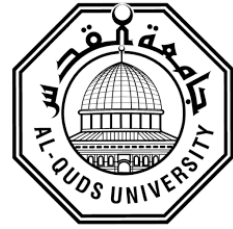


**Deanship of Graduate Studies  
Al-Quds University**



**The Association between Dietary Consumption and  
weight status Among University Female Students at Al-  
Quds University- Palestine**

**Raghda Adel Omar Amro**

**M.Sc. Thesis**

**Jerusalem – Palestine**

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weight status Among University Female Students at Al-  
Quds University- Palestine**

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## Thesis Approval

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1446 /2024

## Dedication:

إلى والديّ الأعتاء؁

الذفن لظالما غمروني بعبهم وءعمهم غير المشروط؁ والذفن علّموني أن الطموح والعمل الجاد هما مفتاح النجاح؁ ولم ببخلوا عليّ بالءعم والتشجيع؁ والذفن كانوا دائماً مصدر قوتي وإلهامي.

إلى أصدقائي الأعتاء؁

الذفن كانوا لي العائلة الثانية؁ والذفن ساندوني على الءوام؁ والذفن شاركوني كل لحظة من هذه الرحلة.

إلى أساتذتي الكرام؁

الذفن كانوا لي المنارة التي أنارت دربي؁ والذفن لم ببخلوا عليّ بنصائحهم وتوجيهاتهم القيمة.

إلى كل من آمن بي ووقف إلى جانبي.

وآمل أن تكون هذه الخطوة بداية الطريق نحو تحقيق حلمي الأكبر في نيل درجة الءكتوراه؁ وأن أستمرفي رفع اسم عائلتي وأصدقائي عالياً بإنجازاتي المستقبلية.

رغءة عادل عمرو

2024

**Declaration:**

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

**Name: Raghda Adel Omar Amro**

**Signature:** 

**Date: 21/8/2024**

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{ يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ } المجادلة:11

(وَلَقَدْ آتَيْنَا دَاوُودَ وَسُلَيْمَانَ عِلْمًا وَقَالَا الْحَمْدُ لِلَّهِ الَّذِي فَضَّلَنَا عَلَى كَثِيرٍ مِنْ عِبَادِهِ الْمُؤْمِنِينَ). (سورة النمل، 15)

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## **Abstract:**

**Introduction:** This cross-sectional study examines the link between dietary consumption and weight status among female students at Al-Quds University, aiming to address a gap in understanding how these factors influence obesity and weight management. **Methods:** A cross-sectional study of 2,364 female students from Al-Quds University was conducted to analyze how food and beverage consumption patterns, combined with socioeconomic and lifestyle factors, influence body mass index (BMI). Data were collected through questionnaires on dietary intake, physical activity, and lifestyle habits, and then statistically analyzed using version 23.0 of the Statistical package for Social Sciences software (SPSS) to determine correlations with BMI. **Results** The analysis shows a significant positive correlation between high-calorie, fast-food consumption and increased BMI among the participants, with a p-value of  $<0.05$ . Diets rich in vegetables and lower in processed foods were associated with healthier weight statuses ( $p < 0.05$ ). Furthermore, lifestyle factors such as physical activity ( $p = 0.033$ ) and sleep duration ( $p < 0.001$ ) also significantly influenced weight status. Socioeconomic factors, including family affluence and family size, showed a strong correlation with BMI, with lower affluence being linked to higher obesity rates ( $p < 0.001$ ). Additionally, smoking status, breakfast frequency, and the amount of water consumed were also significant predictors of BMI ( $p < 0.05$ ). **Conclusion:** The findings highlight the importance of dietary interventions and weight management strategies for female university students, which should be incorporated into public health policies and educational programs to combat obesity and promote healthier lifestyles.

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## **List of Abbreviation**

<b>ANOVA</b>	: Analysis of variance
<b>BMI</b>	: Body Mass Index
<b>FAS2</b>	: Family Affluence Scale
<b>FFQ</b>	: Validated Food Frequency Questionnaire.
<b>SD</b>	: Standard Deviation
<b>SES</b>	: Socioeconomic Status
<b>SMOTE</b>	: Synthetic Minority Over-Sampling Technique
<b>WC</b>	: Waist Circumference
<b>WHO</b>	: World Health Organization
<b>WHR</b>	: Waist-to-Hip ratio

# Chapter one

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## Introduction

### 1.1 Background

According to the World Health Organization, approximately 80% of health conditions such as cardiovascular diseases, obesity, diabetes, and cancer are strongly influenced by lifestyle and dietary factors(Perlstein et al., 2016) . The prevalence of these chronic diseases highlights the need to improve both dietary intake and lifestyle habits by consuming nutrient-rich, balanced diets to prevent various adverse health conditions. When students enter higher education, their lifestyle undergoes significant changes, including shifts in eating habits. These changes are often driven by new life challenges, increased independence, and the experience of living away from home for the first time.(Victor Ikujenlola & Susanna Adekoya, 2017)

An energy imbalance between calories expended and calories consumed is the main cause of obesity, and it is frequently made worse by sedentary lifestyles, bad eating habits, and genetic predispositions (Goettler et al., 2017; Chooi et al., 2019). Numerous factors are identified in the literature as contributing to the problem, such as urbanization, socioeconomic level, and aggressive marketing of unhealthy foods (Popkin, 2004; Lee et al., 2022). Obesity also has a significant financial impact because it raises the expenditures

of hospital stays, ambulatory care, prescription drugs, and long-term care (Mohajan & Mohajan, 2023).

Goon, Bipasha, and Islam (2014) conducted a cross-sectional study to look at the connection between Bangladeshi university students' use of fast food and their risk of obesity. According to the report, 56% of students visit fast food outlets at least once a week, indicating a significant frequency of fast-food consumption. Fast food consumption was found to be closely linked to obesity, with students who ate it twice a week or more having a significantly higher chance of being fat (OR 2.2; 95% CI 1.3-3.9). The results demonstrate the swift change in eating habits among young people in Bangladesh, primarily due to the accessibility and allure of fast food, which significantly increases the risk of obesity and associated health issues. The report emphasizes how urgently focused treatments are needed to combat unhealthy eating.(Goon, 2014)

A study by Martínez Álvarez et al. (2015) examined the eating habits and preferences among students at the Completeness University of Madrid (UCM). The research indicated that students used the UCM meal services for consuming a whole meal on average 2.3 times per week (SD 1.3). A gender disparity was noted, with males using the services 2.4 times per week (SD 1.3), compared to females who used them 2.25 times per week (SD 1.2). The majority of surveyed students (74.6%) preferred using the cafeteria in their own department, while 15.0% used other common areas in their faculty, and 10.4% went to cafeterias in other centers.(Martínez Álvarez et al., 2015)

The work of Joffe (2006) and Bertoia (2015) has focused specifically on the consumption of sugar-sweetened beverages, reinforcing the notion that these drinks are a major factor in the increase of obesity, thus underlining the importance of beverage choices in overall dietary patterns.

Exploring beyond specific food groups, McCrory (2016) and Mozaffarian (2011) investigated the relationship between lifestyle factors, including dietary habits, and obesity. Their findings indicate that aggregate dietary changes, reflective of overall lifestyle adjustments, are associated with significant differences in weight gain. Complementing this, research by Williamson (1987), Aljadani (2015), and Collins (2011) has brought to light the crucial role of diet quality in weight management. These studies collectively suggest that higher-quality diets are associated with lower prospective weight gain and a reduced risk of becoming overweight or obese.

Socio-demographic factors, including economic status and cultural background, also play a pivotal role in shaping dietary patterns and, by extension, weight status. These elements are influential in determining food choices and access, thereby impacting weight management strategies.

The role of physical activity in modulating the impact of diet on weight change cannot be overlooked. Research by Rizk & Treat (2015) and Sinha (2016) has demonstrated the contributory role of physical inactivity, coupled with unhealthy dietary patterns, in weight gain. This emphasizes the need for a holistic approach to weight management that incorporates both diet and physical activity. Additionally, recent studies by Veer (2016) and Nadeem (2016) have reported the role of mindfulness in eating habits and its potential impact on weight management. Mindful eating practices have been linked to better weight control and healthier dietary choices.

Gender-specific dietary patterns also reveal interesting insights. Studies by Fung (2015), Olstad (2017), and Kang (2021) have pointed out that improvements in diet quality are particularly beneficial for weight management in younger women and overweight individuals, suggesting a need for gender-tailored dietary interventions.

For university students, especially females, the transition to university life often brings about significant changes in dietary habits. This demographic is likely to increased consumption of fast foods, snacks, and sugary beverages due to a hectic academic schedule and lifestyle changes. Research by Vinke (2020) and Kimokoti (2010) demonstrates how these dietary shifts can have a profound impact on their weight status.

Cultural and geographic factors also greatly influence dietary patterns. Shi (2010) and Neale (2007) have shown how cultural preferences affect dietary choices and weight status. For instance, diets in Mediterranean regions, characterized by high consumption of olives, olive oil, and whole grains, are associated with lower obesity rates and fewer chronic diseases.

Concurrently, the trend toward increased fast-food consumption and adoption of Western dietary patterns has been linked to rising obesity rates. Studies by Drummond (1995, 1996) and Singh & Yadav (2022) highlight the association between Western fast-food consumption and poor dietary quality, leading to higher weight gain, particularly among women.

## **1.2 Problem Statement**

The period of university education represents a pivotal transition in the lives of young female students, marked by significant changes in dietary habits and lifestyle. This phase often involves increased independence, exposure to diverse food environments, and altered eating patterns, all of which can substantially impact the weight status of university female students.

Despite these critical changes, existing research in nutritional epidemiology and public health has inadequately explored the complexities of these transitions within this demographic. This lack of comprehensive studies has resulted in a significant gap in understanding and has impeded the development of targeted dietary interventions and weight management strategies tailored specifically for this group.

The transition to university life increases autonomy over food choices, often leading to a higher intake of convenience foods like fast foods and processed snacks, which are high in calories, fats, and sugars. Lifestyle changes such as irregular meals, fluctuating physical activity, and disrupted sleep further complicate weight management. Socio-demographic factors, including economic status and personal preferences, also shape dietary choices and perceptions of nutrition.

This research proposal addresses the gap of comprehensive studies on the combined effects of dietary, lifestyle, and socio-economic factors on weight status. It aims to provide insights for more effective and culturally sensitive dietary interventions and weight management strategies for female university students.

## **1.3 Justification**

The findings of this study are critically important for several reasons:

The proposed study on the dietary patterns and obesity among university female students at Al Quds University is of immense importance and significance, intersecting various fields such as public health, nutritional science, and social well-being. This research is crucial for enhancing our understanding of nutritional epidemiology within a specific demographic. Moreover, to provide valuable insights into the different dietary patterns and lifestyle choices of university female students, a group often underrepresented in nutritional research. By focusing on this demographic, the study aims to bridge the existing gaps in

knowledge about how dietary habits interplay with lifestyle factors like stress, sleep, and physical activity. This understanding is vital for the creation of effective nutritional guidelines and interventions tailored to their specific needs.

From a public health perspective, the findings of this study hold the potential to inform targeted intervention strategies. Understanding the dietary patterns that contribute to weight gain or loss in this group can lead to more effective, tailored dietary interventions and weight management strategies. Such targeted approaches are likely to be more effective compared to generic recommendations, contributing significantly to preventative health strategies that combat obesity and related health conditions, such as diabetes and cardiovascular diseases.

The study also has considerable societal and cultural relevance. It takes into account the cultural and socio-economic backgrounds of the participants, thereby contributing to the creation of culturally sensitive dietary recommendations. This is particularly important in a globalized world where dietary practices are diverse. Moreover, empowering university female students with knowledge and strategies to maintain a healthy weight can have long-lasting impacts on their overall health and well-being. This empowerment is crucial during university years, which are formative in developing lifelong habits.

In terms of educational and policy contributions, the findings of this study could be instrumental in shaping educational content for university health programs and influencing policy decisions at university and governmental levels. This could lead to the implementation of healthier food options on campus and programs that promote physical activity and mental well-being.

Furthermore, the study sets a foundation for future research in this area, potentially leading to longitudinal studies that track dietary habits and obesity. It also encourages interdisciplinary collaboration, bringing together experts from various fields to address a common issue.

The proposed study is expected to have wide-reaching implications. Its contributions to enhancing public health strategies, educational content, policy formulation, and overall societal health are invaluable, making it a significant endeavor in the realm of nutritional and public health research.

## **1.4 Aim and specific objectives of the study**

### **1.4.1 Main objective**

To explore the different dietary habits, lifestyle and food preference factors, and obesity dynamics among female students at Al Quds University, with the goal of filling a significant gap in current nutritional epidemiology research.

### **1.4.2 Specific objectives**

- To investigate the predominant dietary consumption among university female students at Al Quds University.
- To study the lifestyle factors such as physical activity, stress, and sleep influence the dietary consumption of these students.
- To explore the correlation between the dietary consumption food preferences and lifestyle factors of these student's weight status.
- To study the socio-demographic factors play in shaping the dietary consumption and weight management strategies of these students.

### **• 1.5 Research Questions**

- What is the predominant dietary consumption among university female students at Al Quds University?
- How do lifestyle factors such as physical activity, stress, and sleep influence the dietary consumption of these students?
- Is there a significant correlation between the dietary consumption food preferences and lifestyle factors of these student's weight status?
- What role do socio-demographic factors play in shaping the dietary consumption and weight management strategies of these students?

## **Chapter two**

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### **Literature Review and study conceptual framework**

#### **2.1 Introduction**

The accumulation of excess body fat causes obesity, a complicated multifactorial disease with detrimental effects on health. The rate of obesity is still rising, leading to an unparalleled crisis which does not appear to be abating anytime soon.(Lin & Li, 2021)

In compliance with standards from the World Health Organization (WHO), BMI is used to define and diagnose obesity. WHO defines "obesity" as a BMI of  $\geq 30.0$  and "overweight" as a BMI of 25.0 to 29.9. Three severity levels have been identified for obesity: class I (BMI 30.0-34.9), class II (BMI 35.0-39.9), and class III (BMI  $> 40.0$ ).(P. P et al., 2006)

The Body Mass Index (BMI) is the most commonly used measure for classifying overweight and obesity. According to the WHO, a BMI of 25-29.9 indicates overweight, while a BMI of 30 or more indicates obesity (Mohajan & Mohajan, 2023). However, BMI has limitations, such as not distinguishing between muscle and fat mass, which can lead to misclassification in certain populations (Nuttall, 2015). Other indices like waist-to-hip ratio (WHR) and waist circumference (WC) are also used to assess obesity-related health risks (Mohajan & Mohajan, 2023).

## **2.2 Importance of Studying Dietary Patterns in University Students**

Studying dietary patterns and obesity among university female students is of significant importance due to the potential impact on their overall health and well-being.

Dietary patterns and their impact on weight variations are shaped by diverse cultural contexts. Global studies conducted by Popkin et al. (2012) and Swinburn et al. (2016) underscore a widespread increase in the adoption of Westernized diets, particularly among the youth. This escalating trend increases concerns about elevated weight gain and heightened obesity risks on a global scale. Nevertheless, it is essential to recognize the distinct dietary traditions and obstacles faced by students in various cultural settings. (Popkin et al., 2012)

University students are adopting less favorable eating patterns, indicating a quick shift from traditional diets toward more globalized behaviors, as observed in studies (El-Qudah, 2008; Nasreddine et al., 2005; Popkin et al., 2005).

For instance, research in developing nations like Ethiopia (Abebe et al., 2019) highlights prominent factors such as food insecurity and restricted access to nutritious foods as key contributors to unfavorable weight changes among university students. (Roman et al., 2019)

## **2.3 Global Trends and Cultural Contexts**

Global research highlights a significant prevalence of dieting and weight control behaviors, along with a notable occurrence of poor body image and weight dissatisfaction, especially among women. There is a consistent observation of a gap between perceived and actual body weight among female students, showcasing high participation in weight loss-oriented dieting (40-50%), despite a relatively low incidence of overweight. The university environment introduces a unique setting for dietary adjustments and weight variations, where the interplay of academic responsibilities, social influences, and constrained resources can substantially influence the eating habits of students. This review examines the potential association between dietary patterns and weight change among female

students at Al-Quds University in Palestine. According to Abu-Joub and A'aysh (2012), the standard Palestinian diet contains no fruits, vegetables, legumes, or whole grains. However, processed foods, sugary drinks, and unhealthy fats have increased due to Westernization and socioeconomic constraints (Suleiman et al., 2019). This change raises questions about possibly harmful eating habits among undergraduates, who might be more vulnerable to these types of influences. (Natour et al., 2021)

Studies global have shown the complex relationship between dietary patterns and weight status in university students. A systematic review by Chen et al. (2017) found that increased consumption of fast food, sugary drinks, and processed foods was associated with weight gain, while higher intake of fruits, vegetables, and whole grains was linked with weight loss or maintenance. (Zidan et al., 2022)

Several studies have revealed a complex relationship between food habits and variations in weight among college students worldwide. A common observation highlights the negative consequences of unhealthful eating practices that involve consuming processed meals, soft drinks, and harmful fats. In particular, Chen et al. (2017) pointed out a steady relationship between increased consumption of these items and weight gain in college students. Conversely, though, there is evidence linking healthy eating habits—which include lots of fruits, vegetables, whole grains, and lean protein—to weight reduction or maintenance. (Tezera Negera, 2016)

In-depth nutritional assessments conducted in certain studies reveal that university students often fall short of meeting recommended nutrient intake levels. The findings indicate an overreliance on both total and saturated fat as contributors to energy intake, surpassing recommended sodium consumption, and insufficient intake of various micronutrients. Notably, female students seem to be more prone to reporting suboptimal nutrient intake profiles. (Sprake, 2018.).

A survey investigating the food attitudes and behaviors among students from two universities in Northern Ireland concluded that students tended towards diets high in convenience (67% of the sample 'regularly' consumed ready-made meals or other convenience foods) and fried (28% consumed fried food 2-3 times weekly) food, alongside infrequent consumption of home-cooked meals (over 30% of students prepared their main meals from raw ingredients less than twice weekly). (Devine et al., 2006) Tam et al. (2017) conducted a study at a large Australian urban university to explore these behaviors and

opinions among university students. The study revealed that the majority of students (93%) purchase food or beverages on campus, primarily driven by taste, value, convenience, and cost.

Female students were found to place more importance on health-related factors and were more likely to follow special dietary behaviors compared to their male counterparts. These findings align with previous research suggesting that food purchasing behavior in young adults is heavily influenced by taste and convenience, followed by cost and healthiness (Tam et al., 2017)

## **2.4 Middle Eastern**

Overweight and obesity have become major global public health concerns, having substantial effects on the prevalence of non-communicable diseases like diabetes, cardiovascular disease, and several cancers. The Middle East has seen a steady increase in the incidence of obesity and overweight due to factors such as increased urbanization, altered food habits, and less physical activity. According to Okati-Aliabad et al.'s (2022) systematic review and meta-analysis, which examined data from 101 research across 17 Middle Eastern nations, the region's total prevalence of adult obesity and overweight was 21.17% and 33.14%, respectively. The study found that women are more likely than males to be obese, and that the prevalence of obesity tends to rise with age, especially impacting those over 40.(Okati-Aliabad et al., 2022).

Studies in the Middle Eastern region shown that there is a shift towards western dietary habits, with increased consumption of fast food, sugary drinks, and processed foods (Aboul-Enein et al., 2017)This transition is linked to rising rates of overweight and obesity, particularly among women (Okati-Aliabad et al., 2022)

A study by Genena & Salama (2015) investigating dietary habits of university students in Alexandria, Egypt, found that a significant portion (80%) reported irregular meals. This highlights a potential concern for unhealthy eating patterns among this population group. Interestingly, the study also revealed a gender difference in breakfast consumption, with a slightly higher percentage of females (57.6%) reporting daily or frequent breakfast intake compared to males (55.3%). However, both genders displayed a tendency towards snacking, with over two-thirds (69.3%) consuming snacks daily or several times a week.

This pattern of irregular meals and frequent snacking warrants further investigation to understand its association with dietary quality and weight management among university students.(Genena & Salama, 2017)

## **2.5 Specific Findings in Palestine:**

A restricted number of studies have focused on examining the relationship between dietary patterns and weight fluctuations among university students in Palestine. A study conducted in Gaza revealed that female students who consumed higher amounts of fruits and vegetables while reducing their intake of convenience foods were less prone to experiencing weight gain during their initial year of university.(Mahfouz et al., 2016)

Recent research conducted on young college adults in the southern governorates of Palestine highlights significant correlations between dietary habits and Body Mass Index (BMI). Despite a notable percentage of students reporting regular breakfast (53.0%) and lunch (75.5%) consumption, a majority (60.5%) indicated inconsistent supper habits. This inconsistency in meal patterns is further emphasized by the finding that, on average, 67.5% of participants consumed only two meals a day.

The study also observed dietary preferences that could negatively impact BMI. A considerable portion of students reported frequent consumption of fried meals (34.5% daily) and snacks (12.0% daily). Moreover, fruit and vegetable intake was alarmingly low, with 42.5% of students consuming them only once or twice a week. Carbonated beverage consumption was prevalent, with 78.0% of participants reporting weekly intake.(Altaher et al., 2021)

Crucially, the study identified specific dietary habits that significantly correlate with BMI. Regular midday meal consumption showed a positive correlation with BMI ( $r=0.171$ ,  $P=0.015$ ), suggesting that consistent eating patterns may influence weight. Additionally, the frequency of fried food intake was positively correlated with BMI ( $r=0.127$ ,  $P=0.047$ ), indicating that higher consumption of fried foods is associated with increased body weight. Conversely, the weekly consumption of carbonated beverages was negatively correlated with BMI ( $r=-0.229$ ,  $P=0.030$ ), which could imply that those consuming fewer carbonated beverages may have lower BMIs. (Altaher et al., 2021.)

With improvements in food quality, there was a decrease in weight increase in the majority of subgroups based on race/ethnicity, baseline age, and baseline BMI. In younger age and

higher BMI groups, the negative relationship was greater. Reduced weight increase was linked to a ten-year improvement in food quality; this relationship differed by race/ethnicity, baseline age, and BMI. According to the research, significant weight gain may be avoided by maintaining to a high-quality diet while implementing improvements to it over time. (Kang et al., 2021).

## 2.6 Integrating Global and Local Findings

Understanding the association between dietary patterns and weight change among female is crucial for promoting their health and well-being. Future research that considers the individual cultural context and challenges faced by these students can inform the development of effective interventions to promote healthy dietary practices and prevent unhealthy weight gain.

The results showed that 30.4% (n=21) gained weight, 49.3% (n=34) maintained their weight and 20.3% (n=14) lost weight. Over the course of the three months, neither males nor women's body weight changed significantly, according to a t-test ( $p > .05$ ). The results of a one-way ANOVA showed a marginally different attitude toward physical activity,  $F(2, 66) = 3.0, p = .05$ . The weight gain group ( $M = 5.1, SD = 1.6$ ;  $M = 6.2, SD = 1.0$ , respectively) exhibited a lower physical activity attitude than the weight loss group, according to a post hoc test. When it came to regular physical activity, 78.6% of individuals in the group that lost weight did so, compared to 60.1% and 61.9% in the groups who gained weight and did not change their weight, respectively. (Yan & Harrington, 2020).

In multivariable analyses, both linear and logistic regression models' BMI results were strongly correlated with the state of hydration. The average BMI of adults who were dehydrated was 1.32 kg/m<sup>2</sup> (95% CI, 0.85–1.79 kg/m<sup>2</sup>;  $P < .001$ ) higher than that of hydrated people. When comparing people who were not drinking enough water to those who were, the odds of becoming obese were 1.59 times higher (95% CI, 1.35–1.88;  $P < .001$ ). (Garcidueñas-Fimbres et al., 2023)

The fast-eating group's participants had lower adherence to the Mediterranean diet ( $\beta, -0.5$  points; 95% CI,  $-0.9$  to  $-0.1$  points) but a higher prevalence risk of overweight/obesity

(OR, 2.9; 95% CI, 1.8-4.4;  $P < .01$ ); larger waist circumference ( $\beta$ , 2.6 cm; 95% CI, 1.5-3.8 cm); greater FMI ( $\beta$ , 0.3 kg/m<sup>2</sup>; 95% CI, 0.1-0.5 kg/m<sup>2</sup>), systolic blood pressure ( $\beta$ , 2.8 mmHg; 95% CI, 0.6-4.9 mmHg), and fasting plasma glucose levels ( $\beta$ , 2.7 mg/dL, 95% CI, 1.2-4.2 mg/dL).(Garcidueñas-Fimbres et al., 2023)

A study by Wilson, Bopp, and Bopp (2023) aimed to examine the perceived weight changes since high school among college students and the factors contributing to these changes. The study found that most participants reported gaining weight since high school, with significant differences in abdominal girth, weight, and body fat percentage between those who gained, maintained, or lost weight. Factors such as decreased physical activity, unhealthy diets, increased food and alcohol consumption were associated with weight gain, while increased physical activity, healthier diets, and reduced food consumption were linked to weight loss.(Wilson et al., 2024a).

Body composition, particularly weight and adiposity, often changes during the transition to and throughout college. Previous research has documented these changes, noting that they are influenced by behaviors affecting energy balance, such as physical activity and diet. Studies have shown that physical activity tends to decline during this period, with only about half of college students meeting the recommended levels of aerobic and muscle-strengthening activities. Dietary quality also tends to deteriorate, while alcohol consumption increases significantly during the first year of college(Wilson et al., 2024).

## **2.7 The Association Between Dietary Habits and Body Mass Index Among Adults in Palestine.**

Several studies have examined the relationship between Body Mass Index (BMI) and various eating habits, revealing significant correlations that underscore the complexity of dietary behaviors and their impact on obesity. Factors such as sex, residence, eating speed, daily meal frequency, habits of consuming sweets, and the number of sugar-sweetened beverages consumed per week are significantly associated with BMI. Research indicates that differences in sex and place of residence influence BMI due to varying lifestyle and dietary patterns. Eating speed shows a significant positive correlation with BMI ( $P < 0.001$ ), suggesting that faster eating leads to higher caloric intake before satiety is registered. Conversely, higher meal frequency is negatively correlated with BMI ( $P = 0.018$ ), indicating that more frequent, smaller meals may help regulate weight more effectively. Additionally, a high-sugar diet ( $P = 0.023$ ) and the consumption of sugar-

sweetened beverages are positively associated with increased BMI, although the effect size is relatively small. These findings highlight the multifaceted nature of dietary behaviors and their impact on BMI, suggesting that targeted interventions, such as promoting slower eating, regular meal patterns, and reduced sugar consumption, could play a critical role in managing and reducing obesity rates.(Xie et al., 2019)

Numerous studies have investigated the prevalence of obesity among adults in Palestine, highlighting significant variations across different regions and populations. A total of 16 studies were identified, including eight conducted in the West Bank, two in the Gaza Strip, and five national studies. Abdeen et al. reported that in the West Bank, 35.5% of women and 40.3% of men were classified as overweight, while the obesity rates were 31.5% for women and 17.5% for men. Studies focused on mothers in the Gaza Strip revealed a combined prevalence of overweight and obesity at 64.1%, with urban and refugee populations exhibiting a prevalence of 67.5%. These studies also identified significant associations between obesity and factors such as age, medium and high education levels, high household income, nutritional education, and non-working status among women.

The eating habits of university students, such as skipping meals and consuming junk food frequently, are a major cause of obesity. According to a study by Karmakar (K. P & N, 2016), greater rates of overweight and obesity were associated with irregular breakfast and supper eating, frequent fried food consumption, and a lack of nutritional understanding. (Alzamil et al., 2019) found a similar relationship between poor dietary choices, like consuming a lot of sugary snacks and beverages, and a rise in the prevalence of obesity among Saudi university students.

## **2.8 Dietary Habits and Obesity Prevalence**

The study by Sakamaki et al. (2005) highlights the dietary habits and body shape perceptions of female university students in Japan and Korea. The research shows that despite the majority of students having a normal BMI, there is a strong desire among them to be thinner. This phenomenon is prevalent in both Japanese and Korean students, reflecting cultural pressures and body image issues.(Sakamaki et al., 2005)

A notable finding from the study is the discrepancy between current and ideal body weights among students. Both Japanese and Korean students reported ideal BMIs that fall into the underweight category, which can lead to unhealthy weight control behaviors. This cultural preference for thinness underscores the importance of addressing body image

issues in health education programs. Dietary habits significantly influence the nutritional status and overall health of university students. Galore et al. (1993) utilized computer software to analyze the dietary habits of first-year medical students, revealing notable nutritional deficiencies and imbalances. Davy et al. (2006) explored sex differences in dieting trends and nutrition beliefs among Midwestern college students, indicating that male and female students exhibit distinct dietary behaviors and perceptions of healthy eating.(Al-Rethaiaa et al., 2010)

Wardle et al. (2004) examined gender differences in food choice, finding that health beliefs and dieting behaviors significantly influence dietary preferences. Kolodinsky et al. (2007) linked higher knowledge of dietary guidelines to better food choices among college students, advocating for enhanced nutritional education to promote healthier eating behaviors.(Al-Rethaiaa et al., 2010)

In the context of university students, one study in the West Bank found the prevalence of overweight and obesity to be 25% (31.1% among men and 15.6% among women) and 7.2% (9.4% among men and 4% among women), respectively. This study also indicated that overweight and obesity were associated with a family history of obesity and low levels of physical activity, with 27.1% of participants being pre-hypertensive. Another study among female university students in the West Bank reported lower prevalence rates, with 12.4% overweight and 1.7% obese. National data from the STEPS Survey conducted in Palestine between 2010 and 2011 indicated that 57.8% of adults were overweight, and 26.8% were obese.(A. Assaf et al., 2023)

Obesity and overweight are prevalent health concerns among university students globally. Musaiger et al. (2003) identified lifestyle factors associated with obesity among male university students in the United Arab Emirates, highlighting the significance of dietary and physical activity behaviors in this demographic. Similarly, a study by Bertias et al. (2003) in Crete, Greece, found a correlation between obesity and cardiovascular risk factors among medical students, suggesting the need for targeted health interventions.(Yahia et al., 2008)

Cheng and Liu (2019) conducted a cross-sectional study among university students in Beijing, China, to examine the differences in food intake related to gender, year in college, and BMI. The study found that male students consumed more staple foods, meats, eggs, and soft drinks, while female students preferred vegetables and fruits. These dietary

differences were reflected in BMI variations, with higher consumption of protein- and fat-rich foods being associated with increased obesity risk among male students. The study highlights the importance of understanding gender-specific dietary patterns to develop targeted interventions that can promote healthier eating habits and reduce obesity risk in this demographic. Furthermore, the findings suggest that university years are critical for establishing long-term dietary habits, necessitating tailored interventions that consider the socio-cultural context of students' food choices.(Cheng & Liu, 2019)

## **2.9 Dietary Habits and Obesity Management Among Female University Students in Palestine.**

Research on the relationship between dietary habits and body mass index (BMI) has highlighted breakfast consumption and snacking behavior as important factors in managing weight. A study conducted by Isa and Masuri (2011) explored these associations among university students in Malaysia. The findings revealed that while a significant proportion of students maintained a healthy BMI, there was a notable percentage (24%) who skipped breakfast on the day of data collection. The study suggested that skipping breakfast could be linked to an increased risk of unhealthy snacking, which in turn might contribute to higher BMI. However, the results were inconclusive, as no significant differences were found between the normal and overweight groups concerning their snacking behavior. Interestingly, while sex and healthy food frequency were significantly related to BMI status, with females showing a lower likelihood of being overweight, the study also noted a paradoxical association where higher consumption of healthy snacks was linked to an increased likelihood of being overweight. These findings contribute to the growing body of evidence that underscores the complexity of dietary behaviors and their impact on BMI, particularly in young adults during their university years.(Isa & Masuri, 2011)

The best way to decrease obesity's negative effects on health and the economy is to prevent it. It is essential to support public health initiatives that encourage physical exercise and a balanced diet. Treatment for people who are already obese is crucial, though. Pharmacotherapy, lifestyle modifications, and bariatric surgery are effective treatments (Mohajan & Mohajan, 2023). For the management of obesity and the prevention of its related disorders, early detection and individualized treatment regimens are essential (Yazdi et al., 2015)

A study conducted among female college students in Palestine explored the prevalence of obesity, dieting behaviors, and predictors of dieting in this demographic. Despite a majority of participants being of normal weight, a high prevalence of dieting behaviors was observed, driven by low body satisfaction and the influence of media promoting thinness ideals. Significant predictors of dieting included the number of previous dieting attempts, perceived media pressure, regular exercise, higher BMI, and the belief that weight negatively impacted social interactions. The study highlighted that body satisfaction was not significantly related to self-esteem or religious faith, suggesting that secular and Western influences heavily shape body image perceptions in Palestinian society. The findings indicate that, while obesity rates remain low, the pressure to conform to a thin body image is pervasive, necessitating strategies that address cultural influences and promote healthy dieting practices.(Bayyari et al., 2013)

According to Alfawaz's study from 2012, a significant portion of pupils had poor eating habits. Nearly half of them drank soft drinks and consumed chips, fried meals, french fries, and chicken shawarma—grilled chunks of chicken or beef combined with mayonnaise paste and salt. Of the female students, 54 percent consumed fast food at home, 12 % at restaurants, and 10 % at the university (delivery). Twenty percent of students said that eating at restaurants resulted in a higher quantity of food consumed than eating at home or at school. Most female students (85.8%) are aware of the negative health effects of fast food. Despite learning about this information in college, only 49.6% of respondents were aware that it is heavy in fat, salt, energy, and poor in fiber. study findings indicated that there was no meaningful correlation between BMI and the frequency or amount of fast food consumed. It founds no significant relationship between the portion size of all types of fast-food meals consumed (chicken sandwich meal, meat sandwich meal, chicken nuggets, French fries, vegetable pizza, cheese pizza, apple pie, soft drinks, chicken shawarma, and meat shawarma) and BMI, whereas there was a significant ( $p < 0.05$ ) positive relationship between fish sandwich meal size and BMI."(Alfawaz, 2012)

An ongoing energy imbalance—a situation in which energy intake exceeds energy expenditure—leads to obesity. Diets heavy in fat and calories have a direct correlation with the prevalence of obesity. Many studies have shown that obese people have a greater liking for fatty meals, which may be a cause of obesity rather than an effect of it. For example, even if they are not obese themselves, children from obese families frequently choose fatty foods, suggesting a possible hereditary or familial propensity. Mixed results have been

found on the preference for sweet foods among obese individuals. Some research revealed that there is no substantial difference in the taste for sweet meals between individuals who are obese and those who are not; nonetheless, obese people do seem to have a larger preference for sweetness. This disparity could result from personal preferences for sweetness.

A study conducted by (Nasser, 2001) examined the role of taste in food intake and its implications for obesity. The study found that sweet, salty, and umami tastes are generally well-accepted and promote food intake, while bitter and sour tastes are typically less palatable. Interestingly, the sensitivity to these tastes did not differ significantly between lean and obese individuals. However, in morbidly obese individuals who underwent gastric bypass surgery, there was an increase in sensitivity to bitter and sour tastes and a decrease in sensitivity to sweet and salty tastes. This change in taste perception could contribute to altered food preferences and intake post-surgery.

Additionally, the study highlighted that obese individuals often have a reduced thermic effect of food, which is linked to lower energy expenditure after eating. This reduced sensitivity to sensory-based signals that terminate food intake, combined with possible increased incentive salience of food stimuli and decreased activation of food-reward circuits, might lead to the over-consumption of energy and contribute to obesity. These findings suggest that interventions targeting taste perception could be beneficial in obesity management(Nasser, 2001) .

Long-term weight increase has been linked to a number of lifestyle modifications, including adjustments to the consumption of particular foods and beverages, physical activity, alcohol use, television watching, and smoking behaviors. In non-obese people, average long-term weight gain is slow (0.8 lb/year on average in the cohorts we analyzed). However, even little increases in weight over time might have consequences for long-term metabolic dysfunction linked to adiposity, diabetes, cardiovascular disease, and cancer. In all three cohorts, weight changes attributed to individual lifestyle factors were rather small; but, when taken as a whole, dietary and physical activity changes explained a significant portion of the variation in weight increase. The three distinct cohorts' results were similar, which boosted our confidence in the findings' validity and generalizability.(Mozaffarian et al., 2011)

## 2.5 Conceptual Framework

### 2.5.1 Introduction

This thesis investigates the complex relationship between dietary consumption patterns and obesity among female students at Al-Quds University in Palestine. This framework outlines potential factors influencing dietary choices and their association with weight status.

Conceptual Definitions.

### 2.5.2 Dependent Variable:

**Obesity:** is a long-term, complicated condition characterized by excessive fat accumulation that may affect one's health. (Obesity and Overweight, WHO, 2024.)

You can categorize participants into normal weight, overweight, and obese based on standard BMI classifications.

### 2.5.3 Independent Variables:

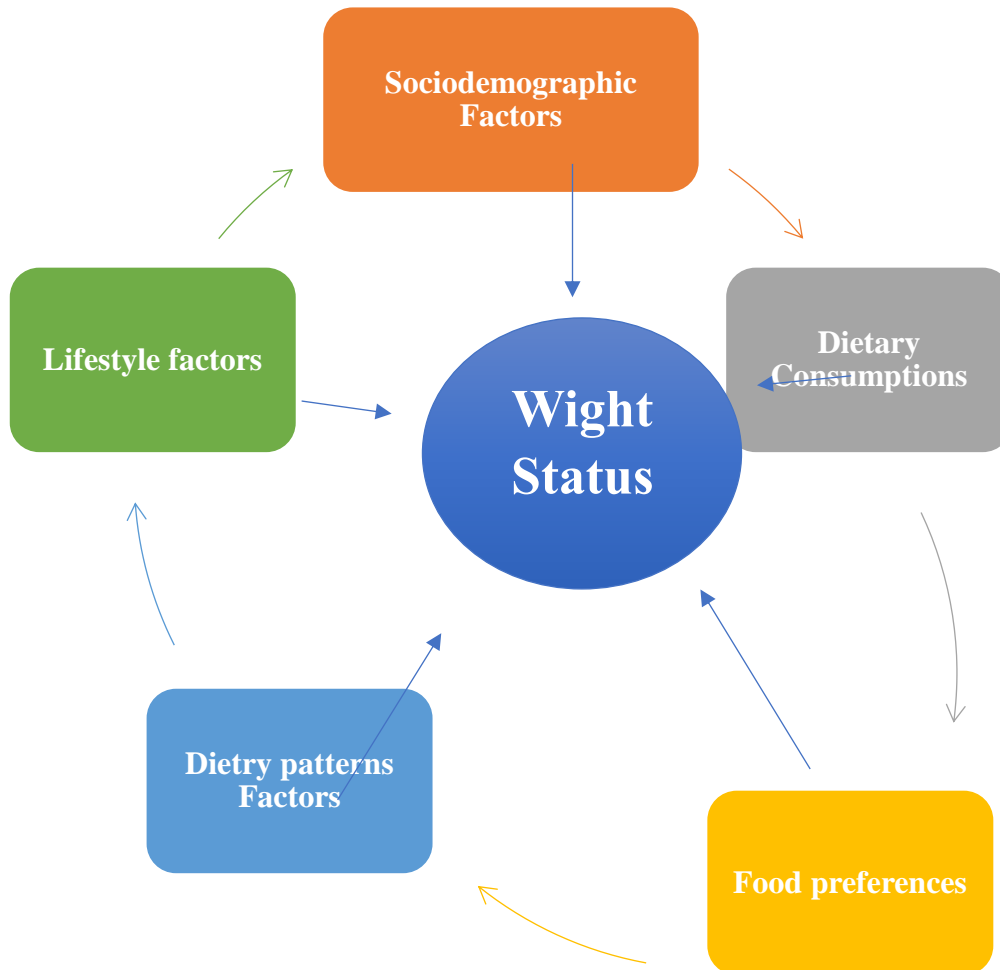
**Dietary consumption:** refers to the intake of food and beverages by an individual (Gibson et al., 2012)

**Sociodemographic Factors:** refer to a combination of social and demographic factors, including socioeconomic status (SES), which is typically assessed based on an individual's level of education, type of occupation, and income (Vo et al., 2023).

**Lifestyle Factors:** a way of life based on recognizable behavioral patterns that are influenced by social contacts, economic factors, and environmental factors in addition to an individual's basic characteristics.(Bagordo et al., 2017)

**Food preference's** primary determinant role in formative dietary intake and eating habits, persisting from early childhood through adulthood. Therefore, development a preference for healthy foods from a young age is a promising strategy for enhancing diet quality, which is a key factor in promoting cardiometabolic health.(Beckerman et al., 2017)

**Dietary pattern:** The amount, proportion, variety or the combination of different foods and beverages in the diet, and the frequency with which they are habitually consumed.(Pepe et al., 2022.)



Figure

## 2.1 Study conceptual Framework

### 2.5.4 Risk of obesity:

Practically every element of health is negatively impacted by excess weight, particularly obesity, from mental and emotional states to respiratory and reproductive systems. Diabetes, heart disease, and some malignancies are just a few of the fatal and crippling conditions that obesity raises the chance of developing. It accomplishes this through a number of mechanisms, some as simple as the physical strain of gaining excess

weight and others involving intricate adjustments to hormones and metabolism. In addition to raising healthcare expenses on an individual, a national, and international level, obesity reduces life expectancy and quality. The good news is that losing weight can reduce some of the risks associated with obesity.(Health Risks | Obesity Prevention Source | Harvard T.H. Chan School of Public Health, 2017.)

## **Chapter three**

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### **Methodology**

In this chapter, the research methodology is presented. The study Design, study population, study sampling method, study tools, statistical analysis utilized during the project, ethical considerations, and variables operation definitions are presented.

#### **3.1 Study Design**

The researchers adopted a cross-sectional design for the study, because its time-efficient and cost-effective, deal for generating hypotheses and can answer this research questions, and also for the nature of this study that is depending on recall cross sectionals study investigate the current preferences with the current weight status and can answer this research questions.

#### **3.2 Study setting:**

This research conducted at Al-Quds University in Jerusalem, Palestine, focusing on the diverse group of undergraduate female students across various disciplines. Al-Quds University (AQU) is offers more than 120 undergraduate and postgraduate programs, taught through its fifteen degree-granting faculties that cover the main scientific disciplines such as medicine, life, and natural sciences, business and management, arts and

humanities, law and jurisprudence, engineering, and social sciences. This setting was chosen as it gave the researchers easy access to this category of participants.

### **3.3 Sample size:**

To ensure a representative sample of the undergraduate female students at Al-Quds University, 2,364 participants were recruited for this study using a weighted random sampling method. This sample size was determined using the Calculator sample size calculator, considering a 1.77% margin of error, a 95% confidence interval, and a population size of 7584 which is the number of females registered at Al-Quds university at the academic year 2023-2024.

### **3.4 Sample Methods and technique**

Participants for this study recruited from Al Quds University. Recruitment methods include classroom announcements and advertisements within the university to attract a diverse participant group. The study targets a total of 2364 to ensure a balanced representation across different body mass index (BMI) categories, including normal, overweight, and obese BMI groups. To address potential challenges of an unbalanced initial sample size and achieve diversity across variables like age group and BMI categories, the Synthetic Minority Over-sampling Technique (SMOTE) is utilized. This technique helps in generating synthetic samples to expand the sample size, ensuring a strong participant group for analysis.

### **3.5 Inclusion Criteria**

The study Include female students between the ages of 18 and 30 who were currently enrolled at Al-Quds University. To participate, they had to give informed consent and be in good health, free from chronic illnesses that could impact their dietary habits or body weight.

### **3.6 Exclusion Criteria**

Exclusions were as follows: male students, individuals under 18 or over 30 years old, students not enrolled at Al-Quds University, those who did not provide informed consent, and. Pregnant students and those with incomplete or missing data on crucial variables were also excluded from the study. Females were chosen because they are more sensitive to changes at the university life stage, and it is easier to communicate with for a female researcher.

### **3.7 Measurements (study tools)**

The study used a tool to gather detailed information about how food preferences, eating habits, and other factors are connected to obesity among students. The study mainly looked at three main things:

#### **3.7.1 Body Mass Index (BMI):**

Weight and height were measured using calibrated scales and stadiometers. Body weight was measured to the nearest 0.1 kg, with participants wearing minimal clothing and no shoes. BMI was calculated by dividing weight in kilograms by the square of height in meters ( $\text{kg}/\text{m}^2$ ). BMI categories were defined as follows: underweight ( $\text{BMI} < 18.5 \text{ kg}/\text{m}^2$ ), normal weight ( $\text{BMI} = 18.5\text{--}24.9 \text{ kg}/\text{m}^2$ ), overweight ( $\text{BMI} = 25\text{--}29.9 \text{ kg}/\text{m}^2$ ), and obese ( $\text{BMI} \geq 30 \text{ kg}/\text{m}^2$ ). (World Health Organization, 2000)

#### **3.7.2 Understanding Dietary Patterns:**

The study delved into dietary habits using a validated Food Frequency Questionnaire (FFQ) (García Rodríguez et al., 2019) and the food consumption pattern scale. This questionnaire provided valuable insights into the dietary patterns and choices of the participants. The scales include a list of items such as Milk, Juice, Soft drinks, Energy drinks, Coffee, Caffeinated, and Tea. The scales are categorized into four categories: Never, Daily, Weekly, and Monthly, alongside a measure of daily consumption in cups. For milk, participants report their intake frequency using the given scale and also specify the number of cups they consume each day. The food preferences scale, which consists of a three-level scale including "Don't Like," "Like," and "Like A Lot," is used to assess individual preferences for a variety of food items. This method allows participants to express their liking for each food item, providing insights into their dietary preferences. For items like fruits and vegetables, participants indicate their preference level from the three options. This helps to understand their feeling towards these essential food groups. Similarly, legumes and nuts are important sources of protein and healthy fats. The scale helps to measure how much participants enjoy these foods. Preferences for different types of unprocessed meats, including fish, poultry, and red meat, are also assessed using this

scale. This approach provides information on how much participants favor unprocessed and presumably healthier meat options over processed varieties. For sweets and salty snacks, the scale helps to understand the extent of the participant's preference for these typically high-calorie foods. This can be particularly insightful for dietary patterns and health outcomes. Bread, including general and white bread, is assessed to determine the participants' liking for carbohydrate sources. Likewise, preferences for milk and dairy products, sources of calcium, and other nutrients are evaluated. The scale applied to beverages, including non-sugar and sugar-sweetened beverages, energy drinks, and other specific drinks like Arabian sweet beverages. This helps in understanding participants' preferences for different types of drinks, which can significantly impact their overall dietary intake. The scale used for processed meats, a food category often associated with various health risks, provides insights into participants' tendencies towards these kinds of meats. The scale also includes specific items like tomatoes and yogurt, allowing for a detailed understanding of preferences for these commonly consumed foods. Additionally, preferences for regional or culturally specific items like cooked food and rice offer a glimpse into cultural dietary habits.(Cheikh Ismail et al., 2020)

### **3.7.3 The fast-food consumption scale**

with five categories is designed to measure how often individuals eat certain fast foods. The categories are "Never," "1-2 times a month," "Less than 4 times a month," "Once a week," and "2-4 times a week." This scale is applied to various fast-food items to measure their frequency in participants' diets. For each item - burgers, fried chicken, fries, pizza, shawarma, chips, and noodles - participants select one of the five frequency options. "Never" indicates no consumption, "1-2 times a month" and "Less than 4 times a month" represent occasional consumption, "Once a week" suggests a regular weekly intake, and "2-4 times a week" reflects a more frequent consumption. FFQ-Porto Alegre has a fair relative validity in adolescents and adults. (Henn et al., 2010)

### **3.8 Procedure and Data Collection**

Data collection involved a two-step process. Initially, face-to-face interviews were conducted with selected students from July 2023 to April 2024 to complete a comprehensive questionnaire about their food preferences and consumption patterns.

Subsequently, anthropometric measurements, including weight, height, body fat percentage, and BMI, were taken to analyze the interrelationship between food preferences and obesity among female university students. Face to face conducted before October 7<sup>th</sup> war, then later self-administered data was collected from the students as there was no chance to access the university Lab, and also fact composition was taken from the variables, as it could not have been collected through self-administered questionnaire.

### 3.9 Data Analysis

The data were analyzed using version 23.0 of the Statistical package for Social Sciences software (SPSS). Analysis of variance (ANOVA) was employed to examine variations in the anthropometric characteristics of the participants, as the data was a continuous variable with three or more categories. The results were presented as means with standard deviations (SD). Univariate analysis was used to explore the relationships between obesity, food preferences, and consumption. All reported P values were derived from two-sided tests and assessed against a 5% significance level. Statistical significance was recognized for P values below 0.05.

Table 3.0.1: Reliability statistics.

	Cronbach's Alpha	N of Items
Food frequency	.708	7
Food consumption	.827	14

### 3.10 Validity and reliability

The research tool used in the study demonstrates a comprehensive approach to ensuring both validity and reliability in measuring obesity-related factors among students.

The researchers used a pre validated study tools like “fast food questionnaire and food frequency questionnaire” in addition to a data collection sheet. Test retest and Cronbach alpha was used to validate the Arabic versions of the questionnaire, Cronbach alpha 0.708 and 0.827 respectively, which showed to be reliable data collection tools in their Arabic version  $p < 0.05$ .

The Body Mass Index (BMI) measurement, is based on a universally recognized formula that considers weight and height, thereby accurately reflecting the body mass category of an individual. This method aligns with global health standards, indicating a high level of content validity.

Food Frequency Questionnaire (FFQ) employed to understand dietary patterns covers a wide array of food items, from basic groups to specific regional choices, ensuring that it comprehensively captures dietary habits.

### **3.11 Ethical consideration**

Ethical approval will be obtained from Al-Quds University.

The study sheet contains information about the aim of the study, objective, methods of data collection. Also, it contains an informal constant (the participant has the right to refuse to participate in the study and their participation will be anonymously).

- The privacy, confidentiality and veracity will be assured for all participants and his information will be only for the purpose of the scientific research and their participation will be anonymously.

## Chapter four

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### Results

#### 4.1 Characteristics of the sample:

Table 4.0.1 Sociodemographic Characteristics by Weight Status (n= 2,364)

Sociodemographic		Underweight %	Normal %	Overweight %	Obese %
Family affluence	Low	26.9	33.0	43.5	44.8
	Moderate	58.7	53.0	50.3	53.5
	High	14.4	14.0	6.3	1.7
Family Members	<=3	51.8	42.0	49.2	28.9
	4- 6	44.7	44.3	38.2	46.4
	7 +	3.6	13.7	12.5	24.7

Table 4.1 shows the descriptive analysis of the sociodemographic characteristics and weight status. Average age of the participants was 20 years with STD of 1.62 years, The percentages presented in the table are weighted by age group and gender to ensure that the distributions accurately reflect the population structure. Family affluence and family members significantly influence weight status. Individuals from low affluence are more

likely to be overweight (43.5%) or obese (44.8%), while those from high affluence tend to be underweight (14.4%) or normal weight (14%). Additionally, smaller families have higher rates of underweight (51.8%). whereas larger families show a higher prevalence of obesity (24.7%).

## 4.2 Lifestyle and weight status

Table 4.0.2: Univariate Analysis of Lifestyle Variables and Weight Status

Lifestyle Variable		Underweight %	Normal %	Overweight %	Obese %	F	P-Value
Smoke	No	90.00	85.40	90.00	98.00	0.671	0.413
	Yes	10.00	14.60	10.00	2.00		
Physical Active	Yes	55.20	57.00	66.20	61.80	4.566	0.033
	No	44.80	43.00	33.80	38.20		
Sleeping Hours	≤ 5 Hours	23.40	41.30	29.30	32.00	40.961	.000
	6-8 Hours	64.30	55.20	65.50	67.50		
	> 8 Hours	12.40	3.60	5.20	0.50		
Food allergy	Yes	14.00	18.10	15.70	5.90	31.619	.000
	No	86.00	81.90	84.30	94.10		
Chronic illness	Yes	2.70	9.10	2.00	0.00	13.958	.000
	No	97.30	90.90	98.00	100.00		
Amount of drinking water	1 to 1.5 liters	38.10	44.30	36.00	47.20	72.056	
	1.5 to 2 liters	23.20	9.80	25.50	8.10		
	≥ 2 liters	12.40	6.80	10.70	1.50		

The univariate analysis in Table 4.2 shows only 2.0% of obese people smoke, compared to the greatest rates of smoking among underweight (14.6%) and normal weight (10.0%) people. Those who are underweight (55.2%) and normal weight (57.0%) are less likely to be physically active than those who are overweight (66.2%) and obese (61.8%). 23.4% of underweight people and 32.0% of obese people report getting less than five hours of sleep per night, whereas normal weight people report sleeping for at least eight hours at a time at the greatest rate (12.4%). Compared to the obese category (5.9%), food allergies are more common in the normal weight (18.1%) and overweight (15.7%) categories. Chronic illness

is most prevalent in normal weight individuals (9.1%) and absent in the obese category (0.0%).

Table 0.3: Association Between Meal Frequency and Weight Categories

Meals	Underweight		Overweight		Obesity	
	F	P-value	F	P-value	F	P-value
Breakfast Frequency	8.679	.003	.210	.647	1.336	.248
Lunch Frequency	97.758	.000	10.546	.001	55.539	.000
Dinner Frequency	3.392	.066	31.832	.000	.370	.543
Breakfast Weekdays	28.688	.000	16.889	.000	2.940	.087
Breakfast Weekends	6.808	.009	.942	.332	3.022	.082

Table (4.3) shows that skipping breakfast is most common among overweight individuals (33.2%), while having breakfast 1-3 times per week is highest in the obese category (50.6%). Daily lunch consumption is most frequent among obese individuals (51.1%). Skipping dinner is highest among overweight (42.5%) and obese (34.9%) individuals. Not having breakfast on weekdays is most common among overweight individuals (33.7%), while obese individuals show the highest rate on weekends (36.7%).

Table 0.4 Relationship Between Eating Quantity, Eating Speed, and Weight Status

Lifestyle Variable		Underweight %	F	P-Value	Normal %	Overweight %	F	P-Value	Obese %	F	P-Value
Eating quantity	Eats a lot	29.9	21.69	0.00	10	52.6	119.7	0	35	6.88	0.00
	Eats moderately	60.7			73.9	44.8			54.8		
	Eats small amounts	9.3			16.1	2.5			10.2		
Eating speed	Quick eater	41.8	5.64	0.01	26.7	38.1	2.461	0.11	29.4	0.00	0.97
	Moderate eater	46.4			56.5	54.1			66.2		
	Slow eater	11.8			16.8	7.8			4.4		

As presented in table (4.4), Overweight individuals report eating a lot (52.6%) more frequently, whereas normal weight individuals report eating moderately (73.9%). Quick eating is more common among underweight (41.8%) and overweight (38.1%) individuals, while moderate eating is prevalent among normal weight individuals (56.5%). A significant percentage of obese individuals drink less than 1 liter of water per day (43.1%), whereas normal weight individuals most commonly drink 1 to 1.5 liters (44.3%).

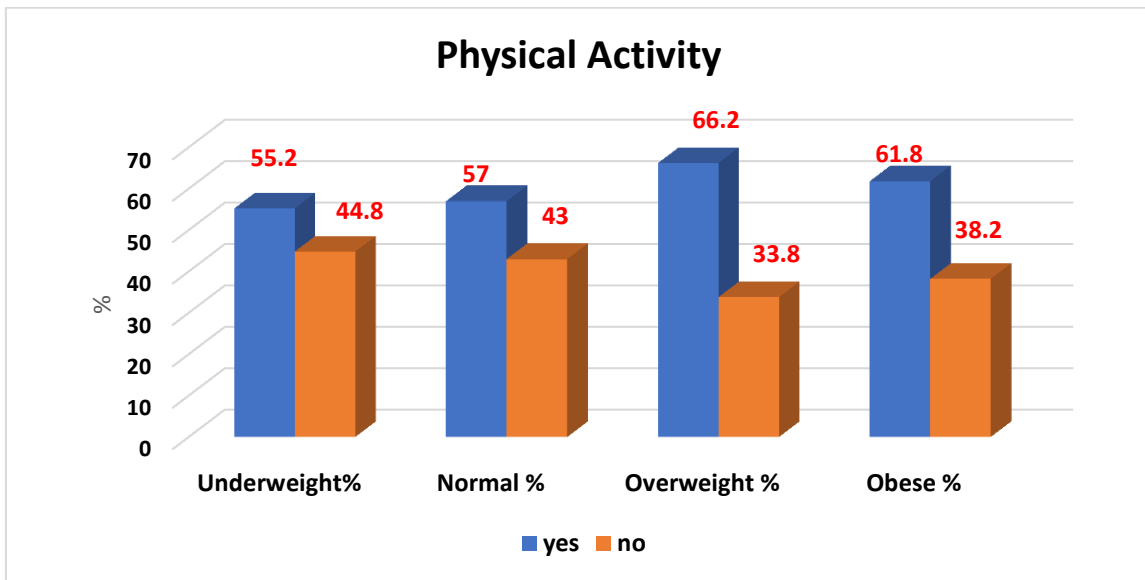


Figure 0.1: Prevalence of physical activity among different weight groups.

This figure 4.1 shows a significant relationship between physical activity levels and weight status, with underweight reporting higher levels of physical activity (55% reported being physically active) and overweight and obese showing lower likelihood of participating in physical activity (35% of obese individuals reported being physically active). On the other hand, underweight people were more likely to engage in physical activity. Participants with normal weights showed a moderate degree of physical activity.

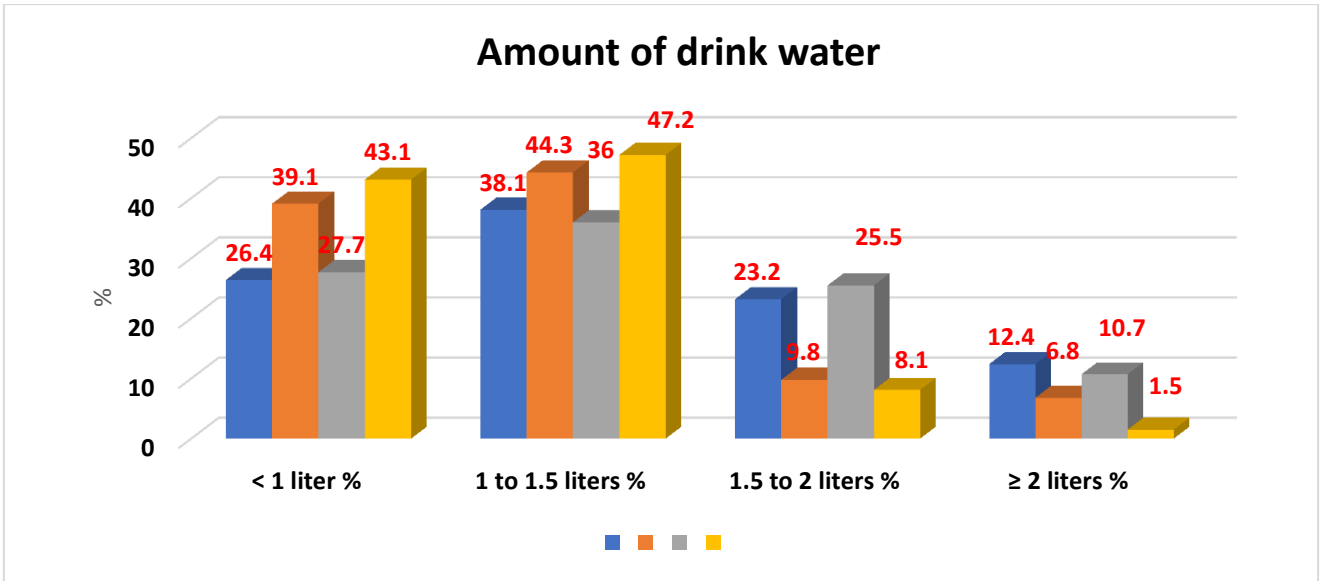


Figure 4.2: The relationship between amount of drinking water and weight status.

This figure 4.2 shown the relationship between water intake and BMI categories, revealing that underweight and normal-weight individuals generally consume moderate amounts of water (1 to 1.5 liters), with a notable percentage of underweight individuals drinking less than 1 liter. In contrast, overweight and obese individuals tend to drink less water, with the highest percentage of obese individuals consuming less than 1 liter daily. Overall, the trend suggests that lower water consumption is associated with higher BMI, indicating that adequate water intake may play a role in managing or preventing obesity.

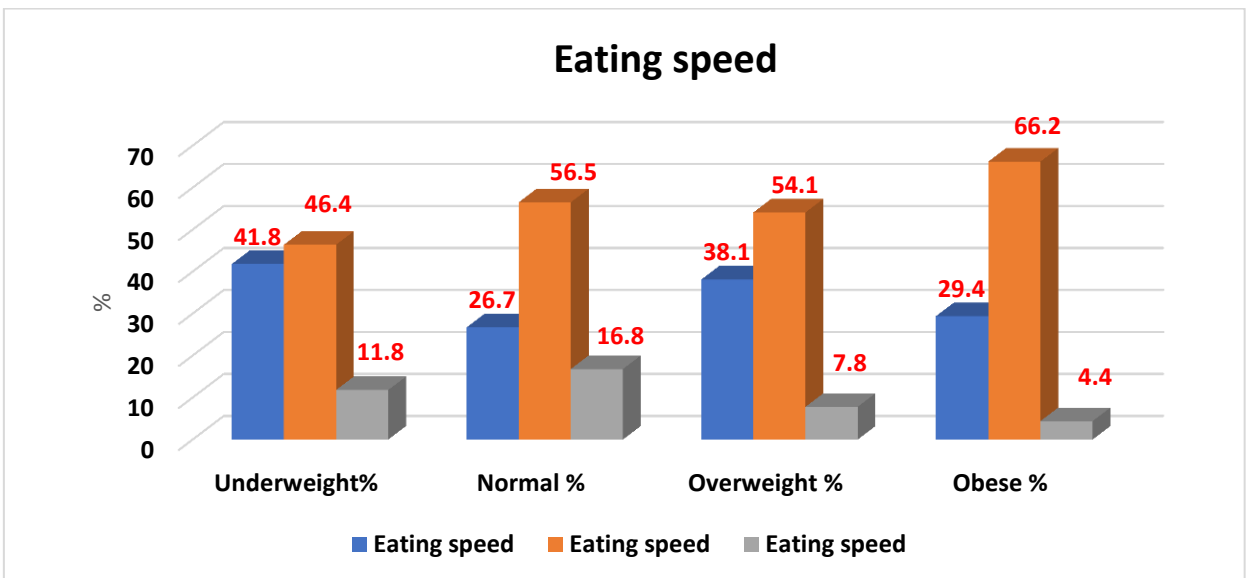


Figure 4.3: Prevalence of speed of eating and weight status.

This figure 4.3 shows a significant relationship between eating speed and weight status, with overweight and obese students showing a higher tendency to eat more quickly than underweight students (e.g., 26.7% reported being quick eaters), and 66.2% of obese students reported being quick eaters. On the other hand, underweight people were more likely to be slow eaters. Students with normal weights showed a more evenly distributed in all categories of eating speed.

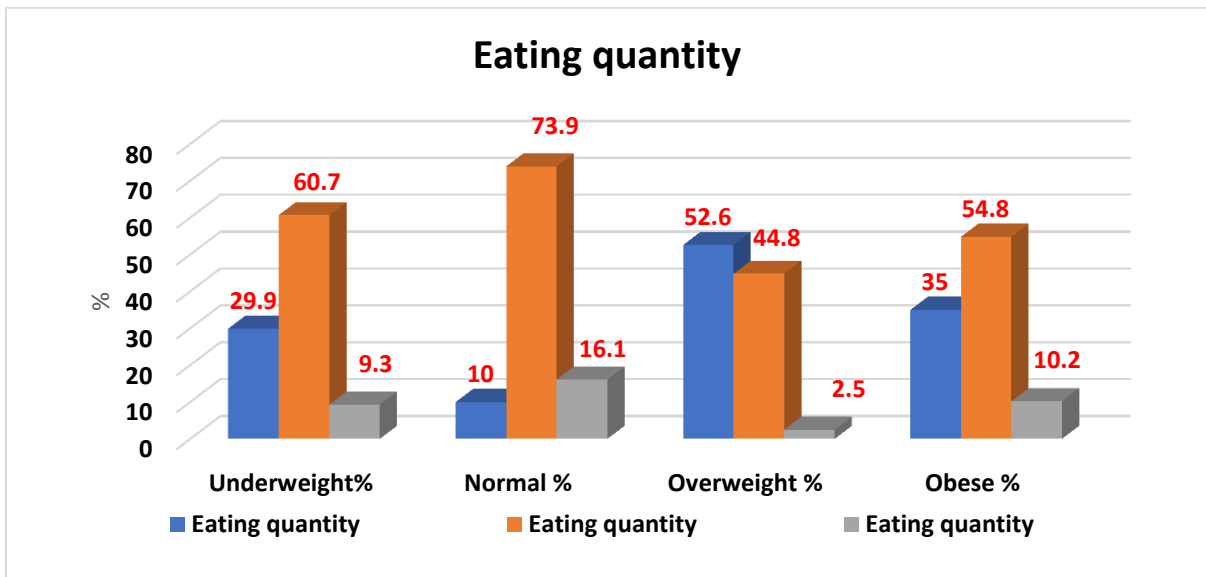


Figure 4.4:Prevalence of eating quantity and weight status.

The Figure 4.4 shows a significant relationship between eating quantity and weight status, with overweight and obese people showing a higher tendency to consume more food (for example, 70% of obese people reported eating a lot) than underweight people (30% reported eating a lot). On the other hand, those who were underweight showed a stronger tendency to eat less. Participants with normal weights showed a more evenly distributed dispersion in all areas of eating amount.

Table 0.5: Univariate Analysis of Selected Beverages Consumption Patterns and Weight Status

<b>Food Consumption</b>		Underweight%	Normal %	Overweight%	Obese%
Milk consumption	Never	57.00	52.30	50.30	59.40
	One Cup	28.30	28.10	20.50	14.20
	2 Cups	11.80	8.60	17.60	23.40
	3 + Cups	2.90	11.00	11.70	3.00
Juice Consumption	Never	51.10	48.60	50.80	57.40
	One Cup	31.50	22.50	14.40	14.20
	2 Cups	15.70	16.80	11.20	26.10
	3 + Cups	1.70	12.20	23.70	2.40
Soft drink Consumption	Never	52.80	56.90	59.20	75.00
	One Cup	35.50	18.80	13.70	22.00
	2 Cups	9.80	10.30	17.90	2.00
	3 + Cups	1.90	14.00	9.10	1.00
Energy Consumption	Never	69.90	79.00	84.40	86.30
	One Cup	12.40	9.30	4.60	12.20
	2 Cups	13.40	6.90	5.90	1.50
	3 + Cups	4.40	4.70	5.10	0.00
Coffee consumption	Never	59.60	70.40	65.10	81.70
	One Cup	27.40	15.20	14.00	14.60
	2 Cups	11.20	9.00	15.10	2.40
	3 + Cups	1.90	5.40	5.80	1.40
Caffeinated Consumption	Never	70.60	65.10	64.10	53.80
	One Cup	17.80	21.20	17.80	15.10
	2 Cups	8.50	7.40	12.00	10.50
	3 + Cups	3.20	6.30	6.10	20.60
Tea Consumption	Never	35.90	56.50	55.00	47.40
	One Cup	36.50	20.00	15.90	17.40
	2 Cups	17.90	12.50	23.40	13.50
	3 + Cups	9.60	11.00	5.80	21.70

Table (4.5) presents the frequency of consumption for various beverages among students categorized by weight status (underweight, normal, overweight, obese). It shows the percentage of each group consuming different quantities (never, one cup, two cups, three or more cups) of milk, juice, soft drinks, energy drinks, coffee, caffeinated drinks, and tea.

For milk consumption, a significant percentage of obese students (59.40%) never consume milk, compared to 57.00% of underweight students and 52.30% of normal-weight students. Consuming one cup of milk per day is most common among underweight (28.30%) and normal-weight students (28.10%), while overweight students are less likely to consume one cup (20.50%) and obese students even less so (14.20%). Interestingly, drinking two cups of milk daily is more prevalent among overweight (17.60%) and obese students (23.40%), whereas consuming three or more cups is most common among normal-weight students (11.00%).

Juice consumption also varies significantly across weight categories. A notable percentage of obese students (57.40%) and underweight students (51.10%) never consume juice. One cup of juice per day is most common among underweight students (31.50%), while obese and overweight students are less likely to consume this amount (14.20% and 14.40%, respectively). Consuming two cups of juice is notably high among obese students (26.10%), while frequent juice consumption (three or more cups) is most prevalent among overweight students (23.70%).

Soft drink consumption shows that a substantial majority of obese students (75.00%) never consume soft drinks, a trend that decreases across the other weight categories, with 59.20% of overweight and 52.80% of underweight students abstaining. One cup of soft drink daily is most common among underweight students (35.50%), whereas two cups are more frequent among overweight students (17.90%). Consuming three or more cups is relatively high among normal-weight students (14.00%).

Energy drink consumption patterns indicate that the majority of students across all weight categories rarely consume these drinks, with the highest abstention rate among obese students (86.30%). Underweight students are more likely to consume one cup (12.40%) or two cups (13.40%) of energy drinks compared to other groups. Consuming three or more cups of energy drinks is minimal across all categories, with no obese students reporting such consumption.

Coffee consumption shows that a significant proportion of obese students (81.70%) never drink coffee, compared to 70.40% of normal-weight and 59.60% of underweight students. One cup of coffee daily is more common among underweight students (27.40%), while two cups are consumed more by overweight students (15.10%). Consuming three or more cups of coffee is relatively rare, with the highest rate among normal-weight students (5.40%).

For caffeinated beverages, underweight students show the highest rate of non-consumption (70.60%), followed by normal-weight (65.10%) and overweight students (64.10%). One cup of caffeinated beverages is more frequently consumed by normal-weight students (21.20%). Two cups are more commonly consumed by overweight students (12.00%), while consuming three or more cups is most common among obese students (20.60%).

Lastly, tea consumption reveals that normal-weight students have the highest rate of never consuming tea (56.50%), followed by overweight (55.00%) and obese students (47.40%). One cup of tea daily is most common among underweight students (36.50%). Consuming two cups is more prevalent among overweight students (23.40%), whereas three or more cups are consumed most frequently by obese students (21.70%).

Table 0.6: Univariate Analysis of Risky food Consumption Patterns and Weight Status.

<b>Food Consumption</b>		Underweight %	Normal%	Overweight%	Obese%
Burger Consumption	Never	69.00	69.70	67.70	73.80
	1-2 times a month	25.40	23.00	28.40	17.10
	3 + times a month	5.60	7.30	3.90	9.10
Fried Chicken Consumption	Never	63.50	61.30	66.30	78.20
	1-2 times a month	20.00	19.80	20.00	18.40
	3 + times a month	16.60	19.00	13.70	3.40
Fries Consumption	Never	54.50	50.40	49.70	57.90
	1-2 times a month	14.90	20.00	14.90	20.50
	3 + times a month	30.60	29.60	35.40	21.70
Pizza Consumption	Never	64.30	67.50	58.20	64.60
	1-2 times a month	21.70	19.10	28.60	18.80
	3 + times a month	14.00	13.40	13.20	16.60

Table (4.6) shows a majority of students across all weight categories rarely consume burgers, with the highest percentage observed in the obese category (73.80%). Overweight students are more likely to consume burgers 1-2 times a month (28.40%), while a small percentage of obese students consume burgers frequently (9.10%). Similarly, the majority of students do not frequently consume fried chicken, with the highest percentage in the obese category (78.20%). Consumption of fried chicken 1-2 times a month is fairly consistent across all categories, but fewer obese students consume fried chicken 3+ times a month (3.40%).

About fries' consumption, a significant percentage of students never consume fries, with the highest rate among obese students (57.90%). Overweight students are more likely to consume fries 3+ times a month (35.40%). When it comes to pizza consumption, the majority of students across all categories rarely eat pizza, with a higher percentage of overweight students consuming it 1-2 times a month (28.60%). Frequent consumption of pizza (3+ times a month) is slightly higher among obese students (16.60%).

Table 4.7: Shawarma, Chips, and Noodles Consumption Patterns and their Association with Weight Status.

<b>Food Consumption</b>		Underweight %	Normal%	Overweight%	Obese%
Shawarma Consumption	Never	55.20	65.80	64.50	59.70
	1-2 times a month	35.50	21.30	23.90	31.60
	3 + times a month	9.30	12.90	11.70	8.60
Chips Consumption	Never	49.70	57.50	65.10	72.90
	1-2 times a month	8.30	18.10	16.90	11.50
	3 + times a month	42.00	24.40	17.90	15.60
noodles Consumptions	Never	69.50	68.40	74.80	70.40
	1-2 times a month	15.60	13.50	15.40	23.90
	3 + times a month	14.90	18.10	9.80	5.80

As shown in table (4.7) shawarma consumption patterns indicate that normal-weight students are more likely to never consume shawarma (65.80%), while a higher percentage of underweight students consume it 1-2 times a month (35.50%). Chips consumption shows that a significant majority of obese students rarely consume chips (72.90%), with underweight students having the highest frequent consumption rate (3+ times a month at 42.00%).

Lastly, noodle consumption patterns reveal that the majority of students across all categories rarely consume noodles, with a slightly higher frequent consumption rate among normal-weight students (18.10%). These findings suggest that food consumption patterns vary across different weight categories, with certain foods being more or less prevalent in specific groups.

## Chapter five

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### Discussion

The age distribution of Al-Quds University's female university students appears to be unaffected by age, as seen by the consistent patterns of underweight, normal weight, overweight, and obesity across the various age groups (18–19, 20–21, and 22–23). This result comes as a bit of a surprise because prior research has frequently shown that changes in food, lifestyle, and metabolism with age might affect one's weight status (Tanveer et al., 2022). The study's findings about the uniformity of weight distribution across age groups, however, may be explained by the fact that university students experience similar environmental influences and lifestyle behaviors.

Data from the Family income clearly show a pattern where lower rates of obesity are correlated with higher socioeconomic position. Compared to students from moderately-affluent families (53.5%) and low-affluence families (44.8%), students from high-affluence families have the lowest obesity prevalence (1.7%). This pattern is in line with international studies that shows improved availability to nutrient-dense food and healthier lifestyle options are associated with higher socioeconomic level (Jones et al., 2014).

Financial hardships restricting their access to nutritious food and opportunity for physical activity may be the cause of the increased prevalence of overweight and obesity among

students from low-income homes (Drewnowski & Specter, 2004). This emphasizes how important it is to provide pupils from lower socioeconomic backgrounds with specialized nutritional instruction and interventions. Students from larger families (7+ members) had higher rates of obesity (24.7%), while students from smaller families ( $\leq 3$  members) have a higher percentage of underweight individuals (51.8%), according to the analysis of family size. This is explained by the potential financial hardships and problems with resource allocation that bigger families may have, which can have a detrimental effect on diet quality and availability of wholesome food options (Giskes et al., 2006). Larger families may also be related with stress and financial strain, which can lead to poor eating habits and less physical exercise, ultimately raising the risk of obesity.

The data indicates significant relationships between lifestyle variables and weight status among female university students. Students who do not smoke have a significantly higher prevalence of obesity (98.0%) compared to those who do smoke (2.0%), match with existing literature that associates smoking with lower body weight due to appetite suppression and increased metabolism (Dahlawi et al., 2024). Physical activity is particularly higher among students with normal weight (57.0%) and overweight (66.2%) compared to those who are underweight (55.2%) and obese (61.8%), underlining the importance of regular physical activity in maintaining a healthy weight (Warburton et al., 2006) About sleep, students who sleep 6-8 hours per night show the highest prevalence of normal weight (55.2%) and overweight (65.5%), while those with more than 8 hours of sleep are least likely to be obese (0.5%). This supports the idea that adequate sleep is crucial for maintaining hormonal balance and metabolic health, as both insufficient and excessive sleep can lead to weight gain ((Chaput et al., 2007)

The data also shows that the majority of students do not have food allergies, with higher obesity rates (94.1%) among those without food allergies compared to those with allergies (5.9%). This might be due to dietary restrictions imposed by food allergies that limit the intake of calorie-dense foods. Furthermore, students who do not have chronic illnesses show a higher rate of obesity (100%) compared to those with chronic illnesses, likely because managing chronic illnesses often involves dietary restrictions that can lead to weight loss or prevent weight gain due to illness-related metabolic changes. (Guh et al., 2009) Breakfast frequency does not show a clear pattern with weight status; however, students who never eat breakfast have higher rates of overweight (33.2%) and underweight (27.7%). Regular breakfast consumption has been associated with better weight control

and metabolic health due to improved filling and reduced total caloric intake (Timlin & Pereira, 2007).

The data shows that daily lunch consumption is linked to higher rates of normal weight (49.4%) and obesity (51.1%), indicating that regular meals can help maintain metabolic stability and prevent excessive snacking. On the other hand, skipping dinner is more frequent among overweight (42.5%) and obese (34.9%) students, which suggests that missing meals may lead to compensatory overeating later ((Mekary et al., 2012) Additionally, the frequency of breakfast consumption on weekdays and weekends shows that skipping breakfast is more common among obese students (21.8% and 36.7%, respectively), underscoring the importance of regular meal patterns for weight management.

The data demonstrates a strong correlation between food consumption volume and weight. Students who eat moderately had greater rates of normal weight (73.9%) and lower rates of obesity (54.8%) and overweight (44.8%), whereas those who eat a lot have the highest rates of overweight (52.6%) and obesity (35.0%). Little eaters had the lowest rates of obesity (10.2%) and overweight (2.5%) and the largest percentage of students (16.1%) who are normal weight. This implies that whereas excessive eating is linked to greater rates of overweight and obesity, moderate eating is linked to healthy weight statuses. This is corroborated by recent research, which shows that calorie intake is directly impacted by portion size, which in turn influences weight gain (Roe et al., 2022)

Eating speed also influences weight status. Quick eaters have higher rates of overweight (38.1%) compared to moderate (54.1%) and slow eaters (7.8%). Slow eaters are least likely to be obese (4.4%), whereas moderate eaters show the highest prevalence of normal weight (56.5%) and the lowest obesity rates (66.2%). This finding aligns with contemporary research, which suggests that slower eating rates are associated with increased satiety and reduced calorie intake, helping prevent weight gain (Wallace et al., 2023)

Less than one liter of water consumed daily by students is associated with higher obesity rates (43.1%) and lower normal weight prevalence (39.1%). On the other hand, people who drink one to one and a half liters per day have lower obesity rates (47.2%) and higher normal weight rates (44.3%). Lower rates of obesity (8.1%) and overweight (25.5%) are linked to drinking 1.5 to 2 liters per day. Students who drink two or more liters of water a day are the least likely to be obese (1.5%) and are more likely to have normal weight

(6.8%). This shows that drinking more water is associated with healthier weight statuses, presumably because it helps promote satiety and lower total calorie consumption (Rousham et al., 2022).

The study reveals notable patterns in the relationship between beverage consumption and weight status among female university students at Al-Quds University. High milk consumption (3+ cups) is lowest across all weight categories, with the highest percentage in normal weight students (11.0%), suggesting that milk is not a major component of their diets, possibly due to dietary preferences or lactose intolerance (Nicklas et al., 2011). Juice consumption shows that students who never drink juice have high prevalence rates in all weight categories, particularly among obese students (57.4%), while overweight students have the highest juice consumption (23.7%), indicating a potential link between high juice intake and overweight status. Non-consumption of soft drinks is associated with the highest obesity rates (75.0%), while moderate consumption (1 cup) is more prevalent in normal weight students (18.8%).

Energy drink consumption is generally low, but non-consumption correlates with the highest rates of obesity (86.3%). Coffee and caffeinated drink consumption patterns show that non-consumption is associated with higher obesity rates (81.7% for coffee and 53.8% for caffeinated drinks), while moderate consumption (1 cup) is more common among normal weight students. Finally, tea consumption shows that non-consumption is linked to higher rates of normal weight (56.5%), while regular consumption (3+ cups) is associated with higher obesity rates (21.7%), suggesting that beverage choices significantly impact weight status and highlight the need for promoting healthier drinking habits among students.

The data indicates that the majority of students across all weight categories consume burgers infrequently, with the highest non-consumption rate observed among obese students (73.8%). In contrast, frequent burger consumption (3+ times a month) is associated with a higher prevalence of obesity (9.1%). This finding suggests that while infrequent burger consumption is common among students managing their weight, frequent consumption is linked to higher obesity rates. This aligns with contemporary research that associates high fast-food intake with increased caloric intake and BMI (Rosenheck, 2008)

Students who are obese have the highest percentage of not eating fried chicken (78.2%), but their rate of frequent consumption (three or more times per month) is significantly

lower (3.4%). This tendency would suggest that obese people are changing their diets, cutting back on their intake of fried food in an effort to lose weight. Because fried food has a high energy density and poor nutrient quality, modern studies support the link between obesity and fried food consumption ((Guallar-Castillón et al., 2007)

Frequent consumption of fries (3+ times a month) is most prevalent among overweight students (35.4%), while non-consumption is highest among obese students (57.9%). This suggests that high fry consumption contributes to overweight status, and those who become obese might reduce their intake. Current literature highlights the role of fried potato products in promoting weight gain due to their high caloric content (Mozaffarian et al., 2011b)

Pizza consuming does not exhibit a significant pattern across weight statuses; nevertheless, students who are obese (16.6%) are slightly more likely than other groups to consume pizza frequently (3+ times per month). This suggests that even while pizza is consumed widely, obesity may be slightly more of a question at greater frequencies. According to recent research, eating pizza and other high-energy foods on a regular basis may result in an increase in calorie intake and weight gain (Powell & Nguyen, 2013).

Obese students are more likely to consume moderate amounts of shawarma (1-2 times a month) (31.6%), whereas normal weight students are more likely to abstain from consumption (65.8%). This implies that obese students are more likely to consume modest amounts of shawarma, which is consistent with dietary patterns that occasionally contain high-calorie meals. The study revealed a significant statistical association between shawarma consumption and overweight or obesity, with a p-value of 0.004.(Khatatbeh et al., 2022)

Non-consumption of chips is most prevalent among obese students, with 72.9% reporting they do not eat them, while frequent consumption (three or more times a month) is most common among underweight students, at 42.0%. This pattern suggests a possible link between higher chip consumption and underweight status, which could be attributed to increased energy needs or differing dietary patterns. Contemporary research supports this, as chips are high in fats and calories, and their excessive consumption can substantially affect weight. (Wang et al., 2020)

The consumption of noodles reveals that non-consumption is common in all weight groups, with overweight students having the greatest rates (74.8%). The higher frequency

of intake (3+ times per month) among students who have normal weight (18.1%) indicates that occasional noodle consumption has no discernible effect on weight status. Increased instant noodle intake is strongly correlated with obesity and cardiometabolic syndrome in South Korea, the country with the greatest global instant noodle consumption per capita.(Sil Huh et al., 2017)

Poor socioeconomic status and high family number were associated with more obesity, which are both non-changeable variables, but their presence is indicating the importance of further care for their impact on obesity, part of the potential justification of this relation could be due to the fact that the poor students could not afford a healthier diet that is composed of fruit and health food, rather depend on basic food like bread and rice and other types of diet they may be correlated with obesity, the same thing with the number of family members as it is itself may be associated with less socioeconomic status.

#### **Limitations:**

- The reliance on self-reported data may introduce response bias, and the focus on female students at Al-Quds University limits generalizability to other populations.
- Additionally, not all potential confounding factors, such as genetics or psychological stress, were considered.
- Adding males would have been a good chance for comparison based on gender differences, as a comparison between the two gender categories could have been a very valuable addition to the study. Also, the self-reporting data could have been much better if it was taken and captured at the lab, which may be taken into consideration for future research.

## **Chapter six**

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### **Conclusion**

The study indicates that while age does not significantly impact the weight status of female university students at Al-Quds University, socioeconomic factors such as family affluence and family size do. Higher socioeconomic status is associated with lower obesity rates, underlining the importance of economic incomes in maintaining a healthy weight. Conversely, students from larger families and lower socioeconomic backgrounds are more prone to obesity, likely due to economic constraints affecting their dietary and lifestyle choices.

These findings suggest that interventions aimed at reducing obesity among female university students should focus on addressing socioeconomic disparities. Programs that promote healthy eating habits, increase access to nutritious food, and encourage physical activity are essential, particularly for students from lower socioeconomic backgrounds and larger families. Addressing these factors can help mitigate the risk of obesity and improve the overall health and well-being of female university students.

The study indicates that lifestyle variables such as smoking, physical activity, sleep duration, meal frequency, eating quantity, eating speed, water intake, and the presence of chronic illnesses significantly impact weight status among female university students at Al-Quds University. Non-smoking, adequate sleep, regular physical activity, moderate eating,

slower eating speeds, higher water intake, and consistent meal consumption are associated with healthier weight statuses. Conversely, smoking, insufficient or excessive sleep, irregular meal patterns, excessive food consumption, quick eating, low water intake, and chronic illnesses correlate with higher rates of underweight, overweight, and obesity. These findings emphasize the need for targeted interventions that promote healthy lifestyle habits to address weight-related issues in this population, focusing on consistent physical activity, regular meal patterns, adequate sleep, smoking cessation, moderate eating, slower eating speeds, and adequate hydration as part of comprehensive strategies to manage and prevent overweight and obesity.

The study highlights the significant impact of beverage consumption patterns on the weight status of female university students at Al-Quds University. Milk and juice consumption appear to influence weight status, with higher juice intake linked to overweight and milk consumption being relatively low across all categories. Soft drink and energy drink non-consumption are associated with higher obesity rates, while moderate coffee and caffeinated drink consumption correlate with normal weight. These findings underscore the importance of promoting healthier beverage choices as part of comprehensive strategies to manage and prevent overweight and obesity in this population. Encouraging adequate milk intake, reducing juice and soft drink consumption, and balancing caffeinated drink intake could be key components of effective weight management interventions.

The study emphasizes the nuanced association between female Al-Quds University students' consumption of fast food and their current weight state. Obese students are more likely to abstain from other meals, such as fried chicken and chips, but frequent consumption of some fast-food items, including burgers and fries, is associated with greater risks of overweight and obesity. These results highlight the need of supporting balanced meals and healthier eating practices, such as cutting back on high-calorie fast food intake. In order to address weight-related concerns in this population, tailored nutritional treatments that emphasize lowering fast-food consumption and encouraging healthier options are essential.

The study highlights the complex relationship between fast food consumption and weight status among female university students at Al-Quds University. Frequent consumption of certain fast foods, such as burgers and fries, is linked to higher rates of overweight and obesity, while non-consumption of other foods, like fried chicken and chips, is more common among obese students. These findings underscore the need for promoting

healthier eating habits, including reducing the intake of high-calorie fast foods and encouraging balanced diets. Tailored nutritional interventions focusing on reducing fast food consumption and promoting healthier alternatives are crucial in addressing weight-related issues in this population.

In conclusion, this study highlights the complex interplay of socioeconomic, lifestyle, dietary, and psychological factors in influencing the weight status of female university students. The findings underscore the need for comprehensive, multifaceted interventions that address both the economic and behavioral aspects of weight management. Future research could further explore the psychological and social determinants of eating behaviors, as well as the long-term effectiveness of targeted interventions in promoting healthy weight among university students.

Drinking water was associated with less obesity, which reflects the importance of promoting this habit as a life style and include it in future studies that would use other type of designs such as cohort prospective studies

### **Recommendations:**

Based on the results of the study the researchers recommend the following

- For professional and decisionmakers
  1. Implement programs that specifically address the dietary needs of female university students from lower socioeconomic backgrounds.
  2. Encourage regular physical activity, adequate sleep, and consistent meal patterns among university students.
  3. Promote a health awareness campaign promoting healthier food choices and showing consequences of poor dietary intake
    4. Improve the availability of healthy food choices on campus, including more options for fresh fruits, vegetables, and low-fat dairy products.
- Recommendations for researchers
  1. To conduct the assessment at a nutrition lab rather than self-administered questionnaire
  2. To take into consideration involving males in the study as it could play a very important bench for comparison

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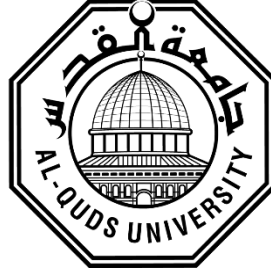
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## Appendix (1): study questionnaire



جامعة القدس

كلية الصحة العامة والتغذية

برنامج الصحة العامة/ مسار علم الأوبئة

عزيزتي المشاركة،

تحية طيبة وبعد....

تدعوكم الباحثة لتعبئة الاستبيان التالي بعنوان:

لتقييم نمط الغذاء والعوامل الحياتية المؤثرة على السمنة وحالة الوزن بين طالبات جامعة القدس.

لقد تم اختيارك عشوائيا للمشاركة في هذه الدراسة. مشاركتك قيمة وطوعية. يمكنك الانسحاب من الدراسة في أي وقت ودون إبداء أي سبب. جميع البيانات سرية وتبقى مخزنة في خزانة مغلقة أثناء الدراسة ويتم تدميرها بعد الانتهاء. يمكن للشخص المخول فقط الوصول إلى النسخ الرقمية للاستبيان، يرجى الإجابة على هذه الأسئلة لأنه سيتم استخدام جميع المعلومات بشكل فريد للدراسة البحثية. لا توجد إجابات صحيحة أو خاطئة. نحن نقدر أن إجاباتك تعكس نمط حياتك. لقد قرأت الشرح حول الدراسة. سمح لي بمناقشة استفساراتي، وقد تمت الإجابة عليها جميعا. وبناء على ذلك، أوافق على الاشتراك في هذه الدراسة وأدرك أنها طوعية، ويحق لي الانسحاب من الدراسة وقتما أشاء.

لمزيد من المعلومات، الرجاء التواصل مع:

د. رضوان قصراوي،

البريد الإلكتروني: [radwan@staff.alquds.edu](mailto:radwan@staff.alquds.edu)

شكرا جزيلا لتعاونكم، لكم فائق التقدير والاحترام.

## 1. البيانات الشخصية

### 1. الجنس

- ذكر
- أنثى

### 2. العمر (سنوات): \_\_\_\_\_

### 3. الإقامة

- نابلس
- قلقيلية
- طوباس
- سلفيت
- طولكرم
- جنين
- أريحا
- رام الله
- بيت لحم
- الخليل
- القدس

### 4. الحالة الاجتماعية

- أعزب/عزباء
- متزوج/ة
- مطلق/ة
- أرمل/ة

### 5. هل تعيش مع عائلتك أم تعيش وحدك؟

- أسكن مع عائلتي
- أسكن لوحي
- أسكن مع رفاق في السكن

### 6. القياسات الأنثروبومترية

- طولك (سم)
- وزنك (كجم)

7. هل تمتلك أنت أو عائلتك سيارة؟

○ لا

○ نعم، فقط واحدة

○ نعم، أكثر من واحدة

8. هل لديك غرفة نوم خاصة بك لنفسك؟

○ لا

○ نعم

9. خلال الأشهر الـ 12 الماضية، كم مرة سافرت بعيدا في عطلة مع عائلتك؟

○ أبدا

○ مرة

○ مرتين

○ أكثر من مرتين

10. كم عدد أجهزة الكمبيوتر و / أو الهواتف الذكية التي تمتلكها أنت أو عائلتك؟

○ لا يوجد

○ واحدة

○ اثنان

○ أكثر من اثنين

11. يرجى تحديد مستواك الأكاديمي

○ دبلوم

○ درجة بكالوريوس

○ درجة الماجستير

○ الدكتوراه

12. هل تعاني من أي حساسية أو عدم تحمل للطعام؟

○ نعم

○ لا

13. هل تعاني من أي مرض مزمن؟

○ نعم

○ لا

## II. نمط الحياة

أ\_ التدخين

14. هل سبق لك أن دخنت (سجائر، سجائر إلكترونية، فيب، شيشة / شيشة / شيشة، بايب،

سيجار)؟

○ لا

○ نعم

ب\_ النشاط البدني وممارسة الرياضة

15. هل تمارس نشاطاً بدنياً معتدلاً (الأنشطة التي تتطلب مجهوداً بدنياً معتدلاً وتجعلك تتنفس

بصعوبة إلى حد ما) على الأقل 150 إلى 300 دقيقة في الأسبوع؟

○ لا

○ نعم

16. هل تمارس نشاطاً بدنياً قوياً (تشمل الأنشطة رفع الأحمال الثقيلة أو الحفر أو التمارين

الرياضية أو ركوب الدراجات السريعة وما إلى ذلك) على الأقل 75-150 دقيقة في

الأسبوع؟

○ لا

○ نعم

17. هل تقوم بنشاط بدني معتدل أقل من 150 دقيقة ونشاط قوي أقل من 75 دقيقة في

الأسبوع؟

○ لا

○ نعم

18. كم متوسط عدد ساعات نومك في اليوم؟ \_\_\_\_\_

19. على مدى الأسبوعين الماضيين، كم مرة مررت بأي من المشاكل التالية:

السؤال	أبدا	عدة أيام	أكثر من نصف الأيام	كل يوم تقريبا
1_ القليل من الاهتمام أو المتعة في القيام بالأشياء	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2_ الشعور بالإحباط أو الاكتئاب أو اليأس	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3_ صعوبة في النوم أو البقاء نائما أو النوم أكثر من اللازم	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4_ الشعور بالتعب أو وجود القليل من الطاقة	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5_ ضعف الشهية أو الإفراط في تناول الطعام	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6_ الشعور بالسوء تجاه نفسك - أو أنك فاشل أو خذلت نفسك أو عائلتك	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7_ صعوبة في التركيز على الأشياء، مثل قراءة الصحيفة أو مشاهدة التلفزيون	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8_ التحرك أو التحدث ببطء شديد بحيث يمكن للآخرين أن يلاحظوا ذلك، أو العكس أن تكون منزعجا أو مضطربا لدرجة أنك كنت تتحرك أكثر بكثير من المعتاد	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9_ فكار بأنك ستكون أفضل حالا ميتا أو تؤذي نفسك بطريقة ما	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### III. النظام الغذائي

أ\_ نمط الأكل

20. هل تأكل وجباتك بانتظام؟

- نعم
- لا

21. كم تأكل من الوجبات الرئيسية التالية أسبوعياً؟

الوجبة	0	1	2	3	4	5	6	7
الإفطار	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
الغذاء	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
العشاء	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. كم مرة تأكل بين الوجبات؟

- لا يوجد
- واحدة
- اثنان
- ثلاث مرات
- أكثر من ثلاث مرات

23. كم مرة تتناول عادة وجبة الإفطار (أكثر من كوب من الحليب أو عصير الفاكهة)؟ يرجى وضع علامة في مربع واحد لأيام الأسبوع ومربع واحد لعطلة نهاية الأسبوع.

23. أيام الأسبوع

- لا أتناول الإفطار أبداً خلال الأسبوع
- يوم واحد
- يومان
- ثلاث أيام

- أربعة أيام
- خمسة أيام

### 23. ب. نهاية الأسبوع

- لا أتناول الإفطار أبدا خلال عطلة نهاية الأسبوع
  - عادة ما أتناول وجبة الإفطار في يوم واحد فقط من عطلة نهاية الأسبوع
  - عادة ما أتناول وجبة الإفطار في يومي عطلة نهاية الأسبوع
24. كيف تصنف نفسك من ناحية نمط الأكل؟

### 24. أ. الكمية

- كثير الأكل
- معتدل
- خفيف الأكل

### 24. ب. السرعة

- سريع الأكل
- معتدل
- بطيء الأكل
- 

### 25. ما هو نوع الطعام الذي يصفك بشكل أفضل؟

- مستهلك اللحوم والنبات
- نباتي Vegetarian
- مستهلك الأطعمة قليلة الدسم
- Vegan نباتي
- أخرى، يرجى التحديد: \_\_\_\_\_

### 26. كيف تصف نظامك الغذائي؟

- صحي ومتوازن (يشمل الفواكه والخضروات والوجبات المطبوخة في المنزل).
- غير صحي (يشمل الكثير من الوجبات السريعة ومشروبات الطاقة وما إلى ذلك)
- خليط بين الاثنين

○

27. هل تضيف عادة ما يلي إلى طعامك العادي:

الدهون والزيوت	○ دائماً	○ أحياناً	○ نادراً	○ لا أضيفها أبداً
السكر	○ دائماً	○ أحياناً	○ نادراً	○ لا أضيفها أبداً
الملح	○ دائماً	○ أحياناً	○ نادراً	○ لا أضيفها أبداً

28. ما مقدار الماء الذي تشربه كل يوم؟

- أقل من 1 لتر
- من لتر إلى لتر ونصف
- لتر ونصف إلى 2 لتر
- 2 لتر إلى 2.5 لتر
- 2.5 لتر ونصف إلى 3 لتر
- أكثر من ذلك

29. ما هو مشروبك المفضل؟

- قهوة سادة
- قهوة بالحليب و / أو السكر
- مشروبات الطاقة
- مشروبات غازية
- الشاي
- أخرى، يرجى التحديد \_\_\_\_\_

30. كم عدد الأكواب التي تستهلكها من المشروبات التالية:

الصنف	عدد المرات	الاستهلاك
الحليب / الزبادي		
العصائر		
المشروبات الغازية (الغازية)		
مشروبات الطاقة		
القهوة		
المشروبات التي تحتوي على الكافيين مثل الكابتشينو والموكا		
الشاي		

## ب\_ التفضيلات

31. ماذا تفضل لتناول الإفطار؟

○ فطائر والوافل والمربي

○ بيض

○ نقانق

○ خسروات/ سلطة

○ فواكة

○ جبن

○ زيتون

○ خبز وكرواسون

○ زيت وزعتر

○ سندويشات

○ غير ذلك، الرجاء التحديد

32. ماذا تفضل لتناول طعام الغداء والعشاء؟

○ سلطة

○ خسروات

○ لحوم /دجاج /سمك

○ معكرونة

○ أرز

○ سندويشات

○ غير ذلك، الرجاء التحديد

33. هل تفضل الوجبات السريعة؟ (برغر، دجاج مقلي، البطاطا المقلية، البيتزا، شاورما، رقائق

البطاطس، نودلز سريعة التحضير)

○ لا

○ نعم

### 34. يرجى تحديد درجة التفضيل للأطعمة التالية:

لا ينطبق	أنا أحب ذلك كثيرا	أنا أحب ذلك إلى حد ما	محايد	أنا لا أحب ذلك إلى حد ما	أنا لا أحب ذلك على الإطلاق	صنف الطعام
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الفواكه (طازجة أو مثلجة)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الخضار (طازجة أو مثلجة)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	البقوليات (مثل: العدس او الفاصولياء وغيرها)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	المكسرات (مثل: الجوز وغيرها) (غير مملحة)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الأسماك
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الدواجن
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	اللحوم الحمراء بجميع أصنافها وأنواعها
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	أي وجبات خفيفة (مثل: الحلويات، الكيك أو الكوكيز)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الوجبات الخفيفة المألحة (مثل رقائق البطاطس والمكسرات المملحة)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الخبز المعد بالحبوب الكاملة، المعكرونة بالحبوب الكاملة)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الخبز الأبيض أو المعكرونة
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	الحليب
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	منتجات الألبان الأخرى (مثل: الجبنة والزبادي)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	مشروبات غير سكرية (مثل: الشاي، القهوة والماء)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	مشروبات سكرية (مثل: المشروبات الغازية، القهوة والشاي المضاف إليها سكر)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	مشروبات الطاقة
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	بدائل اللحوم / الدواجن / الأسماك / بدائل المجهزة للنباتيين المعالجة

						لتعزيز النكهة أو تحسين الحفظ. مثل الهامبرغر، النقانق، الأطعمة المقلية، وما إلى ذلك.
○	○	○	○	○	○	الحلويات العربية مثل الكنافة
○	○	○	○	○	○	يخنات الطماطم
○	○	○	○	○	○	يخنات الزبادي
○	○	○	○	○	○	الصواني
○	○	○	○	○	○	الأطباق القائمة على الأرز على سبيل المثال: المجردة

35. إلى أي مدى تعتقد أن ما يلي يؤثر على تفضيلاتك الغذائية:

درجة التأثير					الصف
لا يؤثر	ليس كثيراً	محايد	يؤثر إلى حد ما	يؤثر كثيراً	المظهر / طريقة التقديم
○	○	○	○	○	النكهة
○	○	○	○	○	الكثافة (سائل، شبه صلب أو صلب)
○	○	○	○	○	الرائحة

نشكر حسن تعاونكم

## العلاقة بين الاستهلاك الغذائي وحالة الوزن لدى طالبات الجامعة في جامعة القدس-فلسطين

أعداد: رغد عادل عمر عمرو

إشراف: د. رضوان القصرابي

### المُلخَص

المقدمة: تدرس هذه الدراسة المقطعية العلاقة بين استهلاك الغذاء وحالة الوزن بين الطالبات في جامعة القدس، بهدف سد الفجوة في فهم كيفية تأثير هذه العوامل على السمنة وإدارة الوزن. **منهجية البحث:** تم إجراء دراسة مقطعية على 2,364 طالبة من جامعة القدس لتحليل كيفية تأثير أنماط استهلاك الطعام والشراب، إلى جانب العوامل الاجتماعية والاقتصادية ونمط الحياة، على مؤشر كتلة الجسم (BMI). تم جمع البيانات من خلال استبيانات تتعلق بالتناول الغذائي، والنشاط البدني، والعادات الحياتية، ثم تم تحليلها إحصائيًا باستخدام الإصدار 23.0 من برنامج الحزمة الإحصائية للعلوم الاجتماعية (SPSS) لتحديد الارتباطات مع مؤشر كتلة الجسم. **النتائج:** أظهرت التحليلات وجود علاقة إيجابية ملحوظة بين استهلاك الأطعمة السريعة ذات السعرات الحرارية العالية وزيادة مؤشر كتلة الجسم بين المشاركات، بقيمة  $p$  أقل من 0.05. كما كانت الأنظمة الغذائية الغنية بالخضروات والتي تحتوي على كميات أقل من الأطعمة المعالجة مرتبطة بحالات وزن صحية ( $p < 0.05$ ). أظهرت عوامل نمط الحياة مثل النشاط البدني ( $p = 0.033$ ) ومدة النوم ( $p < 0.001$ ) تأثيرًا كبيرًا على حالة الوزن. كما أظهرت العوامل الاجتماعية والاقتصادية، بما في ذلك الثراء الأسري وحجم الأسرة، ارتباطًا قويًا بمؤشر كتلة الجسم، حيث ارتبط انخفاض الثراء بارتفاع معدلات السمنة. ( $p < 0.001$ ) بالإضافة إلى ذلك، كانت حالة التدخين وتكرار تناول وجبة الإفطار

وكمية الماء المستهلكة من المؤشرات الهامة لمؤشر كتلة الجسم. ( $p < 0.05$ ) الخلاصة: تسلط النتائج الضوء على أهمية التدخلات الغذائية واستراتيجيات إدارة الوزن للطالبات الجامعيات، والتي يجب إدراجها في السياسات الصحية العامة والبرامج التعليمية لمكافحة السمنة وتعزيز أنماط الحياة الصحية.