8 to 17.2 gm/dL, for females: 12.1 to 15.1 gm/dL, [52, and 53].

Iron deficiency anemia (IDA): is a common anemia (a decrease in number of red blood cells (RBCs) or less than the normal quantity of hemoglobin in the blood) [54] that occurs when iron loss occurs (often from intestinal bleeding or menses), and/or the dietary intake or absorption of iron is insufficient. In iron deficiency, hemoglobin, which contains iron, cannot be formed [55].

The study Questionnaire:

A questionnaire which was previously used [56] was modified, and contained 29 questions (dietary habits, smoking and physical activity, height, weight, WC, Hb%, etc) tested on ten students by a pilot study to determine its acceptability and ease of use by the study participants. The pilot study was carried out in order to identify potential problems and to revise the methods and logistics of data collection before starting the actual fieldwork. The selected tools were appropriate for the collection of the needed information. Questions were understood and answered correctly. The sequence of the questions was logical, the wording clear, and translations accurate. Accordingly, the questionnaire was valid and reliable for the study purposes.

In this study, the factors assumed to be associated with obesity were dietary habits, smoking, physical activity, and socio- demographic factors (Figure 1).

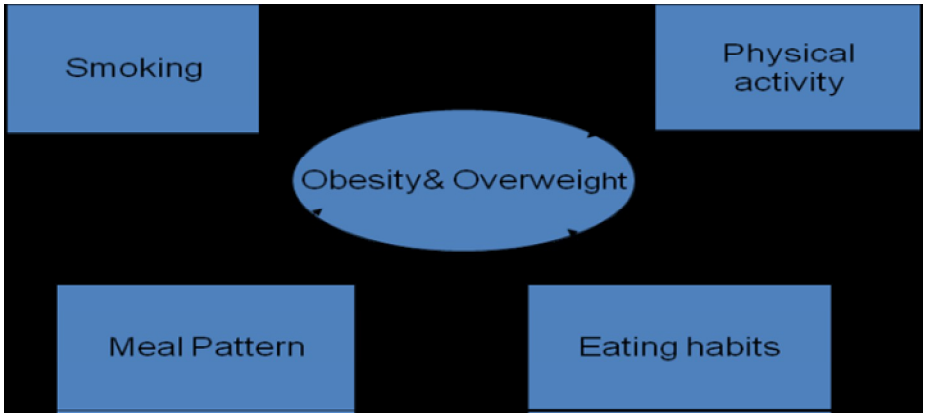

Figure (1): Variables influencing Overweight & Obesity

Socio-demographic variables:

Gender: (Male, Female)

Age: (18--20 years, 21--23years, 24-31 years)

Social status: (Single, Married, engaged, others)

Residency: (City, Village, Camp, student's residence).

Family monthly income: (1000-3000 NIS, 3200-7000 NIS, 8000-12000 NIS).

Studying year level (1st yr, 2nd yr, 3rd yr, 4rth yr)

Faculty: (Faculty of Science and Faculty of Arts)

Independent variables: Food habits, physical activity, meal pattern and smoking.

Dependent variables: Overweight, obesity and anemia.

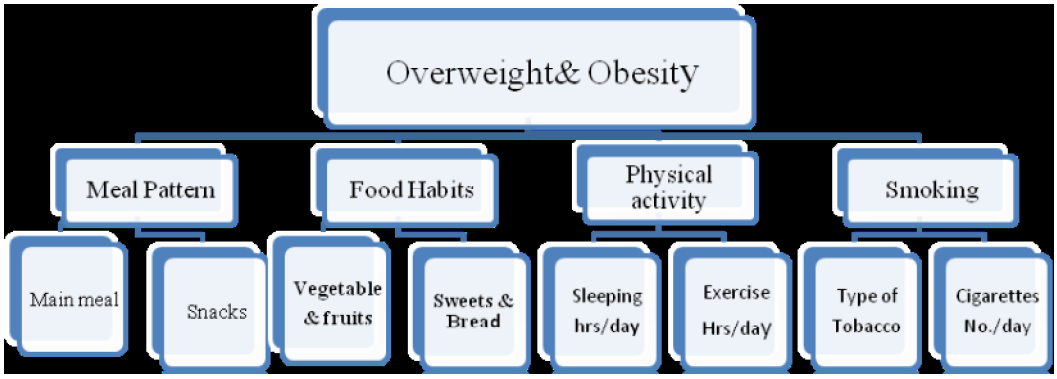

Figure (2): Conceptual framework for some causes of overweight and obesity

3.5 Data collection procedure

Data were collected during the period between 5th of March to 30th of April, 2011.

After taking the approval letter from the university IRB (Institutional Review Board) committee, the researcher had started the research study. Permissions have been taken from the Dean of the Faculty of Arts and the Dean of the Faculty of Science in order to facilitate data collection. Enrollment and recruitment of the study subjects was done through weekly meetings with the students. Banners were hanged on the walls of different areas of the university campus inviting students to participate in the study. Anthropometric measurements and blood withdrawal were conducted at two laboratories of the university; the Central Medical Laboratory in the old campus, and the Scientific Medical Laboratory in the new campus. Weight, height and waist circumference of each participant were measured using a weighing scale (SECA- 803-Germany), with scale of (0.1- 150kg) and measuring tape and rod. Measurements for each parameter were taken

in three occasions at the same time, the closest two measurements were averaged and recorded in the individual's questionnaire while the third measurement was excluded. The weighing scale was calibrated at the beginning of every session of measurement. Participants were weighed in their light clothing without shoes (after the removal of their coats, handbags, mobile phones and other personal accessories). Weight was measured to the nearest 100g. Height and waist circumferences were measured to the nearest 0.5 cm. With the footwear removed, standing straight and looking forward, the participant's height was recorded at the point when the arm of the measuring rod rested on the head. The BMI was calculated as the weight in kilograms divided by the height in square meters (kg/m^2). BMI was based on the World Health Organization (WHO) BMI cut-offs; (BMI < 18.5 kg/m^2 is classified as underweight, 18.5– 24.9 kg/m^2 is classified as normal weight, 25.0–29.9 kg/m^2 is classified as pre-obese (overweight), and > 30 is classified as obese. In addition, hemoglobin level in blood was tested by auto-analysis device (CBC method) for each participant by a well qualified laboratory technician to assess the prevalence of anemia. The result considered normal when hemoglobin level for males ranged between 13.8 to 17.2 gm/dL and for females between 12.1 to 15.1 gm/dL [53].

3.6 Data Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 15. Quantitative variables (continuous)

were analyzed using students't-test, while chi-square and Fisher's exact tests were conducted for qualitative variables (categorical). All reported P-values were made and compared to a significance level of 5%; differences were considered statistically significant at $P < 0.05$.

3.7 Ethical considerations

Approval letter from the university IRB committee was taken before starting this study. All participants in this study were asked to sign a consent form. In addition, students were given a note that the participants can withdraw from the study without giving reasons. All data were recorded and stored in a locked cabinet. Questionnaires were anonymous (no name was written) and only identified by codes. Permissions to collect data from the target faculties have been taken from each faculty Dean.

Chapter 4

Results

Chapter 4
Results

4.1 Characteristics of the participants

About half (52.4%) of the students aged 18-20yr, 43.7% aged 21-23yr and only 3.9% aged 24-31yr. Most students (90.8%) were single, 2.3% were married, and 5.6% were engaged and only 1.3% were widow or divorced. About 60% of the participants lived in villages, 28.0% lived in cities, 5.3% lived in camps and only 7.3% lived in students' dorms. About two thirds (64.1%) of the participants reported that their family monthly income was between 1000 - ≤ 3000NIS, 30.6% reported that their family monthly income was between 3200 - (7000 NIS, and only 5.3% reported monthly income was between 8000 - (12000 NIS, (Table 4.1- 1)

Table (4.1-1): Socio-demographic characteristics of the participants

Characteristics		N (n=304)	%
Age	18-20 yr	159	52.4
	21-23 yr	133	43.7
	24-31 yr	12	3.9
Marital status	Single	276	90.8
	Married	7	2.3
	Engaged	17	5.6
	Widow, divorced, etc	4	1.3
Residency	City	85	28.0
	Village	181	59.5
	Camp	16	5.3
	Student's dorm	22	7.3
Monthly Income	1000 - ≤ 3000	195	64.1
	3200 - ≤ 7000	93	30.6
	8000 - ≤ 12000	16	5.3

4.2 Anthropometric measurements of the participants

Table 4.2-1 shows the mean and standard deviation of the anthropometric measurements of the participants by gender. The mean weight for male students was 73.1kg compared to 59.9 kg for females. The mean height was 176.2cm for male students and 162.4cm for females. However, the BMI mean was 23.5 (kg/m^2) for male students and 21.5 (kg/m^2) for females.

The mean of waist circumference for male students was 81.4cm and 74.6 cm for females. Findings showed significant differences ($p<0.01$) between males and females in the means of all variables (Table 4.2-1).

Table (4.2-1): Mean and standard deviation of the anthropometric measurements of the participants by gender

Variable	Mean ± SD		
	Male	Female	*P- Value
Weight in kg	73.1 ±13.1	59.9 ± 8.7	0.001
Height in cm	176.2±6.7	162.4±5.6	0.001
BMI in kg/m^2	23.5± 0.7	21.5± 0.5	0.009
WC in cm	81.4±9.3	74.6±8.1	0.001

***T-Test**

4.3 Percentages of physical activity and smoking among university students

About two thirds (62.5%) of the participants were practicing different kinds of sports while 37.5 % of them were not. Furthermore, 71.4% of the participants never smoked; in contrast 28.6% of them were active smokers. There were significant differences between males and

females in physical activity and smoking, ($P < 0.05$). Higher proportion of males practiced sports, but higher proportions were current smokers. Male students practiced sports more than female students (69.1% of males practiced sports compared to 55.9% of females; 48.7% of males currently smoked compared to 8.6% of females), (Table 4.3-1)

Table (4.3-1): Percentages of physical activity and smoking among university students by gender

Physical activity & smoking		Sex				Total		*P-Value
		Male		Female		N	%	
		N	%	N	%			
Do you practice any kind of sports	**Yes**	105	69.1	85	55.9	190	62.5	**0.018**
	No	47	30.9	67	44.1	114	37.5	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Smoking	Never smoke	78	51.3	139	91.4	217	71.4	**0.000**
	Smoking Currently	74	48.7	13	8.6	87	28.6	
Total		**152**	**100**	**152**	**100**	**304**	**100**	

***X^2 tests**

4.4 Dietary habits among university students

Table 4.4-1 shows the meal pattern of university students by gender. About two thirds (68.4%) of the participants take meals irregularly, while 31.6% take meals always regularly. In addition more than half (50.7%) of the participants were consuming two main meals per day, while 6.9% were taking one main meal per day, 37.8% of them were taking three main meals /day and 4.6% were taking more than three main meals per day. Furthermore, 22.4% declared that they do not consume snacks between meals, while about half (47%) of the participants were consuming one

snack between meals, 23.0% were consuming two snacks between meals, whereas 4.9% were consuming three snacks between meals, and 2.6% were consuming more than three snacks between meals. There were significant differences between males and females in meal patterns, ($P < 0.05$). Higher proportion of female students take their meals irregularly compare to male students (76.3% vs 60.5%). Male students take more meals than female students, but consume less snacks (50.7% of males consumed three or more meals compared to 34.2% of females; 84.9% of females consumed one or more snacks compared to 70.4% of males),(Table 4.4-1)

Table (4.4-1): Meal pattern of university students by gender

Meal pattern		Sex				Total		*P-Value
		Male		Female		N	%	
		N	%	N	%			
Taking meals regularly	Always regular	60	39.5	36	23.7	96	31.6	**0.003**
	Irregularly	92	60.5	116	76.3	208	68.4	
Total		152	100	152	100	304	100	
Main meal /day	One	9	5.9	12	7.9	21	6.9	**0.026.**
	Two	66	43.4	88	57.9	154	50.7	
	Three	67	44.1	48	31.6	115	37.8	
	>Three	10	6.6	4	2.6	14	4.6	
Total		152	100	152	100	304	100	
Snack/ day	Nothing	45	29.6	23	15.1	68	22.4	**0.008**
	One	68	44.7	75	49.3	143	47.0	
	Two	27	17.8	43	28.3	70	23.1	
	Three	6	3.9	9	5.9	15	4.9	
	>Three	6	3.9	2	1.3	8	2.6	
Total		152	100	152	100	304	100	

***X^2 tests**

Table 4.4-2 shows the food habits of the university students by gender. More than half (58.2%) of the participants consumed vegetables once daily, 10.9% consumed vegetables 3-4 times/day, whereas 20.7% of

the participants consumed vegetables 1-2 times/week, and 10.2% rarely consumed vegetables. About 13.2% of the participants consumed fruits 3-4 times/day, while 43.8% consumed fruits once daily, 29.9% consumed fruits 1-2 times/week and 13.2% rarely consumed fruits. However there was significant difference between males and females in fruit consumption ($P < 0.05$). Female students consumed more fruits than male students (58.6% of females consumed fruits once or 3-4 times/day compared to 55.3% of males).

About one fifth (16.8%) of the participants rarely consumed meats, less than half (45.4%) consumed meats one or two times/week, while 24.7% consumed meats once daily, and 13.2% of the participants consumed meats 3-4 times/day.

More than one third (39.5%) of the participants consumed sweets once daily, 13.5% consumed sweets 3-4 times/day, 28.0% consumed sweets 1-2 times/week, and 19.1% of the participants rarely consumed sweets.

About 5.6% of the participants consumed bread 3-4 times/day, while most of the participants (91.1%) consumed bread once daily (the highest consumption among the food habits variables), whereas 0.7% consumed bread 1-2 times/week and 2.6% of the participants rarely consumed bread. About two thirds (68.4%) of the participants take soft- drinks/Juice once daily, while 12.8% take soft- drinks/Juice 3-4 times/day, 14.1% of the

participants take soft- drinks/Juice 1-2 times/week and 4.6% of them rarely take soft- drinks/Juice.

About 61% of the participants consumed milk rarely, while 17.4% of them consumed milk once daily, only 4.9% consumed milk 3-4 times/day and 16.4% of them consumed milk 1-2 times/week. However there was significant difference between males and females in consuming milk in favor of males, ($p < 0.05$). Male students consumed more milk than female students (25% of males consumed milk once or 3-4 times/day compared to 15.8% of females).

More than half (53.6%) of the participants consumed tea as once daily, while,11.2% consumed tea 3-4 times/day, whereas 11.8% of the participants consumed tea1-2 times/week, and 23.4% of them rarely consumed tea. 6.6% of the participants were consuming coffee 3-4 times/day, 47.4% of them rarely consumed coffee,34.9% consumed coffee once daily and 11.2% consumed coffee 1-2 times/week. However there was a significant differences between males and females in consuming coffee in favor of males, ($P < 0.05$).

Male students consumed more coffee than female students (57.9% of males consumed coffee once or 3-4 times/day compared to 25% of females). 8.9% of the participants consumed quick- meals 3-4 times /day, 47.0% of them consumed quick- meals once daily, whereas 28.0% consumed quick- meals 1-2 times/week and 16.1% rarely consumed quick-meals. Most of the participants (91.1%) reported that they rarely consume

margarine, 2.3% consumed it once daily , 1.0 % reported that they consumed margarine 3-4 times/day and 5.6% of the participants consumed it 1-2 times/week, (Table 4.4-2)

Table (4.4-2): Food habits of the university students by gender

Food habits How many times do you eat/take from the following?		Sex				Total		*P-Value
		Male		Female				
		N	%	N	%	N	%	
Vegetable	Once daily	90	59.2	87	57.2	177	58.2	0.154
	3-4times /day	12	7.9	21	13.8	33	10.9	
	1-2 times /week	30	19.7	33	21.7	63	20.7	
	Rarely	20	13.2	11	7.2	31	10.2	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Fruits	Once daily	71	46.7	62	40.8	133	43.8	0.015
	3-4 times/ day	13	8.6	27	17.8	40	13.2	
	1-2times/ week	53	34.9	38	25.0	91	29.9	
	Rarely	15	9.9	25	16.4	40	13.2	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Meat	Once daily	41	27.0	34	22.4	75	24.7	0.086
	3-4 times/ day	25	16.4	15	9.9	40	13.2	
	1-2times/ week	67	44.1	71	46.7	138	45.4	
	Rarely	19	12.5	32	21.1	51	16.8	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Sweets	Once daily	49	32.2	71	46.7	120	39.5	0.067
	3-4 times/day	21	13.8	20	13.2	41	13.5	
	1-2times/ week	49	32.2	36	23.7	85	28.0	
	Rarely	33	21.7	25	16.4	58	19.1	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Bread	Once daily	139	91.4	138	90.7	277	91.1	0.905
	3-4 times /day	9	5.9	8	5.3	17	5.6	
	1-2times /week	1	0.7	1	0.7	2	0.7	
	Rarely	3	2.0	5	3.3	8	2.6	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Soft-drinks /Juice	Once daily	110	72.4	98	64.5	208	68.4	0.290
	3-4 times/ day	20	13.2	19	12.5	39	12.8	
	1-2times/ week	17	11.2	26	17.1	43	14.1	
	Rarely	5	3.3	9	5.9	14	4.6	
Total		**152**	**100**	**152**	**100**	**304**	**100**	

Food habits How many times do you eat/take from the following?		Sex				Total		*P-Value
		Male		Female		N	%	
		N	%	N	%			
Milk	Once daily	36	23.7	17	11.2	53	17.4	0.030
	3-4 times /day	8	5.3	7	4.6	15	4.9	
	1-2times /week	21	13.8	29	19.1	50	16.4	
	Rarely	87	57.2	99	65.1	186	61.2	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Tea	Once daily	85	55.9	78	51.3	163	53.6	0.857
	3-4 times/ day	16	10.5	18	11.8	34	11.2	
	1-2times/ week	18	11.8	18	11.8	36	11.8	
	Rarely	33	21.7	38	25.0	71	23.4	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Coffee	Once daily	78	51.3	28	18.4	106	34.9	0.000
	3-4 times/day	10	6.6	10	6.6	20	6.6	
	1-2times/week	17	11.2	17	11.2	34	11.2	
	Rarely	47	30.9	97	63.8	144	47.3	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Quick - meals	Once daily	73	48.0	70	46.1	143	47.0	0.495
	3-4 times/day	13	8.6	14	9.2	27	8.9	
	1-2times/week	38	25.0	47	30.9	85	28.0	
	Rarely	28	18.4	21	13.8	49	16.1	
Total		**152**	**100**	**152**	**100**	**304**	**100**	
Margarine	Once daily	**7**	**4.6**	**0**	**0.0**	**7**	**2.3**	0.052
	3-4 times/day	**2**	**1.3**	**1**	**0.7**	**3**	**1.0**	
	1-2times/week	**10**	**6.6**	**7**	**4.6**	**17**	**5.6**	
	Rarely	**133**	**87.5**	**144**	**94.7**	**277**	**91.1**	
Total		**152**	**100**	**152**	**100**	**304**	**100**	

***X^2 test**

4.5 Prevalence of overweight and obesity among university students and their associations

The overall prevalence of overweight and obesity among university students were 20.1% and 4.6%, respectively (Table 4.5-1). Prevalence of overweight and obesity were higher among male students (27.0% and 5.9%) compared to females (13.2% and 3.3%). There was a significant

relationship between gender and BMI status (chi-square test, $p < 0.05$). (BMI classifications were not homogenous among males and females), (Table 4.5-1)

Table (4.5 -1): **Prevalence of overweight and obesity among university students by gender.**

BMI status	Sex				Total		*P-value
	Male		Female				
	N	%	N	%	N	%	
Underweight (BMI<18.5)	8	5.3	7	4.6	15	4.9	0.009
Normal (BMI: 18.5-24.9)	94	61.8	120	78.9	214	70.4	
Overweight (BMI: 25-29.9)	41	27.0	20	13.2	61	20.1	
Obese (BMI > 30)	9	5.9	5	3.3	14	4.6	
Total	152	100	152	100	304	100	

***$X^{2,}$ test**

Table 4.5 -2 shows the percentages and the associations between BMI status and the meal pattern among sampled students. No association was found between BMI status and meal patterns among sampled students (P-> 0.05). About two thirds (65.6%) of the overweight participants take meals irregularly. On the other hand, 57.1% of the obese participants take meals irregularly. About half (49.2%) of the overweight participants take two main meals per day, while 8.2% of them take one main meal/day, whereas 42.6% of them take three or more main meals /day. On the other hand, about 57.1% of the obese participants take three or more main meals per day, while none of them take one main meal/day and 42.9 % of them take two main meals / day.

Nearly, half (47.5%) of the overweight participants take one snack between meals per day, while 23.0% of them take no snacks, 26.2% of them take two snack between meals per day and 3.3% of them take three or more snacks between meals /day. On the other hand, more than half (57.1%) of the obese participants take one snack between meals per day, while 14.3% of them do not take snacks, whereas 28.6% of the obese participants take two snacks between meals/day and none of them take three or more snacks between meals /day. Meal pattern association with BMI was also investigated for each gender separately, but the results were the same, (data are not shown), (Table 4.5 -2)

Table (4.5 -2): Meal patterns by BMI status among university students.

Meal patterns		BMI status								Total		*P-value
		Underweight		Normal		Overweight		Obese				
		N	%	N	%	N	%	N	%	N	%	
Taking meals regularly	Regular	2	13.3	67	31.3	21	34.4	6	42.9	96	31.6	0.338
	Irregularly	13	86.7	147	8.7	40	65.6	8	57.1	208	68.4	
Total		**15**	**100**	**214**	**100**	**61**	**100**	**14**	**100**	**304**	**100**	
Main meal /day	One	1	6.6	15	7.0	5	8.2	0.0	0.0	21	6.9	0.790
	Two	7	46.7	111	51.9	30	49.2	6	42.9	154	50.7	
	>Three	7	46.7	88	41.1	26	42.6	8	57.1	129	42.4	
Total		**15**	**100**	**214**	**100**	**61**	**100**	**14**	**100**	**304**	**100**	
Snack/ day	Nothing	4	26.7	48	22.4	14	23.0	2	14.3	68	22.4	0.654
	One	5	33.3	101	47.2	29	47.5	8	57.1	143	47.0	
	Two	6	40.0	44	20.6	16	26.2	4	28.6	70	23.0	
	>Three	0.0	0.0	21	9.8	2	3.3	0.0	0.0	23	7.6	
Total		**15**	**100**	**214**	**100**	**61**	**100**	**14**	**100**	**304**	**100**	

***X^2 tests**

Table 4.5 -3 shows the prevalence of abdominal obesity among university students gender. About 18% of the participants had abdominal obesity (central obesity) based on WC classification. The prevalence of

abdominal obesity was higher (p-value < 0.05) among females than males in the studied sample of university students (23.0% vs 12.5%), (Table 4.6-3)

Table (4.5-3): prevalence of abdominal obesity among university students by gender

Waist Circumference	Sex				Total		*p-value
	Male		Female				
	N	%	N	%	N	%	
Normal	133	87.5	117	77.0	250	82.2	**0.016**
Abdominal Obesity	19	12.5	35	23.0	54	17.8	
Total	152	100	152	100	304	100	

*X^2 test. Male abdominal Obesity; WC (94cm, Normal; WC(94cm, Female abdominal Obesity; WC (80cm, Normal; WC(80cm

Table 4.5- 4 shows the prevalence of overweight and obesity among university students by faculty. About 57.4% of the overweight students were from the Faculty of Arts, while 42.6% were from the Faculty of Science. On the other hand, about two thirds (64.3%) of the obese students were from the Faculty of Arts, while 35.7% were from the Faculty of Science. (Table 9)

Table (4.5-4): prevalence of overweight and obesity among university students by Faculty

Faculty	BMI status								Total		*p-value
	Underweight		Normal		Overweight		Obese				
	N	%	N	%	N	%	N	%	N	%	
SCIENCE	9	60.0	112	52.3	26	42.6	5	35.7	152	50	**.316**
ARTS	6	40.0	102	47.7	35	57.4	9	64.3	152	50	
Total	15	100	214	100	61	100	14	100	304	100	

*** X^2, tests**

Table 4.5-5 shows the prevalence of overweight and obesity among university students by study year level. For males, overweight was most

common among 4rth year students (42.1%), followed by 31.6% for 1st year level, 18.4% for 3rd year level and 15.8% for 2nd year level of study. The highest prevalence of obesity among males was for 2nd year students (10.5%), followed by 5.3% for 1st year level, 5.3% for 3rd year level and 2.6% for 4th year level.For females, overweight was most common among 4rth year students (23.7%), followed by 18.4% for 3rd year level, 7.9% for 2nd year and 2.6% for 1st year level. The highest prevalence of obesity among females was for 4rth year students (5.3%), followed by 5.3% for 2nd year level, 2.6% for 1st year level and none for 3rd year level, (Table 4.5-5).

Table (4.5-5): **Prevalence of overweight and obesity among university students by study year level**

Weight status	Male Study year level								Female Study year level							
	1st y		2nd yr		3rd yr		4th yr		1st yr		2nd yr		3rd yr		4th yr	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Underweight	3	7.9	2	5.3	2	5.3	1	2.6	2	5.3	1	2.6	3	7.9	1	2.6
Normal	21	55.3	26	8.4	27	71.1	20	52.6	34	89.5	32	84.2	28	73.7	26	68.4
Overweight	12	31.6	6	15.8	7	18.4	16	**42.1**	1	2.6	3	7.9	7	18.4	9	**23.7**
Obese	2	5.3	4	**10.5**	2	5.3	1	2.6	1	2.6	2	**5.3**	0	0.0	2	**5.3**
Total	38	100	38	100	38	100	38	100	38	100	38	100	38	100	38	100

4.6 Prevalence of anemia among university students and its associations

Table 4.6-1 shows the prevalence of anaemia among university students. The prevalence of anaemia was 13.8%; (18.4% among female students and 9.2% among males). There were significant differences in anaemia between male and female university students, ($p < 0.05$), (Table 4.6-1

Table (4.6-1): Prevalence of anaemia among university students by gender

Hemoglobin status	Sex				Total		*p-value
	Male		Female				
	N	%	N	%	N	%	
Anemia	14	**9.2**	28	**18.4**	42	**13.8**	**0.020**
Normal	138	90.8	124	81.6	262	86.2	
Total	**152**	**100**	**152**	**100**	**304**	**100**	

***X^2 test**

Table 4.6-2 shows the prevalence of anaemia among university students by residency. The prevalence of anaemia among university students was 13.6% for students living in dorms, 18.8% for students living in cities, 11.6% for students living in villages and, 12.5% for students living in camps. However, these prevalence rates were not significantly different, (X^2 test**,** P > 0.05) (Table 4.6-2).

Table (4.6-2): The prevalence of anaemia among university students by residency

Hemoglobin Level	Residency								Total		*p-value
	City		Village		Camp		Dorms				
	N	%	N	%	N	%	N	%	N	%	
Anemia	16	18.8	21	11.6	2	12.5	3	13.6	42	13.8	
Normal	69	81.2	160	88.4	14	87.5	19	86.4	262	86.2	**0.465**
Total	**85**	**100**	**181**	**100**	**16**	**100**	**22**	**100**	**304**	**100**	

***X^2, test**

Table 4.6-3 shows the percentage of overweight and obesity by anemia among university students. Among the overweight males, 14.3% had anaemia and among the obese males, 14.3% of them had anaemia. No significant association was found between hemoglobin status (anemia) and BMI status among males, (P > 0.05). On the other hand, among the

overweight females, 17.9% had anaemia while among the obese females, none of them had anaemia. A significant association was found between anemia and BMI status (overweight and obesity) among females, ($P < 0.05$). (Table 4.6-3)

Table (4.6-3): Percentage of overweight and obesity by anemia among university students

Sex	BMI status	Hemoglobin status				Total		*P-value
		Normal		Anemia				
		N	%	N	%	N	%	
Male	Underweight	7	5.1	1	7.1	8	5.3	**0.414**
	Normal	85	61.6	9	64.3	94	61.8	
	Overweight	39	28.3	2	14.3	41	27.0	
	Obese	7	5.1	2	14.3	9	5.9	
	Total	**138**	**100**	**14**	**100**	**152**	**100**	
Female	Underweight	3	2.4	4	14.3	7	4.6	**0.026**
	Normal	101	81.5	19	67.9	120	78.9	
	Overweight	15	12.1	5	17.9	20	78.9	
	Obese	5	4.0	0	0.0	5	3.3	
	Total	**124**	**100**	**28**	**100**	**152**	**100**	

*** X^2 test**

Table 4.6-4 shows the meal pattern by anaemia among university students. About 73.8% of the anemic participants take their meals irregularly, while 26.2% of them take their meals always regularly. About half (47.6%) of the anemic participants take three or more main meals/day, 11.9% take one main meal/day while 40.5% of them take two main meals/day. Only 42.9% of the anemic participants take one snack between meals/day, 28.6% take two snacks between meals/day, 19.0% take nothing between meals/day, while 9.5% take three or more snacks between meals/day. However no significant association was found between meal pattern and anemia

(P > 0.05, X^2 and Fisher's exact test), (Table 4.6-4)

Table (4.6-4): Meal pattern by anemia among university students

Meal Pattern	Hemoglobin Level				Total		*P-value
	Normal		Anaemia				
	N	%	N	%	N	%	
Taking meals:							
Regular	85	32.4	11	26.2	96	31.6	**0.418**
Irregular	177	67.6	31	73.8	208	68.4	
Total	**262**	**100**	**42**	**100**	**304**	**100**	
Main meals/ day: One	16	6.1	5	11.9	21	6.9	
Two	137	52.3	17	40.5	154	50.7	**0.378**
> Three	109	41.6	20	47.6	129	42.4	
Total	**262**	**100**	**42**	**100**	**304**	**100**	
Snacks/day:							
None	60	22.9	8	19.0	68	22.4	
One	125	47.7	18	42.9	143	47.0	**0.350**
Two	58	22.1	12	28.6	70	23.0	
> Three	19	7.3	4	9.5	23	7.6	
Total	**262**	**100**	**42**	**100**	**304**	**100**	

*** $X^{2,}$ test**

Table 4.6-5 shows food habits by anemia among university students. Data indicated that, there were no associations between anemia and the variables of food habits (P > 0.05), except for eating sweets where those who eat sweets once daily represented about 54.8%, who eat 3-4 times/day represented 11.8%, those who eat sweets 1-2times/week represented 31.0%, and those who rarely eat sweets represented 2.4%, (P < 0.05).

However, the relationship was significant for females (who ate sweets) when the analysis was carried out by gender (Fisher exact test, P < 0.05) but not for males (P > 0.05) (data not shown), (Table 4.6-5)

Table (4.6-5): Food habits by anemia among university students

Food habits How many times do you eat/take from the following?		Hemoglobin Level				Total		*P-Value
		Normal		Anemia				
		N	%	N	%	N	%	
Vegetable	Once daily	150	57.3	27	64.3	177	58.2	0.571
	3-4times/day	31	11.8	2	4.8	33	10.9	
	1-2 times/week	54	20.6	9	21.4	63	20.7	
	Rarely	27	10.3	4	9.5	31	10.2	
Total		262	100	42	100	304	100	
Fruits	Once daily	112	42.7	21	50.0	133	43.8	0.117
	3-4 times/day	35	13.4	5	11.9	40	13.2	
	1-2times/week	84	32.1	7	16.7	91	30.0	
	Rarely	31	11.8	9	21.4	40	13.2	
Total		262	100	42	100	304	100	
Meat	Once daily	64	24.4	11	26.2	75	24.7	0.918
	3-4 times/day	34	13.0	6	14.3	40	13.2	
	1-2times/week	121	46.2	17	40.5	138	45.4	
	Rarely	43	16.4	8	19.0	51	16.7	
Total		262	100	42	100	304	100	
Sweets	Once daily	97	37.0	23	54.8	120	39.5	0.017
	3-4 times/day	36	13.7	5	11.8	41	13.5	
	1-2times/week	72	27.5	13	31.0	85	28.0	
	Rarely	57	21.8	1	2.4	58	19.1	
Total		262	100	42	100	304	100	
Bread	Once daily	239	91.2	38	90.5	277	91.1	0.909
	3-4 times/day	14	5.3	3	7.1	17	5.6	
	1-2times/week	2	0.8	0	0.0	2	0.7	
	Rarely	7	2.7	1	2.4	8	2.6	
Total		262	100	42	100	304	100	
Soft-drinks/Juice	Once daily	182	69.5	26	61.9	208	68.4	0.400
	3-4 times/day	33	12.6	6	14.3	39	12.9	
	1-2times/week	37	14.1	6	14.3	43	14.1	
	Rarely	10	3.8	4	9.5	14	4.6	
Total		262	100	42	100	304	100	
Milk	Once daily	45	17.2	8	19.0	53	17.4	0.667
	3-4 times/day	14	5.3	1	2.4	15	4.9	
	1-2times/week	45	17.2	5	11.9	50	16.5	
	Rarely	158	60.3	28	66.7	186	61.2	
Total		262	100	42	100	304	100	
Tea	Once daily	145	55.3	18	42.9	163	53.6	0.428
	3-4 times/day	27	10.3	7	16.6	34	11.2	
	1-2times/week	30	11.5	6	14.3	36	11.8	
	Rarely	60	22.9	11	26.2	71	23.4	
Total		262	100	42	100	304	100	

Food habits How many times do you eat/take from the following?		Hemoglobin Level				Total		*P-Value
		Normal		Anemia				
		N	%	N	%	N	%	
Coffee	Once daily	94	35.9	12	28.6	106	34.9	0.731
	3-4 times/day	16	6.1	4	9.5	20	6.5	
	1-2times/week	29	11.1	5	11.9	34	11.2	
	Rarely	123	46.9	21	50.0	144	47.4	
Total		**262**	**100**	**42**	**100**	**304**	**100**	
Quick-meals	Once daily	123	46.9	20	47.6	143	47.0	0.968
	3-4 times/day	24	9.2	3	7.1	27	8.9	
	1-2times/week	72	27.5	13	31.0	85	28.0	
	Rarely	43	16.4	6	14.3	49	16.1	
Total		**262**	**100**	**42**	**100**	**304**	**100**	
Margarine	Once daily	7	2.7	0	0.0	7	2.3	0.073
	3-4 times/day	2	0.8	1	2.4	3	0.9	
	1-2times/week	14	5.3	3	7.1	17	5.7	
	Rarely	239	91.2	38	90.5	277	91.1	
Total		262	100	42	100	304	100	

***X^2 test**

Chapter 5
The Discussion

Chapter 5
The Discussion

1-What are the present proportions of overweight and obesity among Arts and Science university students at An-Najah National University in Palestine?

Nowadays, increased prevalence of overweight and obesity is noted among all age groups in both genders. The purpose of this study was to assess the prevalence of overweight and obesity and their associations with dietary habits among Students from An-Najah National University in Palestine.

Study results indicated that the prevalence of overweight and obesity among the sample (n=304) of students from An-Najah National University were 20.1% and 4.6% respectively. Based on BMI classification of weight status, findings of this study indicate that the majority of students (70.4%) were of normal weight. Normal weight was more prevalent among females (78.9%) as compared to males (61.8%), whereas, prevalence of overweight and obesity were more common among males than female students. Prevalence of overweight was 27.0% among males as compared to 13.2% in females and prevalence of obesity was 5.9% among males as compared to 3.3% in females. The lower prevalence of obesity among female students was expected, since females are more cautious about their weight status than males, because of society perceptions which encourage females to be slim or slender. Obviously, pictures of movie stars and models in fashion

magazines and mass media have a strong impact on girls' body shape and image perception [57].

In this study, it is clear that the prevalence of overweight and obesity higher among males than female students, and these results are in agreement with the recent studies where similar findings of prevalence of obesity among males of university students were reported. [58, 59]. In a study conducted on 749 students (68% females and 32% males) recruited from the State University of the Basque Country, prevalence rate of overweight and obesity was 25% in males compared to 13.9% in females [58]. Another study conducted on 989 medical students (527 men, 462 women) from the University of Crete reported that approximately 40% male students and 23% female students had BMI > 25 kg/m2 [59]. Furthermore, the results of this study are in agreement with several studies conducted among university students in Arab countries [39, 40]. In Lebanon, a study conducted in 2008, the prevalence of overweight and obesity among students of Lebanese American University were found to be more common among male students compared to females (37.5% and 12.5% vs. 13.6% and 3.2%, respectively), [39]. In a study conducted on university students in Bahrain, the proportions of obesity were 11.8% in males and 7.6% in females [40]. High prevalence rates of overweight and obesity was also reported in a study conducted in Kuwait University on 842 students (32% and 8.9%, respectively), [38]. Such findings may be attributed to the comparable eating habits in Palestine with those eating

habits in the neighboring countries, or to the comparable genetic constitution of neighboring communities.

2-Are there significant relationships at the level ($\alpha = 0.05$) between BMI and lifestyle including food habits, meal pattern, physical activity and smoking?

Regarding food habits, university students often select fast food due to its palatability, availability and convenience. They usually do not follow healthy eating habits, as diet is high in fat and low in fruits and vegetables [60]. A previous survey by the American Dietetic Association indicated that obesity, or being severely overweight, is a fast-food related issue [61].

In this study, the data on students' meal pattern indicated that 68.4% of the participants were taking their meals irregularly, while 31.6% were taking their meals always regularly. In addition, more than 50% 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. In addition, about 47.0% of the students eat quick meals (fast food) once daily. However there were significant gender differences in the meal pattern among university students, (females eating more snacks and males eating more main meals), ($P < 0.05$). Frequent snacking and eating fast food can adversely affect students' health status, given the abundance of energy-dense and high-fat ingredients they contain. The Healthy people 2010 objectives included a focus on nutrition and obesity prevention [62].

The findings of this study illustrated that, the prevalence rates of overweight and obesity among female (13.2% and 3.3% respectively) were lower than those in the Arabian Gulf countries [33]. This low prevalence might be attributed to a better education, being not married (97.7%), modern dress of female university students; which clarifies their body shape as compared to the traditional gown; and being not confined to home for Palestinian female students.

Improving students' knowledge about nutrition and healthy eating habits may promote healthy body weight management among students and reduce the prevalence of overweight and obesity. A recent study conducted among college students reported that increased knowledge of dietary guidance, *Dietary Guidelines for Americans 2005*, appeared to be positively related to more healthy eating patterns thus the better eaters had a higher level of knowledge about nutrition **[**63]**.**

In this study, the data analysis of students' food habits indicated that about (91.1%) of the university students consumed bread once daily and it was the highest consume among the meal-pattern variables. About 47.0% of the participants consumed quick- meals (fast food) once daily. More than half (58 %) of the students declared consuming vegetables once daily, while 43.8% of them consume fruits once daily. In addition about 39.5% of students consume sweets once daily. However, results obtained from this study showed that there was a significant gender difference in eating/taking fruits, milk, and coffee among university students ($P < 0.05$). While there

were no significant gender differences in eating/taking vegetables, meat, bread, soft- drinks/juice, tea, Margarine and quick-meals, ($P > 0.05$). Therefore, developing gender adapted nutrition education programs that promote healthy eating habits for university students should be encouraged.

Regarding physical activity and smoking, the findings indicated that 37.5 % of the university students were not practicing physical activity, and 71.4% of the subjects never smoked. Therefore, smoking was not common in the studied sample of university students, in agreement with findings of other studies in the region. For example, a study conducted on 2443 students from 13 public and private schools in Greater Beirut reported that the prevalence rate of cigarette smoking was 2.5% [64]. However, results of this study indicated a significant gender difference in physical activity and smoking among university students, ($P < 0.05$). Several studies had shown inverse relationship between level of physical activity and overweight and obesity [36, 65]. It is well known that physical activity plays a protective role against obesity, controlling the storage, distribution and utilization of calories, leads to an elevation in daily energy expenditure, promotes fat oxidation in order to increase muscle mass and decrease fat mass [65]. In general, it is well known that, low levels of physical activity, sedentary habits, high protein and sugar intakes, low fiber consumption, and frequent snacking contribute to the high prevalence of overweight and obesity.

3. What are the present proportions of anemia among the studied sample of university students at An-Najah National University, Nablus, Palestine?

Iron deficiency anemia could be attributed to low intake of iron and/or poor bioavailability of iron in the diet of students. The prevalence of anaemia among the studied sample of university students was 13.8%. Anaemia was more common in females (18.4%) compared to male students (9.2%). These findings are in agreement with other studies in the region **[**66, 67]. A cross-sectional study investigated the prevalence of iron deficiency anemia in school children aged 6 to 18 years, in the district of Salfeet in the West Bank area of Palestine and found that the prevalence of iron deficiency among females was 30.5%, and among males was (21.6%), [66].

In 2005, a study conducted on Schoolchildren aged 12 and 13 yrs (males: 504; females: 510) from nine primary schools, to assess the iron deficiency among schoolchildren of different socio-economic status in urban Turkey. The iron deficiency prevalence was 20.8% among girls and 17.5% among boys [67].

4. Is there a significant relationship at the level ($\alpha = 0.05$) between BMI and anemia among the studied sample of university students?

Among the overweight male students, 14.3% had anaemia and among the obese males 14.3% had anaemia. No significant association was found between hemoglobin status (anemia) and BMI status among males, (P >

0.05). On the other hand, among the overweight female students, 17.9 % had anaemia while among the obese females, none of them had anaemia. A significant association was found between anemia and BMI status (overweight and obesity) among females, ($P < 0.05$).

These results are in agreement with a study which confirmed that overweight children and adolescents exhibited lower iron levels [68]**.** A cross-sectional study conducted in 2004, found that overweight children and adolescents exhibited lower iron levels; of those with iron deficiency anemia, more than 50% had a body mass index (BMI) greater than the 97th percentile [68].

5. Are there significant relationships at the level ($\alpha = 0.05$) between anemia and dietary habits among the studied sample of university students?

The findings of this study indicated that there were no significant relationships between anemia and dietary habits except for sweets consumption (for females only). This may be attributed to insufficient intestinal absorption of iron, menses, and bleeding—etc, as anemia was more common among females than males.

Such results suggest that iron supplement and food iron fortification are required in order to overcome the prevalence of anemia (particularly among females), this simple but common health problem.

5.1 Limitations of this study

The results of this study are limited by the use of a sample of students from just one university which may not be a representative of all university students in Palestine. This research study is limited to An-Najah National University - Nablus, and it is also limited to the university students of two faculties; Faculty of Science and Faculty of Arts; therefore, samples from other faculties and from different universities may provide a more inclusive picture of university students in Palestine.

The sampling methodology of this study was done by convenient sampling method.

5.2 Conclusions and Recommendations

Conclusions

According to results obtained, the author concluded that overweight and obesity are a problem among An-Najah National University students, despite the low prevalence of overweight and obesity in the studied sample as compared to prevalence in neighboring countries. Overweight and obesity were more common among male students compared to females. Prevalence of anaemia was more common among females than male students. The prevalence of abdominal obesity measured as waist circumference (17.8%) was significantly higher than overall obesity measured as BMI (4.6%) among university students and it was more common among female students compared to males. The consumption of

food which is considered important to prevent chronic diseases such as fruits and vegetables is relatively low. This may be due to lack of nutritional awareness among university students, Therefore educational programs which encourage increased consumption of fruits and vegetables and increased physical activity are recommended for a good health as well as preventive strategy for university students.

Recommendations

1-Further research is needed to investigate the prevalence of factors associated with overweight and obesity among larger samples representing all Palestinian university students.

2- Awareness among university students should be increased, through health promotion, health education and nutritional programs that encourage increase in consumption of fruits and vegetables which is recommended for a good health, and targeting the impact of overweight and obesity on morbidity and mortality.

3- Daily physical activity for university students should be encouraged in all university educational centers and faculties, as it plays a protective role against obesity, as well as its importance in the regulatory system controlling the storage, distribution and utilization of calories in order to increase muscle mass and decrease fat mass. Therefore dietary and exercise counseling are required as preventive strategies for university students.

4- Obesity represents a health problem to university students, as they have been experiencing a nutritional transition in food choices during the past years from the typical Mediterranean diet into the western fast food pattern. Therefore, it is important to pay attention to what university canteens offer for university students, in order to follow a balanced diet, to maintain physical fitness, and body mass index within the normal range.

5-Policy makers must address the problem of overweight and obesity and focus on prevention strategies especially among university students. Furthermore, public demand for health and nutritional information should be taken into consideration when implementing strategies aimed at improving the nutritional well-being of individual.

6-Iron supplement and food iron fortification are required in order to overcome prevalence of anemia, this simple but common health problem.

Competing interests

The author declares that he has no competing interests**.**

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Appendices

Annex 1: The Questionnaire of the study (English & Arabic version)

Annex 2: Table1: WHO standard classification of obesity

Annex 3: Table 2: Sex-specific waist circumferences

Annex-4: : الموافقة على عنوان الأطروحة وتحديد المشرف

Annex-5: IRB Approval letter.

Annex-6: كتاب تسهيل مهمة الطالب /لعميد كلية العلوم و الآداب

Annex-7: A picture for drawing blood sample from a participant.

Annex 1 :The Questionnaire of the study (English version)

Prevalence of overweight & obesity and their associations with dietary habits among Students from An-Najah National University: A cross-sectional study

Dear students.

You are invited to fill up the following questionnaire form which aims to study the prevalence of overweight & obesity and their associations with dietary habits among Students from An-najah National University. This research study is going to be done by students of graduate studies, in order to fulfill their master degree of public health at An-Najah National University. Your participation in this study is voluntary & the participant can withdraw from the study at any time & without any reason. All data will be recorded & will remain stored in a locked cabinet during the study and will be destroyed after the study is complete. No name will be mentioned in the study and the students will be identified by codes. Therefore could you please kindly answer these questions in this form, assuring and confirming to you that this information will be used only for the research study.
Many thanks for your cooperation

The Questionnaire of the study

Q001} the questionnaire number …….

Q002} Date: …….

Q003} Participant ID. No. ……..

♣ (This sign means that the question is extracted from the baseline study).

1-Background Information:

Date of birth: **……**

♣ Q004} Age (Years)	☐☐ **Y**
♣ Q005} Gender (Sex): 1- Male 2- Female	☐
♣ Q006} Marital status: 1- Single 2- Married 3- Engaged 4- Others (widow, divorced, etc.)	☐
♣ Q007} Family income / month: ---------- Shekel (Socioeconomical status)	☐
♣ Q008} Living Place (Residence): 1- City 2- Town 3- Camp 4- Student residence	☐
♣ Q009} Academic level: 1- 1st year 2- 2nd year 3- 3rd year 4- 4th year	☐
♣ Q010} Faculty: 1- Faculty of Science 2- Faculty of Arts	☐

2- Lifestyle:

- **2- 1} The diet:**

2- 1a} Meal pattern:

♣ Q011} Do you take your meals regularly? 1- Always regular 2- Irregular	☐
♣ Q012} How many main meals do you eat daily? 1- One 2- Two 3- Three 4- More than three	☐
♣ Q013} How many snacks do you take per day? 1- None 2- One 3- Two 4- Three 5- More than three	☐

2- 1b} Food habits:

♣ **Q014} how many times do you eat/ take from the following?**

Item Description	Daily	Three or four times / day	Once or twice per week	Rarely
Q014a} Vegetables				
Q 014b } Fruits				
Q014c } Meat				
Q014d } Sweets				
Q014e } Bread				
Q014f } Soft drinks /Juice				
Q014g } Milk				
Q014h } Tea				
Q014i } Coffee				
Q014j } Quick meals				
Q014k } Margarin				

❖ **2-2} Physical (in) activity and exercise:**

♣ Q015} Do you practice any kind of sports? 1- Yes 2- No	☐
If yes, please answer the following questions: Q016} What is the duration of practicing sports (in years)?	☐☐ **Y**
♣ Q017} which kind of exercises do you practice? 1- yes 2-No Q023a} Walking Q023b} Swimming Q023c} Running Q023d} Others. Specify it, ----	☐ ☐ ☐ ----------
♣ Q018} How many times do you practice exercise / week? ----------	☐
♣ Q019} How many hours do you sleep / day? ----------	☐

2- 3} Smoking:

♣ Q020} Are you a smoker? 1- Never smoke 2- Current smoker	☐
♣ Q021} If you are a Current smoker, How many Cigarettes do you smoke per day? 1- Currently Less than 10 cigarettes 2- Currently 10 – 20 cigarettes 3- Currently 20 – 30 cigarettes 4- Currently 30 or more	☐
Q022} For how long have you been smoking (in years)?---------- ----------	☐☐ **Y**
♣ Q023} What was your age when you started smoking? 1- (10 – 15 years) 2- (16 – 20 years) 3- (21 and more)	☐
♣ Q024} what is the type of tobacco do you smoke? 1- Cigarettes 2- Nergila 3- Pipe.	☐

Many thanks for your cooperation

For Researcher Use Only:

3-Anthropometric measures:

♣ Q025} Weight without shoes & heavy clothes in (Kg)	**Kg** ☐☐☐ **mg** ☐☐☐
♣ Q026} Height without shoes in (cm)	**cm** ☐☐☐
♣ Q027} Waist circumference (cm)	**cm** ☐☐☐
♣ Q027} WHR (cm)	**cm** ☐☐☐

4-Lab. Data:

♣ Q028} Hb level	☐

CONSENT FORM

جامعة النجاح الوطنية - نابلس

كلية الدراسات العليا

برنامج ماجستير الصحة العامة

2011/2010

عزيزي/ عزيزتي الطالب/ـــة،

تحية طيبة وبعد،،،

ندعوكم للاشتراك بتعبئة هذه الاستمارة الهادفة لدراسة انتشار السمنة و زيادة الوزن ومدى ارتباطاتها بعادات الأكل بين طلاب من جامعة النجاح الوطنية. اشتراكك في هذة الدراسة إرادي و يمكنك الانسحاب متى أردت ذلك, ودون إبداء الأسباب. ان وصف الدراسة لاحقا سيعلمك بكل المخاطر او عدم الارتياح الممكن حدوثه إثناء الدراسة و يجب عليك مناقشة أي استفسار لديك مع الباحث: بسام ابو شنب -المعد لهذه الدراسة.

ستكون الدراسة بان يدعوك الباحث بسام أبو شنب للمشاركة في تعبئة الاستبانة وقياس الوزن والطول ومحيط الخصر وبمساعدة طالبات وطلاب مدربين وعمل فحص مخبري واخذ عينة دم عن طريق أخصائي التحاليل في الجامعة لفحص نسبة الهيموجلوبين في الدم ولك مطلق الحرية في المشاركة أو عدمها.

يمكن لطلاب وطالبات كليتي العلوم والآداب فقط الاشتراك في هذه الدراسة والمنتسبين من سنة 2006 -2010

لا يوجد مخاطر من الاشتراك في هذه الدراسة وإذا شعرت بأي إرهاق الرجاء إعلام ألباحث بسام أبو شنب ولك الحق في عدم الاستمرار أو ترتيب لقاء آخر في وقت يناسبك. المعلومات التي سأحصـــل عليها ستبقى سرية من قبلي و قبل المشرفين على رسالتي وأن هذه البيانات ســـيتم التعامـــل معهـــا بمنتهى السرية و الخصوصية و الأمانة . مؤكدين لكم استخدام هذه المعلومات الواردة فقط لأغراض البحث العلمي وستتلف بعد خمس سنوات من نشر رسالتي.

يمكنكم الاتصال بي على جوال رقم 0599702390 أو E-mail: bassam_as@yahoo.com

لقد قرأت التوضيح بخصوص الدراسة . و أعطيت الفرصة لمناقشة اسالتي و استفساراتي و قد تمت الإجابة عليها جميعا . وبناء عليه فأنني أوافق على أن أشترك في هـــذه الدراســـة و كمـــا أدرك أن اشتراكي في هذه الدراسة هو إرادي و لي الحق في الانسحاب من الدراسة متى أردت.

ألاسم: ---------- ألتاريخ ---------- ألتوقيع ----------

الباحث: بسام علي عبد الرحيم أبو شنب

جامعة النجاح الوطنية – كلية الدراسات العليا

قسم الصحة العامة

The Questionnaire of the study (Arabic version)

جامعة النجاح الوطنية - نابلس
كلية الدراسات العليا
برنامج ماجستير الصحة العامة

استمارة للبحث حول

(انتشار السمنة و زيادة الوزن ومدى ارتباطاتها مع عادات الأكل بين طلاب من جامعة النجاح الوطنية)

عزيزي/ عزيزتي الطالب/ـــة،
تحية طيبة وبعد،،،

تهدف هذه الاستبانه إلى دراسة انتشار السمنة و زيادة الوزن ومدى ارتباطاتها بعادات الأكل بين طلاب من جامعة النجاح الوطنية. أرجو من حضرتكم التكرم بقراءة فقرات الاســتبانة و الإجابة عنها بدقة ، لما في ذلك من أهمية كبيرة في توفير بيانات تساهم في وضع الحلــول لهذه المشكلة الصحية التي يعاني منها الكثير من آبائنا و أمهاتنا و إخواننا و أخواتنا ، و لــن تستخدم نتائج هذه الدراسة إلا لتحقيق الهدف المذكور . مؤكدين لكم بان المعلومــات التــي ستقدمونها, ستعامل بسرية تامة ، و لن تستخدم إلا لإغراض البحث العلمي .
وشكرا لحسن تعاونكم معنا

Q001) رقم الاستبانة: ----------

Q002) ألتاريخ: ----------

Q003) رقم الشخص المشارك: ----------

ألكلية	ألعلوم				الاداب			
ألجنس	ذكر		انثى		ذكر		انثى	
ألسنة الدراسية	1	2	3	4	1	2	3	4
رقم الشخص المشارك								

1 - معلومات ديموغرافية/ اجتماعية :

تاريخ الميلاد: ----------

♣ Q004) ألعمر (بالسنوات)		☐☐
♣ Q005) ألجنس:	1 - ذكر 2 - أنثى	☐
♣ Q006) ألحالة الاجتماعية:	1 - أعزب/عزباء 2 - متزوج/ة 3 - خاطب/ة 4 - غير ذلك	☐
♣ Q007)معدل دخل الأسرة/ الشهري:----------شيكل		☐
♣ Q008) مكان السكن:	1 - المدينة 2 - القرية 3 - المخيم 4 - سكن طلاب	☐
♣ Q009) ألسنة الدراسية:	1 - الأولى 2 - الثانية 3 - الثالثة 4 - الرابعة	☐
♣ Q010) ألكلية:	1 - العلوم 2 - الآداب	☐

- بيانات أسلوب الحياة:

❖ 2 -1) ألتغذية:

2 -1 - أ) نمط الوجبة:

♣ Q011) هل تتناول الوجبات بانتظام؟ 1 - بانتظام 2 - بغير انتظام	☐
♣ Q012) كم وجبة رئيسية تأ كل باليوم (فطور, غداء, عشاء)؟ 1 - واحدة 2 -اثنتين 3 -ثلاثة 4 - اكثر من ثلاثة مرات	☐
♣ Q013) كم وجبة خفيفة تأكل بينا الوجبات؟ 1 - لا شئ 2 - واحدة 3 - اثنتين 4 - ثلاثة 5 - اكثر من ثلاثة مرات	☐

2 -1 - ب) عادات الاكل:

♣ Q014) **كم مرة تأكل/تتناول من الآتية؟**

وصف المواد	يومياً	ثلاث أو أربع مرات باليوم	مرة أو اثنتين في الاسبوع	نادراً
Q014a) **خضروات**				
Q014b) **فواكه**				
Q014c) **لحوم**				
Q014d) **حلويات**				
Q014e) **خبز**				
Q014f) **عصير/مشروبات خفيفة**				
Q014g) **حليب**				
Q014h) **شاي**				
Q014i) **قهوة**				
Q014j) **وجبات سريعة**				
Q014k) **زبده**				

2 -2) الأنشطة و التمارين الرياضية:

♣ Q015) هل تمارس أي نوع من الرياضة؟ 1 - نعم 2 - لا	☐
أذا كان الجواب نعم, أجب عن الأسئلة ألآتية؟ ♣ Q016) ما طول المدة الزمنية التي تمارس بها التمارين الرياضية (بالسنوات)؟	☐☐ **Y**
♣ Q017) ما هي أنواع الرياضة التي تمارسها؟ 1 - نعم 2 - لا Q017a) ألمشي Q017b) السباحة Q017c) الجري Q017d) اشياء اخرى, حدد ----------	☐ ☐ ☐
♣ Q018) كم من الوقت تمارس التمارين الرياضية في الأسبوع؟	☐
♣ Q019) كم عدد الساعات التي تنام باليوم؟	☐

❖ **-3) أ لتدخين:**

Q020) هل انت مدخن؟ **1 -** لا أدخن أبدا **2 -** أدخن حاليا	☐
♣ Q021) إذا أنت مدخن **حاليا**، كم عدد السجائر التي تدخنها باليوم؟ 1 - حاليا اقل من 10 سجائر باليوم 2 - حاليا 10 -20 باليوم 3 - حاليا 20 - 30 باليوم 4 - حاليا 30 فما فوق	☐
♣ Q022) مـــا طـــول المـــدة التـــي دخنـــت بهـــا (بالســـنوات)؟ - - - - - - - - - - - - -	☐☐ **Y**
♣ Q023) كم كان عمرك عندما بدأت التدخين؟ **1-** (10 - 15 سنه) 2- (16 - 20 سنه) 3- (21 فاكثر)	☐
♣ Q024) ما هو نوع التبغ الذي تدخنه؟ 1 - سجائر 2 - نرجيله 3 - بايب	☐

شكرا لكم و لحسن تعاونكم معنا

لاستعمال الباحث فقط:

3 - مقاييس الجسم البشري

♣ Q025) الوزن بدون حذاء أو ملابس ثقيلة (كغم) :	**Kg** ☐☐☐ **mg** ☐☐☐
♣ Q026) الطول بدون حذاء(سم)	**cm** ☐☐☐
♣ Q027)) محيط الخصر(سم)	**cm** ☐☐☐
♣ Q028)) نسبة محيط الخصر/ محيط الورك(سم)	cm ☐☐☐

4 - فحص المختبر/ مستوى الهيموجلوبين في الدم:

♣ Q029) **مستوى الهيموجلوبين في الدم:**	☐

Annex 2: Table1: WHO standard classification of obesity (WHO 1997)

Risk of co-morbidities	**BMI**	
average	18.5-24.9	Normal BMI
		Overweight:
increased	25.0-29.9	Pre-obese
moderate	30.0-34.9	Obesity class I
severe	35.0-39.9	Obesity class II
very severe	□ 40	Obesity class III

Annex 3: Table 2: Sex-specific waist circumferences for 'increased risk' and 'substantially increased risk' of metabolic complications associated with obesity in Caucasians

Risk of obesity-associated metabolic complications		
Substantially increased	Increased	
□ 102 cm	□ 94 cm	**Men**
□ 88 cm	□ 80 cm	**Women**

Note: The figure are population-specific and the relative risk also depends on levels of obesity (BMI) and other risk factors for CVD and NIDDM) (WHO report 1997).

الموافقة على عنوان الأطروحة وتحديد المشرف :Annex-4

جامعة
النجـــاح الوطنية
كلية الدراسات العليا
مكتب العميد

An-Najah
National University
Faculty of Graduate Studies
Dean's Office

التاريخ : 2011/3/22

حضرة الدكتورة حليمة الصباح المحترمة
منسق برنامج ماجستير الصحة العامة

تحية طيبة وبعد،

الموضوع : الموافقة على عنوان الاطروحة وتحديد المشرف

قرر مجلس كلية الدراسات العليا في جلسته رقم (233)، المنعقدة بتاريخ 2011/3/3، الموافقة على مشروع الأطروحة المقدم من الطالب / بسام علي عبد الرحيم ابو شنب، رقم تسجيل 10853586، تخصص ماجستير صحة عامة، عنوان الأطروحة:

(انتشار السمنة وزيادة الوزن ومدى ارتباطهم بعادات الاكل بين طلال جامعة النجاح الوطنية: دراسة مستعرضة)
(The Prevalence of Overweight & Obesity and their Associations with the Eating habits Among the Students of An-Najah National University: A Cross-Sectional Study)

بإشراف : د. حليمة الصباح

يرجى اعلام المشرف والطالب بضرورة تسجيل الاطروحة خلال اسبوعين من تاريخ اصدار الكتاب. وفي حال عدم تسجيل الطالب/ة للاطروحة في الفترة المحددة له/ا ستقوم كلية الدراسات العليا بإلغاء اعتماد العنوان والمشرف.

وتفضلوا بقبول وافر الاحترام ،،،

عميد كلية الدراسات العليا

د. محمد أبو جعفر

نسخة : د. رئيس قسم الدراسات العليا للعلوم الإنسانية المحترم
: ق.أ.ع. القبول والتسجيل المحترم
: مشرف الطالب
: الطالب
: الملف

22 -03- 2011

فلسطين، نابلس، ص.ب 707 هاتف: 2345115، 2345114، 2345113 (09)(972)* فاكسميل: 2342907(09)(972)
Nablus, P. O. Box (7) *Tel. 972 9 2345113, 2345114, 2345115 هاتف داخلي (5) 3200
* Facsimile 972 92342907 *www.najah.edu - email fgs@najah.edu

Annex-5: IRB Approval letter

An-Najah
National University
Faculty of Medicine

بسم الله الرحمن الرحيم

جامعة
النجاح الوطنية
كلية الطب

IRB Approval letter

Study title:
The prevalence of overweight and obesity and their associations with the eating habits among students of An-Najah National University

Submitted by:
Bassam Ali Abdel- Raheem Abu-Shanab

Date Reviewed:
March 25, 2011

Date approved:
March 28, 2011

Your study titled" The prevalence of overweight and obesity and their associations with the eating habits among students of An-Najah National University . "Was reviewed by An-Najah National University IRB committee & approved on March 28, 2011

IRB

IRB Committee Chairman,
An-Najah National University
Samar Musmar,MD, FAAFP

نابلس - ص.ب ٧٠٧,٧ هاتف: ١٤/٨/٧/٤/٢/٢٣٤٢٩٠٢(٠٩)(٩٧٢)، فاكسميل٢٣٤٩٧٣٩(٠٩)(٩٧٢)
Nablus - P.O.Box 7,707 - Tel. (972)(09)2342902/4/7/8/14 - Facximile (972)(09)2349739
Web Site:www.najah.edu

كتاب تسهيل مهمة الطالب /لعميد كلية العلوم وعميد كلية الآداب Annex-6

An-Najah
National University
Faculty of Graduate Studies
Dean's Office

جامعة
النجـــاح الوطنية
كلية الدراسات العليا
مكتب العميد

التاريخ : 2011/4/5

حضرة السيد الدكتور عميد كلية الآداب المحترم

الموضوع : تسهيل مهمة الطالب/ بسام علي عبد الرحيم ابو شنب، رقم تسجيل (10853586)
تخصص ماجستير صحة عامة

تحية طيبة وبعد،

الطالب المذكور أعلاه من طلبة الماجستير في جامعة النجاح الوطنية، تخصص صحة عامة في كلية الدراسات العليا، وهو بصدد إعداد الاطروحة الخاصة به بعنوان:

(انتشار السمنة وزيادة الوزن ومدى ارتباطهم بعادات الاكل بين طلال جامعة النجاح الوطنية: دراسة مستعرضة)
(The Prevalence of Overweight & Obesity and their Associations with the Eating habits Among the Students of An-Najah National University: A Cross-Sectional Study)

يرجى من حضرتكم تسهيل مهمته في توزيع استبيان واجراء فحوصات على عينة من طلبة كليتكم لاتمام مشروع البحث.

شاكرين لكم حسن تعاونكم.

مع وافر الاحترام ،،،

عميد كلية الدراسات العليا

د. محمد ابو جعفر

جامعة النجاح الوطنية
كلية الدراسات العليا
نابلس - فلسطين

فلسطين، نابلس، ص.ب 707 هاتف:/2345115، 2345114، 2345113 (09)(972)* فاكسميل:2342907(09)(972)
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Dean's Office

جامعة
النجـــاح الوطنية
كلية الدراسات العليا
مكتب العميد

التاريخ : 2011/4/5

حضرة السيد الدكتور عميد كلية العلوم المحترم

الموضوع : تسهيل مهمة الطالب/ بسام علي عبد الرحيم ابو شنب، رقم تسجيل (10853586)
تخصص ماجستير صحة عامة

تحية طيبة وبعد،

الطالب المذكور أعلاه من طلبة الماجستير في جامعة النجاح الوطنية، تخصص صحة عامة في كلية الدراسات العليا، وهو بصدد إعداد الاطروحة الخاصة به بعنوان:

(انتشار السمنة وزيادة الوزن ومدى ارتباطهم بعادات الاكل بين طلال جامعة النجاح الوطنية: دراسة مستعرضة)
(The Prevalence of Overweight & Obesity and their Associations with the Eating habits Among the Students of An-Najah National University: A Cross-Sectional Study)

يرجى من حضرتكم تسهيل مهمته في توزيع استبيان واجراء فحوصات على عينة من طلبة كليتكم لاتمام مشروع البحث.

شاكرين لكم حسن تعاونكم.

مع وافر الاحترام ،،،

عميد كلية الدراسات العليا

د. محمد ابو جعفر

جامعة النجاح الوطنية
كلية الدراسات العليا
نابلس - فلسطين

فلسطين، نابلس، ص.ب 707 هاتف: 2345115، 2345114، 2345113 (09)(972)* فاكسميل: 2342907(09)(972)
Nablus, P. O. Box (7) *Tel. 972 9 2345113, 2345114, 2345115 هاتف داخلي (5) 3200
* Facsimile 972 92342907 *www.najah.edu - email fgs@najah.edu

Annex-7: A picture for drawing blood sample from a participant

A well qualified laboratory technician (Male) was drawing the blood sample from a participant

A well qualified laboratory technician (Female) was drawing the blood sample from a participant.

جامعة النجاح الوطنية
كلية الدراسات العليا

انتشار زيادة الوزن والسمنة وارتباطاتها مع عادات الأكل بين طلاب من جامعة النجاح الوطنية: دراسة مقطعية

إعداد
بسام علي عبد الرحيم ابو شنب

إشراف
الدكتورة حليمة حسن الصباح

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في الصحة العامة في كلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2011م

انتشار زيادة الوزن والسمنة وارتباطاتها مع عادات الأكل بين طلاب من جامعة النجاح الوطنية: دراسة مقطعية

إعداد

بسام علي عبد الرحيم ابو شنب

إشراف

الدكتورة حليمة حسن الصباح

الملخص

إن زيادة الوزن والسمنة هي المشاكل الرئيسية المتعلقة بالصحة العامة والاضطرابات الأكثر شيوعا في مجال التغذية. كما أن انتشار زيادة الوزن والسمنة آخذة في الارتفاع بمعدل ينذر بالخطر في كل من البلدان النامية والمتقدمة. إن الهدف الرئيسي من هذه الدراسة هو تقييم مدى انتشار زيادة الوزن والسمنة وارتباطاتها مع عادات الأكل بين طلاب من جامعة النجاح الوطنية في فلسطين.

المنهجية

أجريت دراسة مقطعية على 304 طلاب (نسبة ذكور 50 ٪ و الإناث 50 ٪) تم اختيارهم عن طريق اخذ عينة مناسبة (ملائمة) من حرم جامعة النجاح الوطنية من كل من الكليات التالية : كلية الآداب (152 طالب) وكلية العلوم (152 طالبا). وقد أجريت عملية جمع البيانات خلال الفترة بين شهري آذار ونيسان 2011. وقد طلب من الطلاب تعبئة استبيان قياسي. لقد تم تقييم العادات الغذائية للمشاركين باستخدام استبيان تواتر الغذاء بالنسبة للمواد الغذائية المحددة. وتم استخدام مؤشر السمنة لتقييم زيادة الوزن والسمنة. كما تم قياس محيط الخصر لتقييم الدهون في منطقة البطن. وبالإضافة إلى ذلك تم فحص مستوى الهيموغلوبين في الدم لكل مشارك. وتم إجراء التحليل الإحصائي باستخدام برنامج الحزم الإحصائية للعلوم الاجتماعية (SPSS, V-15.) لتحديد زيادة الوزن والسمنة بين الطلاب وقد أخذت الموافقة المسبقة من جميع المشاركين.

النتائج

كانت الغالبية العظمى من الطلاب (70.4 ٪) من الوزن الطبيعي (78.9 ٪ للإناث و 61.8 ٪ للذكور) وكانت نسبة انتشار زيادة الوزن و نسبة انتشار السمنة بين طلاب الجامعة(ألاناث والذكور) هي 20.1 ٪ و 4.6 ٪ على التوالي. وعلاوة على ذلك ، فإن انتشار زيادة الوزن والسمنة كانت أكثر شيوعا بين الطلبة الذكور مقارنة بالإناث (27.0 ٪ و 5.9 ٪ مقابل 13.2 ٪ و 3.3 ٪ على التوالي). في حين أن معدل انتشار السمنة الوسطى (في منطقة البطن) بين طلبة الجامعة كانت 17.8% و كانت أكثر شيوعا بين الإناث (23.0 ٪) مقارنة مع الذكور (12.5 ٪). كما أظهرت النتائج أيضا بان معدل انتشار فقر الدم بين طلاب الجامعة كان 13.8 ٪. وكان فقر الدم أكثر شيوعا عند الإناث (18.4 ٪) من الطلاب الذكور (9.2 ٪). وبالإضافة إلى ذلك فان نحو 5.3 ٪ من الطلاب الذكور كانوا اقل من الوزن الطبيعي بالمقارنة مع 4.6 ٪ من الإناث. وذكرت الغالبية من الطلاب (68.4 ٪) أنهم كانوا يتناولون الوجبات بطريقة غير منتظمة.

كانت هناك فروق ذات دلالة إحصائية بين الذكور والإناث في نمط الوجبة ، وكانت هناك أيضا فروقات هامة بين الذكور والإناث في النشاط البدني والتدخين ؛ (69.1 ٪ من الذكور و 55.9 ٪ من الإناث كانوا يمارسون الرياضة ، بينما 30.9 ٪ من الذكور و 44.1 ٪ من الإناث لم تمارس أي نوع من الرياضة . ومن جهة أخرى فان، 51.3 ٪ من الذكور و 91.4 ٪ من الإناث ذكروا أنهم لا يدخنون ، بينما 48.7 ٪ من الذكور و 8.6 ٪ من الإناث ذكروا أنهم يدخنون حاليا).

وأفاد ما مجموعه 58.2 ٪ (57.2 ٪ للإناث و 59.2 ٪ للذكور) و43.4 ٪ (40.8 ٪ للإناث و 46.7 ٪ للذكور) أنهم يتناولون يوميا كمية من الخضار والفواكه على التوالي. وقد كانت هناك فروق ذات دلالة إحصائية بين الذكور والإناث في العادات الغذائية لصالح أكل الفاكهة.

الخلاصة

وفقا للنتائج التي تم الحصول عليها، خلص المؤلف إلى أن زيادة الوزن والسمنة هي مشكلة بين طلاب من جامعة النجاح الوطنية (في كليتي العلوم و الاداب) على الرغم من انخفاض معدل انتشار زيادة الوزن والسمنة في عينة الدراسة مقارنة بانتشار المرض في البلدان المجاورة.

كانت زيادة الوزن والسمنة أكثر انتشارا بين الطلبة الذكور مقارنة مع الإناث، كما كان معدل انتشار السمنة المركزية(في منطقة البطن) أكثر شيوعا بين الإناث مقارنة مع الطلاب الذكور. وكان معدل انتشار فقر الدم أكثر شيوعا بين الإناث من الطلاب الذكور.

وأشارت النتائج إلى أن طلاب الجامعة سيستفيدون من برامج تعزيز الصحة والتغذية للحد من الميل لزيادة الوزن والسمنة بين الطلاب ، وخاصة الذكور، وتحسين عادات الأكل للطلاب عن طريق البرامج التعليمية التي تشجع على زيادة استهلاك الفواكه والخضروات لصحة جيدة