An-Najah National University
Faculty of Graduate Studies

The Pattern of Using Nutritional Supplements Among Students of An-Najah National University-Nablus: Cross-Sectional Study

By
Aseel Mazin Abu Hasan

Supervisor
Dr. Iyad Ali

This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health, Faculty of Graduate Studies, An-Najah National University, Nablus, Palestine.
2021

The Pattern of Using Nutritional Supplements among Students of An-Najah National University-Nablus: Cross-Sectional Study

By
Aseel Mazin Abu Hasan

This Thesis was defended successfully on 23/09/2021 and approved by:

Defense Committee Members	**Signature**
• Dr. Iyad Ali / Supervisor	.....
• Dr. Mohand Jazzar / External Examiner	.....
• Dr. Abdulsalam Alkaiyat / Internal Examiner	.....

Acknowledgement

After praise be to God, I would like to thank my family specially Dad and Mom for your endless support and encouragement. Also I would thank my thesis advisor Dr. Iyad Ali for his gaudiness, advice, expertise throughout the entire thesis process. Finally, I would like to thank college students who participated in this study.

Aseel Mazin

الاقرار

أنا الموقعة أدناه، مقدّمة الرسالة التي تحمل العنوان:

نمط استخدام المكملات الغذائية لدى طلبة جامعة النجاح الوطنية – نابلس: دراسة مقطعية

The Pattern of Using Nutritional Supplements among Students of An-Najah National University-Nablus: Cross-Sectional Study

أقر بأن ما اشتملت عليه هذه الأطروحة إنما هو نتاج جهدي الخاص، باستثناء ما تمت الاشارة إليه حيثما ورد. وأن هذه الرسالة كاملة، أو اي جزء منها لم يقدم من قبل لنيل اي درجة او لقب علمي او بحثي لدى أي مؤسسة تعليمية أو بحثية أخرى.

Declaration

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

Student's Name:	**Aseel Mazin Abu Hasan**	اسم الطالب:
Signature:	.....	التوقيع:
Date:	**23/09/2021**	التاريخ

List of Content

List of Tables

List of Figures

List of Annexes

List of Abbreviations

DS : Dietary Supplement

MVMs : Multi Vitamin Multi Minerals

NVNMs : Non Vitamins Non Minerals

FDA : Food And Drug Administration

HS : Herbal Supplement

DSAEs : Dietary Supplement Adverse Events

The Pattern of Using Nutritional Supplements among Students of An-Najah National University-Nablus: Cross-Sectional Study

By
Aseel Mazin Abu Hasan
Supervisor
Dr. Iyad Ali

Abstract

Study background

Nutritional supplements (also known as dietary supplements) are products that contain one or more dietary ingredients (including vitamins, minerals, herbs or other botanicals, amino acids, and other substances) or their components; used to supplement the diet. These supplements are actually taken by mouth as a pill, capsule, tablet, or liquid.

Dietary supplements (DS) are nutrients that improve the overall health and well-being of an individual as well as reduce the risk of diseases. Proofs indicate a rising prevalence of these products worldwide, especially among college students. The prevalence of supplement use varies in different ethnic groups for a diversity of dietary, economic conditions, and cultural aspects. Many college students live alone when they get their admission to college in separate residences and prepare their own meals. Some students may live with their family, but often do not regularly eat dinner with them because of other commitments such as activities, part-time jobs, or dinner plans with their friends. Also, many college students skip breakfast. Individuals state that they use DS as an overall preference to promote general health, develop performance and energy, treat particular health conditions,

enhance nutrition (because the doctor recommended it and it is good for them), and change their lifestyle to the best.

Methodology

In this study, the research is conducted based on the quantitative research method. The numerical data is collected by online and paper surveys, which have been designed according to the relevant literature. Afterward, two different scale items have been unified with respect to the variables. Accordingly, descriptive analysis has been applied, and the results were presented in tables so the analytical descriptive approach that used to analyze the study data. The study included undergraduate and graduate students from all disciplines at An-Najah University. Research data were obtained from 380 participants.

Results

Statistical analysis was carried out using SPSS, and the results of the study showed the following: based on four different hypotheses. First, there is a difference in the knowledge of dietary supplements between users and non-users, and thus hypothesis 1 was accepted. Second, there is no difference in perception and belief about dietary supplements between users and non-users, and therefore Hypothesis 2 was rejected. Third, there is the widespread use of multivitamins and minerals among college students, thus the third hypothesis was accepted, and finally, there is no significant effect of DS use on weight loss and increased academic focus according to the

participants' responses, thus the fourth hypothesis was rejected. In addition, about 43.4% (n = 165) of the pooling sample (n = 380) were using dietary supplements. Multivitamins and minerals were the most popular dietary supplement among students in this study sample, accounting for 27% of the total. The most common reasons for using supplements were to increase the energy level, followed by strengthening the immune system, strengthening hair and nails, and improving memory. In addition, users frequently receive information from the Internet, nutritionist, and social media.

Conclusion

The use of dietary supplements is widespread among college students, including users and former users. The results of this study suggest that more educational programs on DS are necessary, also appropriate educational intervention is necessary to enable university students to avoid adverse effects from using DSs. The study also suggests that further investigation is needed to be conducted on the general population.

Chapter One

Introduction and Background

Chapter One

Introduction and Background

1.1 Introduction

Dietary supplements abbreviated as (DS) are products that contain one or more dietary ingredients (including vitamins, minerals, herbs or other botanicals, amino acids, and other substances) or their components; used to supplement the diet. These supplements are actually taken by mouth as a pill, capsule, tablet, or liquid[(1)]. People use dietary supplements for a wide variety of reasons, for instance; first, some seek to compensate for diets, medical conditions, or eating habits that limit the intake of essential vitamins and nutrients. Second, other people consider them as a source of energy or use them in order to get a good night's sleep[(2)]. Third, also some people need vitamin supplements because they have particular medical conditions that can lead to deficiencies[(3)].

The use of dietary supplements (DSs) has been steadily growing all over the world as well as the sales of DSs have dynamically increased in the period of coronavirus disease 2019 (COVID-19) in most countries [(4)]. The consumption and interest in immune-related compounds and foods like vitamins C and D, zinc, omega-3, garlic, ginger, and turmeric have increased. Improving immunity was the main reason behind the changes and supplementation in the consumption of pro-healthy foods[(4)].

Dietary supplements (DS) are nutrients that improve the overall health and well-being of an individual as well as reduce the risk of diseases. Proofs indicate a rising prevalence of these products worldwide especially among college students[5]. The prevalence of supplement use varies in different ethnic groups for a diversity of dietary, economic conditions, and cultural aspects[6]. Many college students live alone when they get their admission to college in separate residences and prepare their own meals. Some students may live with their family, but often do not regularly eat dinner with them because of other commitments such as activities, part-time jobs, or dinner plans with their friends. Also, many college students skip breakfast[7]. Individuals state that they use DS as an overall preference to promote general health, develop performance and energy, treat particular health conditions, enhance nutrition (because the doctor recommended it and it is good for them), and change their lifestyle to the best[8].

1.2 Problem Statement

College students are increasingly using dietary supplements for alternative methods of improving health and appearance. Some may use it in the wrong way and have a negative impact on their health. In this study the researcher will examine the use of DSs and evaluate their prevalence, type and patterns intake among college students.

1.3 Objective

Since students share a variety of characteristics and similar lifestyles, their DS use may differ from the general population.

The main objective of this study is to assess demographic characteristics of college students, the prevalence of DS used, type of DS used, reasons for use among college students, DS users' source of information, the effect of DS on academic achievement, life behavior, and money spent on DS and finally Knowledge and perception about DS.

1.4 Research questions

This study is based on the following research QS:

1. What is the prevalence of DSs use among college students?
2. What are the benefits of the use of DSs among college students?
3. Is there a trend by university students towards the use of DSs for the purpose of weight loss?
4. Is there a relationship between the use of DSs and the increased concentration of students?

1.5 Hypotheses

The above research QS raised the following hypothesis

1. Knowledge of DSs will differ between users and non-users.
2. Perception of DSs use will differ between users and non-users.

3. Multivitamins and multi-minerals are widely used among college students.

4. There is a significant impact of using DS on weight loss and increased focus according to participants' responses.

1.6 Operational Definition

Dietary Supplement: is defined as a product that is intended to supplement the diet. A dietary supplement contains one or more dietary ingredients (including vitamins, minerals, herbs or other botanicals, amino acids, and other substances) or their components; is intended to be taken by mouth as a pill, capsule, tablet, or liquid; and is identified on the front label of the product as being a dietary supplement.

College Students: Students enrolled in An-Najah National University-Nablus, Palestine.

Knowledge: The range of one's information or understanding, the fact or condition of being aware of something.

Perception: An individual's belief, and attitude towards dietary supplements.

User: Students took one or more dietary supplement(s).

Non User: Students did not take any dietary supplements or stopped taking it.

1.7 Background

1.7.1 Dietary supplements

Dietary supplements contain vitamins, minerals, herbs, botanicals, amino acids, enzymes, and many other ingredients. Well-known supplements include vitamins D and B12; minerals like calcium and iron; herbs such as Echinacea and garlic; also contain products as glucosamine, probiotics, and fish oils. Some dietary supplements can help you get adequate quantities of essential nutrients if you do not have nutritious diversity of foods. However, supplements cannot be completely used as a permanent alternative instead of the variety of foods that are vital to a healthy diet[9].

Healthy dietary habits and food choices are parts of lifestyle and are recognized as key environmental factors for the prevention of non-communicable chronic diseases during the life course; their modifiable features promise a decreased socio-economic global burden load in aging societies. Supplements' quality, safety, and efficacy are still the main issues for each involved party, i.e., the consumers, the manufacturers, and the regulators[10]. The dose of each bioactive supplement and its potential interactions are significant to ensure their safety and effectiveness. Additionally, technological challenges remain to be overcome to establish certified reference materials and standardized operational protocols[10].

The use of dietary supplements by old people increased over the years. In the United States, an estimated one-half of persons aged 57–85 years take a

dietary supplement regularly. The common conditions in this population including chronic diseases and absorption problems can compromise nutritional status[11].

Several previous studies demonstrated that higher use of DSs was correlated with knowledge about supplements and attitudes of individuals. However, studies also reported that individuals with higher economic status and healthier lifestyles were more likely to use DSs. Furthermore, students who did not smoke and were physically active were more commonly to consume DSs[12]. In addition, epidemiological studies suggest that demographic characteristics may act as determinants of supplement use. Few notable demographic traits associated with increased DS use are old age, level of education, female gender, etc. It was observed in a study that college students were more frequent users of supplements as compared to the general population. As well as, studying a health and/or non-health subject may have some sort of effect on DS use[13]. Besides that, socioeconomic factors (with three sub-topics including subjective norms, food prices, and commercial considerations of the sectors involved in the production and sale of DS) featured as the experiences of the participants as to the intake of DS. Also using DS is influenced by such factors as physical activity, body mass index, history of chronic diseases, and belief about the benefits of DS[14].

1.7.2 Types of Dietary Supplements

Multi-vitamin minerals supplements (MVMS)

Several definitions of MVMS have been suggested. For example, the US National Institutes of Health defines MVMS as: “any supplement containing 3 or more vitamins and minerals but no hormones, herbs or drugs, with each ingredient at a dose less than the Tolerable Upper Intake Level (UL) determined by the Food and Nutrition Board—the maximum daily portion likely to pose no risk for adverse health effects [(15)]. Multivitamin multimineral comprise vitamin A, K, E, D, C, B1, B6, B12, folic acid, iron, zinc, calcium, magnesium and other[(16)].

There is an increasing number of MVMS to support good health and to be protected from different diseases (e.g. cancer, cardiovascular disease, and cognitive decline). High-income countries like the United States and Europe, multivitamins are the most commonly used. There is an increasing number of people MVMS to support good health and to be protected from different diseases (e.g. cancer, cardiovascular disease, and cognitive decline). In detail, the growing numbers of healthy elderly are the big consumers of multivitamins to develop or maintain their health[(17)].

Almost 30% of German adults reported taking MVMS for the enhancement of mental or physical performance, and nearly 8% of American soldiers took MVMS to enhance performance and increase muscle strength[(18)].

Single vitamin single mineral

SVM dietary supplements are products containing one vitamin or mineral. SVM products are widely used when a person experiences a nutrient deficiency due to insufficient intake from the diet or malabsorption problems impairing the body's ability to absorb nutrients from food. The choice between one and a multivitamin depends fully on individual needs[19].

Sports Supplements

Dietary supplements are used to support exercise, athletic performance, and muscle building. Many of these products include numerous ingredients in varied combinations and quantities. Among the more popular ingredients are amino acids, protein, creatine, and caffeine, nitric oxide, fat burners. In addition, sports supplements (called ergogenic aids) also contain vitamins, minerals, herbs, or botanicals (plants) — or any extract, concentration, or combination of these[20].

Herbal supplements (HS)

Herbal supplements include Echinacea, ginseng, ginkgo Biloba, elderberry, turmeric, ginger, valerian, and others. Herbal supplements are used extensively worldwide spread and many consumers consider them safe due to their natural ingredients described as generally recognized HS safe (GRHS) by food and drug administration (FDA). Some herbs are effective and can be used to maintain and boost health alone or in conjunction with

other therapies. Other herbs interact with prescription medication by enhancing or inhibiting action, which may be unintended and harmful [21]. Many of the herbs currently used can be traced to ancient times. However, there is a lack of awareness of the research on safety, efficacy, and interactions with prescription medication[21].

Weight loss supplements

Weight loss supplements include white bean extract, Garcinia cambogia, bitter orange, Hoodia Gordonii, forskolin, green coffee, glucomannan, β-glucans, chitosan, guar gum, and raspberry ketones[22].

1.7.3 Dietary supplements Benefits (for individuals and college students)

The use of different dietary supplements may be associated with the nature of postmodern society, with its passive lifestyles, excessive consumption and medicalization of the body, and pressure on individuals to maintain a healthy and attractive body. The marketing activities of the pharmaceutical industry are also a factor of an increase in dietary supplement use[23]. There are two main approaches to the use of supplements, they can be used to treat or prevent nutritional deficiency, and to lower the risk of non-deficiency disease and promote optimal health[24].

College students appear more likely to use DSs than the general population and many use multiple types of supplements weekly. Habits established at a young age persist throughout life. Therefore, longitudinal research should

be conducted to determine whether patterns of DS use established early in adulthood are maintained throughout life[25]. Some individuals state they use DS, in order of overall preference, to promote general health, improve performance, treat particular health conditions, enhance nutrition, because the doctor recommended it, it is good for them and to change their lifestyle to the best[25]. Some students use DS to strengthen the immune system, to enhance physical health, to improve energy levels, and some other reasons[26].

1.7.4 Regulation of dietary supplements

The Food and Drug Administration (FDA) is a government agency established in 1906 with the passage of the Federal Food and Drugs Act. The agency is separated into sections that oversee a majority of the organization's obligations including food, drugs, cosmetics, animal food, dietary supplements, biological goods, blood product, and medical devices. According to the FDA, the agency is responsible for monitoring the safe consumption of food, tobacco items, and medical products worth more than $2.6 trillion. In 2020, the budget for the FDA was approximately $3.6 billion [27].

Dietary Supplement Health and Education Act (DSHEA)

The Dietary Supplement Health and Education Act (DSHEA) enacted in 1994, had two main goals: to ensure continued consumer access to a wide variety of dietary supplements and to provide consumers with more data

about the intended use of dietary supplements. It accomplished these aims, and more, without changing the basic regulatory status of dietary supplements as a category of foods[28]. In addition, DSHEA required alterations in nutrition labeling for dietary supplements to convey full consumer data about the identity and quantity of the ingredients and their active components. It also maintained FDA's ability to exercise oversight over safety and authorized the agency to strengthen and enhance requirements for Good Manufacturing Practices[28].

1.7.5 Micronutrient deficiency

Micronutrients are essential for maintaining life and for optimal physiological function. The underlying causes that contribute to the immediate causes include inadequate care or feeding practices, food insecurity, and an unhealthy environment with insufficient access to health services. In addition, nutritional status is greatly impacted by infection[29].

Micronutrient deficiency, especially iron and vitamin A deficiency is a general health intention in more than half of all countries in the world, with most of the affected countries being in Africa or southeastern Asia[30]. High requirements for rapid growth and development, or age- or disease-related impairments in nutrient intake, absorption, digestion, or increased nutrient losses can lead to micronutrient deficiencies[31].

In addition, the information shows that place of residence, new academic and social pressures, weight concerns, skipping meals, and getting junk

food are some of the contributing factors to inadequate nutrient intake. Failure to meet daily requirements for fruit, vegetables, dairy products, whole grains, and physical activity can put people at greater risk for nutrient deficiencies or inadequacy, which may increase risk factors associated with chronic diseases[32].

In the Gaza Strip-Palestine, where ~1.4 million Palestinians reside, there are a high prevalence's of anemia and multiple micronutrient deficiencies (MNDs), including those of iron, zinc, vitamins A, B_{12}, D, and E. Dietary diversification and adequate food fortification are framed in policies but remain aspirational goals[33].

Iron deficiency anemia is highly prevalent and considered a critical health issue among university students, in Hodeidah province, Yemen. Their results showed that more than half of the female students were found to be iron deficiency anemia than males. In most cases iron deficiency anemia was occurring due to the lack of healthy iron in daily food, irregular intake of breakfast, drinking tea, low family monthly income all of those were identified as the important risk factors increasing the prevalence of iron deficiency anemia among college students[34].

Vitamin D deficiency is prevalent among female college students. Risk factors included: short time sun exposure, clothes may have interfered with the penetration of ultraviolet radiation into the skin use of sunscreens, and decreased intake of foods rich in vitamin D. Poor vitamin D status has been correlated with increased risk for development of several autoimmune diseases, and other health problems[35].

Chapter Two

Literature Review

Chapter Two

Literature Review

2.1 Dietary supplements among college students

A study performed by Kobayashi et al sought to clarify the prevalence of dietary supplement use among college students. Of the 9066 respondents (response rate 5.8%), 16.8% were presently using dietary supplements, and it increased according to students' grades. Depending on the purpose of dietary supplement use, the most commonly-used dietary supplements were vitamin/mineral supplements in both males and females, then protein and weight loss supplements in males and females, respectively. Most students got information about dietary supplements via the Internet; they usually purchased the supplements from drug stores[36].

Pillay et al set a study to assess the use of dietary supplements by dietetics students. He found there was a low prevalence of dietary supplement use by University of Kwazulu Natal (UKZN) dietetics students, with the high cost of supplements given as the main reason for non-use. According to 139 participant students, 23% (n=32) used dietary supplements. The majority of the supplement users in the present study (84.4%) used a multivitamin and mineral supplement, followed by minerals only (18.8%) and vitamins only (15.6%). More than half of the supplement users gained their dietary supplements from the pharmacy, while 43.8% got their dietary supplements from a health store. The reasons for using dietary supplements

included the following: to enhancement and strengthen the immune system (62.5%), to enhance energy levels (56.3%), and to improve physical health (50%)[37].

Focusing on college students, Alfawaz et al sampled 534 female students to investigate the prevalence of dietary supplement use and its association with lifestyle/socio-demographic characteristics among Saudi female students. In all participants, the prevalence of dietary supplement use was 76.6% (n=409). Multi-minerals (34.4%) were the preferred option when it comes to daily consumption. In addition, the current study demonstrated the high prevalence of dietary supplement use and its correlation with socio-demographic and lifestyle factors (high education, physical activity) in female students at King Saud College, Saudi Arabia[38].

A study conducted by Naqvi et al sought to document prevalence, opinions, and attitudes toward dietary supplement (DS) use, among pharmacy students in Karachi, Pakistan. The study was completed with a total of 612 responses in total, of which 75 responses were received from postgraduate students. The prevalence of DS use was reported at 48.2%: 51% in males and 47.3% in females. The reason for using dietary supplements was physician recommendations, general health, and well-being, weight gain, energy source, immune strength, and joint care[39].

A study was conducted by Sirico et al to investigate the habits and beliefs related to diet supplementation among medical, health professionals, and other universities/high school students. According to 770 participants, of

which 195 (25.3%) were high school and 575 (74.7%) were college students. Among the respondents aware of supplements, 37.4% were taking or had taken them in the past. DS use was more common among college students (especially, those in health professional graduate courses) than high school students. The results of their study suggest that attitudes and beliefs of surveyed students of medical and health professional programs are rarely based on medical proof [(40)].

A study by Pruitt et al focuses on herbal supplements which are used extensively worldwide without much concern and awareness regarding their efficacy and safety. The majority of patients (60%) reported that they told their provider about any regular use of herbs, and 27% reported that they did not share information about herbal use with their HCP. The patients surveyed most frequently used green tea, ginger, garlic, cinnamon, and avocado in their diet. The lack of discussion about herbal use was more significant because providers in the clinic recommend and support herbs as an adjunct to health and for symptom relief[(41)].

Looking at Mamtani et al study reported aim and results; the study aims to examine the use of supplements by college students in Qatar and to elucidate users' views about them. About 419 college students completed a self-administered questionnaire. Nearly half of the respondents (49.6%) had used supplements (ever users), with 56.9% had taken non-herbal, non-vitamin, non-mineral supplements (the most frequently used were proteins, fish oil, and omega 3), 56.2% vitamins and minerals (most frequently

multivitamins, vitamin D and vitamin C) and 27.7% herbal supplements (most commonly ginger, mint, and olive oil). Most respondents preferred supplements over medicines for minor health interests like weight loss/gain and gastrointestinal disturbances[42].

A study performed by Bukic et al was conducted at the University of Split School of Medicine (USSM) in Croatia. Medical students showed the most negative attitudes towards DS, although they are also high users themselves. Medical students were more likely to use evidence and confirmation-based sources of information about dietary supplements[43].

According to a study by Begdache et al has mentioned that college students have become attractive consumers to the DS industry mainly for their regular use of social media. Usually, DS use is based on self-recipes that are supported by media claims. Therefore, DSs education in college students may support a responsible manner of use. College education on DSs appears to empower students with a responsible attitude toward DS use[44].

A study set out by Schmitz et al to evaluate the characteristics of AEs reported with dietary supplement use. Of the 41,121 AE cases reported, 203 (0.48%) were SAEs. SAEs tended to occur with products marketed for weight loss (69.0%) and glycemic control (19.2%). As well, adverse events may include dizziness, vomiting, headache, hypersensitivity, heart rate increased nausea, diarrhea, abdominal pain, dehydration, Syncope, and others[45].

Chapter Three

Methodology

Chapter Three

Methodology

3.1 Introduction

In order to achieve the objectives of the study and to identify the relationship between study contents and to show suggestions that put around it and develop a clear perception about the phenomenon of study and characteristics of its society, the following methodology was used:

3.2 Method

Many researchers emphasized the importance of portraying the research approach as an effective strategy to increase the validity of social research[46]. For this purpose, social science researchers can use three different methods, which can be described as qualitative, quantitative, and mixed research methods[46]. The qualitative research method refers to an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem [46]. This method aims to collect and analyze data, develop and modify a theory, elaborate or refocus the research question, and identify and deal with validity threats by means of open-ended questions, interviews, focus groups, observations, and case studies[47]. In addition, this method is not only about “what” participants think and feel but also about “why” they think and feel so[47]. Moreover, due to qualitative research, culturally specific information about the values,

opinions, behaviors, and social contexts of particular populations can be obtained[48].

The quantitative research method allows testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, commonly on instruments, and thus, the numbered data can be analyzed using statistical procedures[46]. The researcher reaches numerical data with the help of online and/or paper surveys, and interviews. Quantitative research typically begins with data collection based on a hypothesis or theory, and it is followed by the application of descriptive or inferential statistics[49]. Briefly put, descriptive statistics refers to identifying the characteristics of an observed phenomenon or exploring the correlations between two or more entities. Inferential statistics refers to making inferences from data to more general conditions and the statistical testing of hypotheses[50].

In social sciences, the mixed research method means collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, will provide a better understanding of research problems than either approach alone[51]. Mixed methods can be an ideal technique to assess complex interventions[52]. However, this method involves the challenges of qualitative (soft, rich, and deep) and quantitative (hard, objective, and standardized) research approaches resulting from the nature of the data[53].

In this study, the research is conducted based on the quantitative research method. The numerical data is collected by online and paper surveys, which have been designed according to the relevant literature. Afterward, two different scale items have been unified concerning the variables. Accordingly, descriptive analysis has been applied, and the results presented in tables so the analytical descriptive approach that used to analyze the study data, Al Alami defines the analytical descriptive approach as: "The method that simplifies the description of phenomena, events or currents is one of the forms of systematic analysis and interpretation of a phenomenon or problem, which provides data on particular characteristics, requires the knowledge of the participants in the study, the phenomena we study and the times we use to collect data"[(54)]**.**

3.3 Population of the study

The population of the study is defined as all individuals and people that built the subject of the research problem and who are being studied to make the result closer to reality and more accurate. Based on the problem of the study and its objectives, the target community in this study is the students enrolled in An–Najah National University, Nablus, Palestine.

3.4 Study Sample

The data of this research have been acquired from a sample of 380 participants of the students enrolled in An-Najah University. Since students share a variety of characteristics and similar lifestyles, their DS use may

differ from the general population, Therefore the sample of this study includes students enrolled at An-Najah National University in various colleges, where the random sample method was followed as a method of data collection and online surveys were used in the study of 450 responses, 70 surveys were disregarded because of missing data or suspect responses, 380 responses were obtained as online surveys.

3.5 Data sources

A - Primary sources: the sources that the data obtained directly either from organized observations or statistics or data collection, and throughout this study questionnaire was chosen as main tool to collect related data from study sample.

B. Secondary sources: the sources that rely mainly on primary sources in their information that must be collected. In other words, this source depends on information that has been recorded previously, so, in this study related books, previous studies, and articles were used.

3.6 Statistical techniques

To check the hypothesis, the questionnaire was prepared as a main tool because it’s the best tool used in the descriptive-analytical method, which was prepared for this purpose using the statistical program (statistical package of social science) to analyze the relationship between the independent variables and the dependent variables and to test the hypothesis.

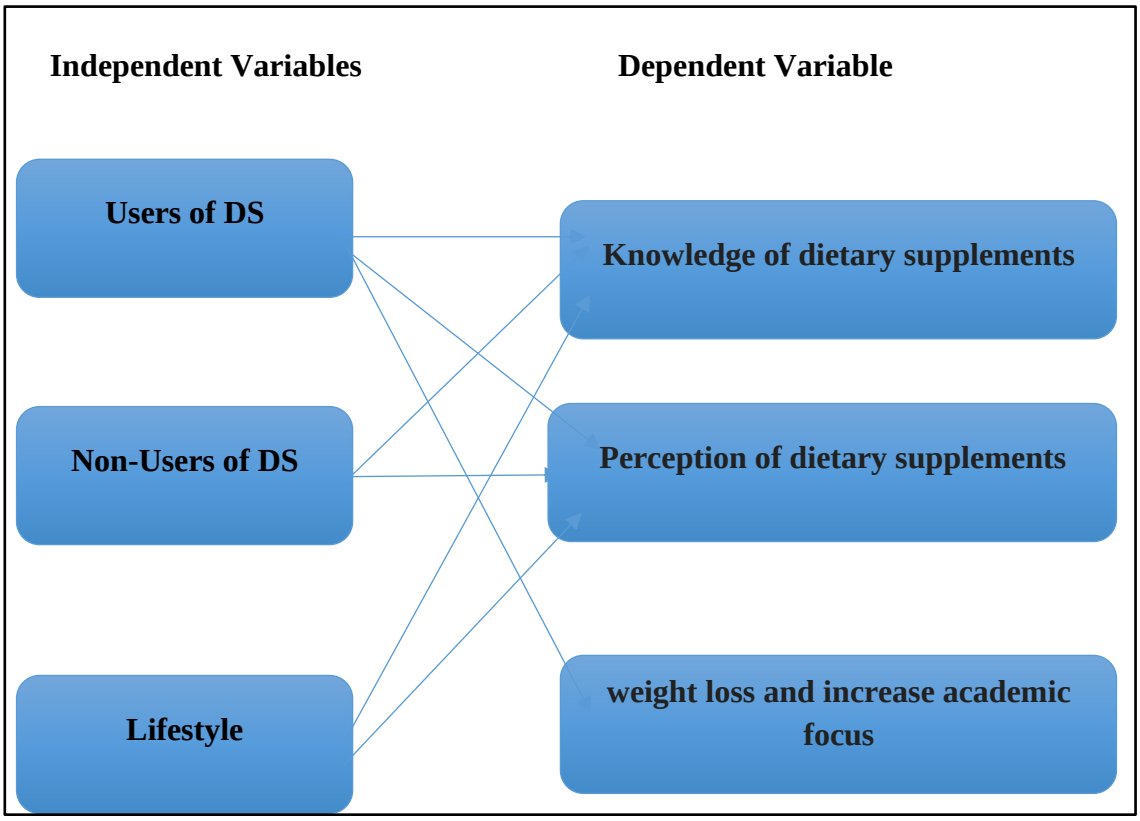

Figure (1): Independent and Dependent Variable.

3.7 Study tool

A questionnaire was prepared on "discovering the differences of knowledge and perception between users and non-users and degree of using among college students enrolled in An– Najah University. The work of the participants to answer the questions was listed within the basis of the Likert scale, multiple-choice questions, and yes or no questions where the scales depend on the responses to indicate the degree of approval and objection to a formula, through the answers of the participants were reached the results of the study.

Table (1): Likert scale scores

Response	Strongly agree	Agree	Neutral (Agree Slightly)	Disagree	Strongly disagree
Degree	**5**	**4**	**3**	**2**	**1**

The questionnaire was composed of two sections as demographic variables section and the scales related to variables of the study. Gender, age, marital status, nature of the residence, college name, and education level were collected to define the characteristics of the sample.

3.8 Inclusion criteria

College students from various disciplines, both male and female, were willing to participate.

3.9 Exclusion criteria

Students who did not agree and did not wish to participate were excluded.

Chapter Four

Data Analysis and Testing Hypotheses

Chapter Four

Data Analysis and Testing Hypotheses

4.1 Introduction

This chapter includes a presentation of the data analysis and testing hypotheses of the study, by answering the study questions and reviewing the main results of the questionnaire which were reached through analyzing the paragraphs, and finding personal information that included (age, gender, marital status, nature of residence and the year of studying) and statistical analyzes of the collected data were conducted from the questionnaire. The Statistical Package for Social Studies (SPSS) was used to obtain the results of the study presented and analyzed in this chapter.

4.2 Statistical description of the study sample according to personal information

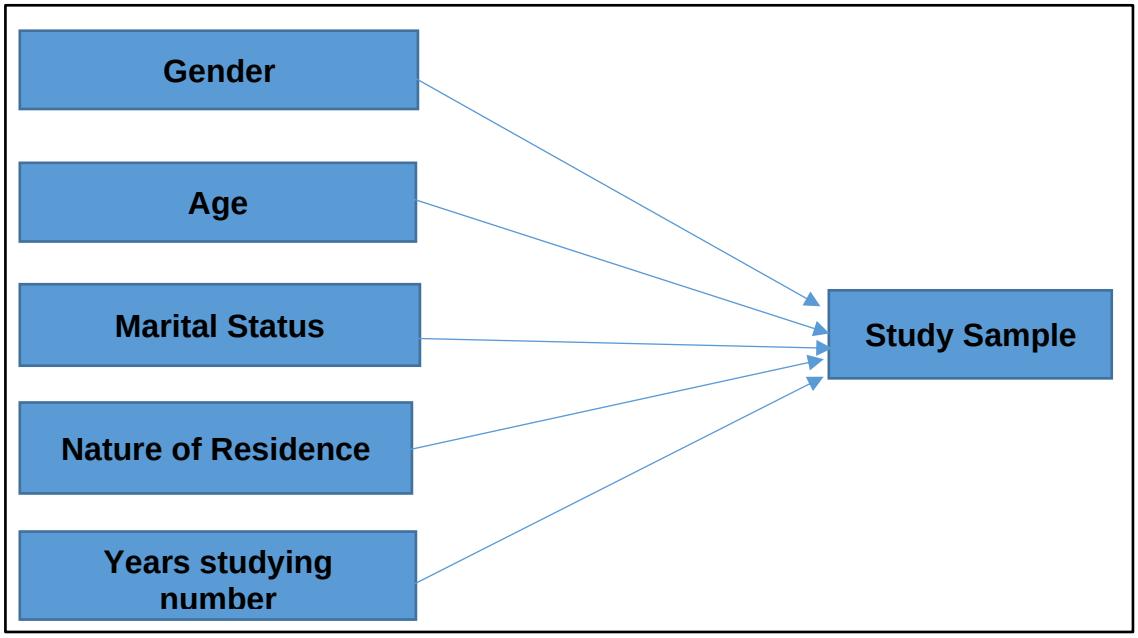

Figure (2): Study sample.

Table (2): Distribution of the study sample according to personal information

Variables		Frequency	Percent
Gender	Male	172	45.9
	Female	203	54.1
	Total	375	100.0
Age	17-19	91	24.0
	20-22	137	36.1
	Over 22	151	39.8
	Total	379	100.0
Marital Status	Unmarried	295	78.0
	Married	33	8.7
	Engage	38	10.1
	Separated	12	3.2
	Total	378	100.0
Nature of housing	University of housing	117	31.2
	With family	258	68.8
	Total	375	100.0
years studying number	First	54	14.3
	Second	85	22.5
	Third	78	20.7
	Four or more	160	42.4
	Total	377	100.0

- According to Table (2), it is clear that participants in the study sample are distributed as 45.9% male and 54.1% female.

- Participants in the study sample are distributed as 24.0% have age between 17-19 years, 36.1% have an age between 20-22 years, and 39.8% have an age above 22 years.

- 78.0% of the participants are single, 8.7% of the participants are married, 10.1% of the participants are engaged, and 3.2 % of the

participants are separated. It is noted that the majority of participants are single by 78.0%.

- 31.2% of participants have university residence and 68.8% of participants have family homes. It is noted that the majority of participants stayed with family during the studying period by 68.8%.

- 14.3% of participants are fresh students, 22.5% of participants in their second year of study, 20.7% of participants in the third year of study, 42.4% of participants in the fourth year of studying or more.

4.3 Testing study hypothesis & Study questions

Here before we began the statistical analysis of questioner paragraph we should test the following things:

1. Reliability of questioner using (Cronbach Alpha):

2. A normal distribution (one-sample K-S Test)

4.3.1 Reliability

Table (3): Cronbach Alpha

Reliability Statistics

Cronbach's Alpha	N of Items
0.982	40

According to Table (3) that explains Cronbach Alpha is very high that equal (0.892) this means scales have high-reliability degree to measure hypothesis and test it.

4.3.2 Normal distribution

As a result of the sample size of more than 200 participants according to the normal distribution rule, no need to test normal distribution for the study sample because of sample is distributed normally by default. On the other hand, when testing the normality for all questionnaire questions the results show that the data is normally distributed. Table (4) explains the significant value in all paragraphs is equal to 0.20 that is more than 0.05 so data distribution is following normality.

Table (4): One-Sample Kolmogorov-Smirnov Test

		normality test
N		380
Normal Parameters [a,b]	Mean	2.2437
	Std. Deviation	0.24372
Most Extreme Differences	Absolute	0.034
	Positive	0.034
	Negative	-0.033
Test Statistic		0.034
Asymp. Sig. (2-tailed)		0.200[c,d]

a. Test distribution is normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

4.3.3 Testing study hypothesis

To achieve the objectives of this study and answer the main questions many hypotheses have been formulated:

- **First hypothesis:**

H1: There is significant difference at level (alpha<0.05) to knowledge of dietary supplements between users and non-users.

- **Second hypothesis:**

H 2: There is significant difference at level (alpha<0.05) to perception of dietary supplements between users and non-users.

- **Third hypothesis:**

H3: There are widely used of Multi vitamin and multi mineral among college students.

- **Forth hypothesis:**

H4: There is significant impact of using DS on weight loss and increase academic focus according participant responses.

To measure the main hypothesis the following tools will be used:

- One way ANOVA test.
- Regression analysis.
- Multiple responses define and analysis.

- Correlation analysis.
- Frequencies.

We can approve the main first and second hypothesis by One way ANOVA test and regression analysis:

- **First hypothesis:**

H1: There is significant difference at level (alpha<0.05) to knowledge of dietary supplements between users and non-users.

1. **One way ANOVA test**

These analytical tools show if there are material differences between users' and non-users' responses according to the knowledge of dietary supplements and perception of dietary supplements (dependent variables).

In this analysis, to prove the hypothesis we will highlight the following:

1. F-test: interpret the quality of the relationship model between independent variables & dependent variable and the validity of reliance on its results to explain the relationship without errors.
2. Sig. level: should be at Coefficients[a] & ANOVA[a] test less than (alpha<0.05).

Table (5): Anova Results (H1)

Dependent Variable	Independent Variables	F_Value	F_Significant
Knowledge of dietary supplements	Non-users	3.162	0.077
	Users	12.265	0.001

According to the above table (5), this analytical tool show (F test value) which interpret if there are material differences between users and non-users responses at the level of sig <=0.05 according to knowledge of dietary supplements (dependent variable), In general, we accept alternative hypothesis (H1) and reject the null hypothesis (H0) because there is a significant difference at level (alpha<0.05) to the knowledge of dietary supplements between users and non-users because of sig. level for F-test equal 0.001 < 0.05 for users and equal 0.077>0.05 for non-users.

2. **Regression analysis**

In this analysis, to prove the hypothesis we will highlight the following:

1. T-value: should be more than role of them (1.96).
2. F-test: interpret the quality of the relationship model between independent variables & dependent variables, and the validity of reliance on its results to explain the relationship without errors.
3. $R^{2:}$ interpret the changing percent of that independent variable affecting the dependent variable.
4. Sig. level: should be at Coefficients[a] & ANOVA[a] test less than (alpha<0.01)**.**

Table (6): Regression Results (H1)

Dependent Variable	Independent Variables	R_Value	F_Value	F_Significant	T_Value	T_Significant
Knowledge of dietary supplements	**Non-users**	11.6%	3.162	0.077	-1.778	0.077
	Users	26.5%	12.265	0.001	3.502	0.001

In general, we accept alternative hypothesis (H1) and reject null hypothesis (H0) because there is significant impact at level (alpha<0.05) to using DS on knowledge of dietary supplements between participant and there is insignificant impact at level (alpha<0.05) to don't using DS on knowledge of dietary supplements between participant because of :

- Significant level at Coefficients & ANOVA test is less than (alpha<0.05) and equal (0.001) for users but significant level at Coefficients & ANOVA test is greater than (alpha < 0.05) and equal (0.077).
- T-value of the user of DS equals (3.502) that consider more than role of them (1.96) but T-value of non-user of DS equal (-1.778) that consider less than the role of them (1.96).
- R equals 26.5%: using DS interpret the change percent in the knowledge of dietary supplements by 26.5% the rest of percent (73.5%) it is explained by other factors in addition to random errors resulting from the accuracy of the sample selection and the accuracy of the measurement.

- Referring to F_Value there is a significant difference at level (alpha<0.05) to the knowledge of dietary supplements between users and non-users because of sig. level for F-test equal 0.001<0.05 for users and equal 0.077>0.05 for non-users.

- **Second hypothesis:**

H 2: There is significant difference at level (alpha<0.05) to Perception of dietary supplements between users and non-users.

1. **One way ANOVA test**

These analytical tools show if there are material differences between users and non-users' responses according to the knowledge of dietary supplements and perception of dietary supplements (dependent variables).

In this analysis, to prove the hypothesis we will highlight the following:

1. F-test: interpret the analysis, quality of the relationship model between independent variables & dependent variable, and the validity of reliance on its results to explain the relationship without errors.

2. Sig. level: should be at Coefficients[a] & ANOVA[a] test less than (alpha<0.05).

Table (7): Anova Results (H2)

Dependent Variable	Independent Variables	F_Value	F_Significant
Perception of dietary supplements	Non-users	1.090	0.362
	Users	0.921	0.558

According to the above table (7), this analytical tool show (F test value) which interpret if there are material differences between users and non-users responses at the level of sig <= 0.05 according to the perception of dietary supplements (dependent variable). In general, we reject the alternative hypothesis (H1) and accept the null hypothesis (H0) because there is an insignificant difference at level (alpha<0.05) to perception of dietary supplements between users and non-users because of sig. level for F-test equal 0.558 > 0.05 for users and equal 0.362>=0.05 for non-users.

2. Regression analysis

In this analysis, to prove hypothesis we will highlight the followings:

1. T-value: should be more than role of them (1.96).
2. F-test: interpret the quality of the relationship model between independent variables & dependent variable, and the validity of reliance on its results to explain the relationship without errors.
3. $R^{2:}$ interpret the changing percent that independent variable affecting on dependent variable.
4. Sig. level: should be at Coefficients[a] & ANOVA[a] test less than (alpha<0.05)

These analytical tools show if there are significant impact of using DS and insignificant of non-using DS on Perception of dietary supplements.

Table (8) : Regression Results (H2)

Dependent Variable	Independent Variables	R-Value	F_Value	F_Significant	T_Value	T_Significant
Perception of dietary supplements	**Non-users**	2.1%	0.100	0.752	-0.316	0.752
	Users	9.1%	1.374	0.243	1.172	0.243

In general, we reject alternative hypothesis (H1) and accept null hypothesis (H0) because there is insignificant impact at level (alpha<0.05) to using DS on perception of dietary supplements between participant and there is insignificant impact at level (alpha<0.05) to don't using DS on perception of dietary supplements between participant because of:

- Significant level at Coefficients & ANOVA test is greater than (alpha<0.05) and equal (0.243) for users and equal (0.752) for non-users.

- T-value for users and non-users of DS equal (1.172) for users and equal (-0.316) for non-users that consider less than the role of them (1.96).

- R equals 9.1% for the user and 2.1 % for non-user so these percentages are too low and do not interpret the change in perception of dietary supplements**.**

- Referring to F_Value there is an insignificant difference at level (alpha<0.05) to the perception of dietary supplements between users and non-users because of sig. level for F-test equal 0.558 > 0.05 for users and equal 0.362>=0.05 for non-users.

- **Third hypothesis:**

Multiple responses define and analysis

This analytical tool shows the analysis and frequencies responses for multiple responses questions to determine if Multivitamin and multi mineral are widely used among college students.

H3: There are widely used of Multi vitamin and multi mineral among college students.

We can approve the main third hypothesis by Multiple responses define and analysis.

Table (9) : Multiple responses define and analysis

Frequencies		Number	Percent
Dietary Supplements	**Non-users**	215	56.6%
	Users	165	43.4%
Total		380	100%

Table (10) : Multiple responses define and analysis

Frequencies		Number	Percent
User of Dietary Supplements	**Multi vitamin and Multi Mineral**	111	67.3%
	Others 4 choice	54	32.7%
Total		165	100%

As shown in table (9), 43.4% of participants are users of dietary supplements in general distributed on a different type of dietary supplements with number of 165 participants from all sample participants (380) and 56.6% of participants are non-users of dietary supplements and finally with number of 215 participants from all sample participants.

As shown in table (10), we accept the alternative hypothesis (H1) and reject the null hypothesis (H0) because Multivitamin and multi mineral are widely used among college students who used dietary supplements. In general because 67.3% of participants who used dietary supplements use multi vitamin and multi mineral and then 32.7% used others 4 choices.

- **Forth hypothesis:**

H4: There is significant relationship of using DS to weight loss and increase academic focus according participant responses.

Table (11): Frequencies of using DS to weight loss and increase academic focus.

Questions	Number of participant response to question by Yes	Number of participant response to question by No or I don't know	Total number of participant response to question
Using DS increase academic focus	51 (31.3%)	112 (68.7%)	163 (100%)
Using DS lead to weight loss	24 (15.9%)	127 (84.1%)	151 (100%)

According to above descriptive table (11) we note the following:

1. Number of participant response to question (using DS increase academic focus) is 163 from 380 and number of participant response to question (using DS lead to weight loss) is 151 from 380.

2. Number of participants that use DS to increase academic focus is 51 from 163 with a percent of 31.3% and the remaining participants with a number of 112 and a percent of 68.9% don't use DS to increase academic focus and do not know about these features in DS using. So,

the majority of the study sample does not use the DS to increase academic focus.

- **Correlation analysis:**

Correlation analysis tests the relationship between independent Variables (Lifestyle, Users & Non-users) and dependent Variable (Perception & Knowledge of participants) as the following:

Table (12): Correlation

Variables		Perception of participants	Knowledge of participants
Lifestyle	**Pearson Correlation**	0.043	0.144**
	Sig. (2-tailed)	0.406	0.005
Users	**Pearson Correlation**	0.091	0.265**
	Sig. (2-tailed)	0.243	0.001
Non-users	**Pearson Correlation**	-0.021	-0.116
	Sig. (2-tailed)	0.752	0.077

As shown in table (12), the correlation between some variables and paragraph has high significant level at (0.05) (Rule **of Thumb**) as the following results:

1. **Significant positive relationship** between lifestyle and knowledge of participants: 0.144** and sig level 0.005 < 0.05. On the other side insignificant **positive** relationship between lifestyle and perception of participants: 0.043 and sig level 0.406 > 0.05.

2. **Significant positive relationship** between users and knowledge of participants: 0.265** and sig level 0.001 < 0.05. On the other side insignificant **positive** relationship between users and perception of participants: 0.091 and sig level 0.243 > 0.05.

3. **Insignificant negative relationship** between non-users and knowledge of participants: 0.116 and sig level 0.077 > 0.05 On the other side, insignificant **negative** relationship between non-users and perception of participants: -0.021 and sig level 0.752 > 0.

4.4 Frequencies

1. Distribution of the study sample in terms of beginning to use DS.

Table (13): Started taking the supplements

	Frequency	Percent
From one month	37	22.7
Less than one year	63	38.7
More than one year	63	38.7
Total	163	100%

As shown in table (13) the distribution of participants who response to this paragraph as the followings:

1. 22.7% participants start to use DS from less than one month.
2. 38.7% participants start to use DS from less than one year.
3. 38.7% participants start to use DS from more than one year.

2. Reasons of using DS

Table (14): Reasons_of_using_DS Frequencies

Reasons_of_using_DS[a]	Responses	
	N	Percent
Muscle building	21	7.6%
Boosting energy level	47	16.9%
Improving sleep	18	6.5%
As a meal replacement	19	6.8%
Strengthening the immune system	44	15.8%
Increase appetite	22	7.9%
Reducing stress	12	4.3%
Strengthening hair and nails	34	12.2%
Improving memory and cognition	30	10.8%
Improving physical performance	14	5.0%
Preserving the sense of hearing	6	2.2%
Preserving the sense of sight	11	4.0%
Total	278	100.0%

- As shown in table (14) the distribution of participants who response to this paragraph as the followings:

- 7.6% participants use DS to Muscle Building.
- 16.9% participants use DS to boost energy level.
- 6.5% participants use DS to sleep improvement.
- 6.8% participants use DS to meal replacement.
- 15.8% participants use DS to strengthening the immune system.
- 7.9% participants use DS to increase the appetite.
- 4.3% participants use DS to reduce stress.
- 12.2% participants use DS to strengthen hair and nails.

- 10.8% participants use DS to memory improvement.
- 5% participants use DS to improve physical performance.
- 2.2% participants use DS to preserve the sense of hearing.
- 4% participants use DS to preserve the sense of sight.

Table (15): Source_of_information Frequencies

Source_of_informationa	Responses	
	N	**Percent**
Book	14	5.6%
Internet	76	30.6%
Family	18	7.3%
Friend	21	8.5%
Nutritionists	69	27.8%
Social media	37	14.9%
Others	13	5.2%

a. Dichotomy group tabulated at value 1.

As shown in table (15) the number of participants that response to this paragraph is 157 from 380 with percent of 41.3 %.

- 5.6% participants obtain information about DS from books.
- 30.6% participants obtain information about DS from internet.
- 7.3% participants obtain information about DS from family.
- 8.5% participants obtain information about DS from friends.
- 27.8%participants obtain information about DS from nutrition specialist
- 14.9% participants obtain information about DS from social media.
- 5.2% participants obtain information about DS from Other source.

3. How much do you spend on supplements per month?

Table (16): I spend on nutritional supplement consumption per month

In Shekels	Frequency	Percent
Less than 50	38	23.2
50-99	70	42.7
100-150	37	22.6
More than 150	19	11.6
Total	164	100%

As shown in table (16) the distribution of participants who response to this paragraph as the followings:

- 23.2% participants spend less than 50 NIS on DS monthly.
- 42.7% participants spend between 50-99 NIS on DS monthly.
- 22.6% participants spend between 100-150 NIS on DS monthly.
- 11.6% participants spend more than 150 NIS on DS monthly.

4. Are there any adverse events when using the DS?

Table (17): I experienced adverse events from taking the (DSs

	Frequency	Percent
Yes	23	14.2
No	99	61.1
I don't know	40	24.7
Total	162	100%

As shown in table (17) the distribution of participants who response to this paragraph as the followings:

- 14.2% participants have negative effects when using the DS.
- 61.1% participants have not negative effects when using the DS.
- 24.7% participants don't know about any negative effects.

5. Symptoms of using DS

Table (18): Symptoms of using DS Frequencies

Symptoms of using DS[a]	Responses	
	N	Percent
Nausea	13	12.7%
Diarrhea	5	4.9%
Constipation	11	10.8%
Rapid heart rate	4	3.9%
Skin sensitivity	6	5.9%
Stomach pain	10	9.8%
Others	53	52.0%
Total	102	100.0%

a. Dichotomy group tabulated at value 1.

As shown in table (18) the distribution of participants who response to this paragraph as the followings:

- 12.7% participants use DS feel with nausea.
- 4.9% participants use DS feel with diarrhea.
- 10.8% participants use DS feel with constipation.
- 3.9% participants use DS feel with rapid heart rate.
- 5.9% participants use DS feel with skin sensitivity.
- 9.8% participants use DS feel with stomach pain.
- 52% participants use DS feel with other symptoms.

6. Have you used the DS previously?

Table (19): Have you ever taken a dietary supplement

	Frequency	Percent
Yes	96	41.6
No	135	58.4
Total	231	100%

As shown in table (19) the distribution of participants who response to this paragraph as the followings:

- 41.6% participants used the DS previously.
- 58.4% participants don't use the DS previously.

7. Participant Action with adverse event of using DS

Table (20): Participants _with_adverse_event frequencies

action_with_adverse_event[a]	Responses	
	N	Percent
Stop using (DSs) immediately	51	28.2%
I do nothing	47	26.0%
Complaint to the factory	20	11.0%
Go to doctor	63	34.8%
Total	181	100.0%

a. Dichotomy group tabulated at value 1

As shown in table (20) the distribution of participants who response to this paragraph as the followings:

- 28.2% participants stop using DS when feel with negative effect.
- 26% participants don't stop using DS when feel with negative effect.
- 11% participants compliant to source of DS when feel with negative effect.
- 34.8% participants go to doctor when feel with negative effect from using DS.

8. Reasons for don’t use DS?

Table (21)

Reasons for don’t use DS?	Measures	Strongly Disagree 1-1.80	Disagree 1.81-2.60	Agree Slightly 2.61-3.4	Agree 3.41-4.2	Strongly Agree 4.21-5	Mean	St. Deviations	Results
I think supplements DS ineffective	Freq.	29	78	89	28	10	3.37	0.991	Agree Slightly
	Percent %	12.4	33.3	38	12	4.3			
DS cost a lot of money	Freq.	15	40	80	72	25	2.77	1.0616	Agree Slightly
	Percent %	6.5	17.2	34.5	31	10.8			
My knowledge about DS is poor	Freq.	11	45	82.7	81	20	2.76	1.011	Agree Slightly
	Percent %	4.7	19.3	32.6	34.8	8.6			
My diet is balanced and I don't need DS	Freq.	18	67	67	58	23	2.99	1.11	Agree Slightly
	Percent %	7.7	28.8	28.8	24.9	9.9			
I have had previous negative effects when taking DS	Freq.	38	86	77	21	1	3.62	0.8913	Agree
	Percent %	17	38.6	34.5	9.4	0.4			

4.5 Summary of hypothesis of the study

In previous chapter, the field study was finalized; the descriptive statistics were investigated and tested the hypotheses successfully. According to the results of the hypotheses, most of the hypotheses were supported positively and negatively. Generally, the hypothesis summary is shown in table 22.

Table (22): Summary of Hypothesis of the study

Main Hypothesis:	**Finding**
H1. There is difference in knowledge of dietary supplements between users and non-users.	**accepted**
H2. There is difference in perception of dietary supplements between users and non-users.	**rejected**
H3. There are widely used of multi vitamin and multi mineral among college students.	**accepted**
H4. There is significant impact of using DS on weight loss and increase academic focus according participant responses.	**rejected**

Chapter Five

Discussion, Recommendation and References

Chapter Five

Discussion, Recommendation and References

5.1 Main study finding

The purpose of this study was to examine An-Najah college students' use, knowledge, and perception of dietary supplements. Statistical analysis was performed by using SPSS, the finding of the study was indicated that: First, there is a difference in knowledge of dietary supplements between users and non-users, thus, Hypothesis 1was accepted. Second, there is no difference in the Perception of dietary supplements between users and non-users, thus, Hypothesis 2 was rejected. Third, there is widely use of multivitamin and multi mineral among college students, thus, Hypothesis 3was accepted). Forth, there is no significant impact of using DS on weight loss and increased academic focus according to participant responses, thus, Hypotheses 4 was rejected. In addition to, about of 43, 4% (n=165) of collecting sample (n=380) were using DS.

Dietary supplements, which include vitamins, herbal supplements, minerals, and others, are widely used across multiple generations. In addition to, an adequate intake of micronutrients (like essential dietary vitamins and minerals) is required for almost all the processes of growth, metabolism, and good health throughout life [55]. The supplement use among US citizens has remained stable from 1999 to 2012, but global sales (including the US) of supplement products increased in the years 2011–

2016, which may be due to a further increase in the prevalence of supplement use or to an increase in the number of dietary supplements being taken by each consumer[56]. Young adults, especially college students, have become attractive consumers to the DS industry mostly for their regular use of social media[57]. The college and undergraduate students feel they need extra nutrients from DS to compensate for their energy deficit for study, extracurricular activities, or part-time jobs. Researchers reported 66% of the five US university students to consume DS[58].

The results of our investigation showed that a little or less than half (43.4%) of college students surveyed were consuming dietary supplements. The prevalence reported from this study was moderate compared to a study conducted on university students in Riyadh indicated a high prevalence of dietary supplement use, i.e., 76.6%[59]. As well as about 80% of surveyed Binghamton University students reported using DSs (vitamin, mineral, probiotic, herbal, botanical, performance enhancer, and/or weight loss supplement) in the past 12 months[60]. While according to a study by Pillay et al. the percentage of dietary supplement use was low, of the 139 participants, 23% (n= 32) used dietary supplements at the University of KwaZulu-Natal (UKZN)[61]. Another study among adult shows that 42,8% of the adult from Novi Sad, Serbia use DS[62].

The percentage of females participating in the study was higher than males, with 54.1% for females and 45.9% for males. Most of the students were from the Faculty of Medicine and Health Sciences with 22%, followed by

the Faculty of Engineering with 14%, the Faculty of Graduate Studies with 13%, the Faculty of Sharia with 9%, and the rest of the students are distributed among other faculties in close proportions. Moreover, nearly 42% of participants in (fourth year or more) of studying followed by 23% in the second year, 21% in the third year, and 14% of participants were fresh students. In a previous study on an individual college level, students from the business college had the highest prevalence followed by students from the college of engineering. While evaluating prevalence based on years of study, it was observed that the prevalence increased steadily from the 2nd year to the 3rd year. The prevalence among students decreased in their 4th year of study and the highest prevalence was reported in the 5th year of study. But in a Japanese study, there was an inclining trend when it came to prevalence based on study years[63].

MVM was reported as the most common dietary supplement used among the students in this study sample accounting for 27% of overall products, is followed by herbs 16%, vitamins only 15%, others 14%, protein amino acids 13%, minerals only 8%, essential fatty acids 7%. This was similar to the findings of a study among female Saudi students as therefore mentioned supplements were commonly used. In another study in female students studying in medicine and pharmacy, the use of MVMN formed the highest ratio between students of a Public sector university in Dammam City[64]. A study by Al-Johani et al. performed on college students suggest that a high prevalence of vitamin and minerals supplement use ≥44%[65]. In addition to, about 1203 participants amongst the general population in Dubai, UAE

vitamins were the most commonly used DS (87.9%) followed by minerals (10.5%) and sports nutrition products (10.5%)[66]. Some herbal supplements have a low likelihood of drug interactions and, with certain caveats, can safely be used with most medications (e.g., black cohosh, cranberry, ginkgo, milk thistle, American ginseng, saw palmetto, valerian)[67]. On the other hand, Samreen et al. was reported approximately 24.6% of students used fiber DSs whereas 19% and 16.4% used DSs for protein and glucosamine/omega 3 fatty acids, respectively[68].

Most of the students answered that they spend between 50 and 99 shekels on supplement costs. Nearly, 38% of students use it daily, 30% weekly then seasonally and at last monthly. Approximately 39% of students answered that they use dietary supplements for a year or more, and in a similar percentage, they said that they have been using them for a less than a year, and the lowest percentage was per month.

The most common reasons for using DS was boosting energy level by about 17%, followed by strengthening the immune system by 16%, strengthening hair and nails 12%, improving memory 11%, and muscle building 8%. The rest of the benefits from using dietary supplements are distributed in close proportions to each other. Similar findings according to previous studies, a survey by Dickinson et al. reported that the most common motivations for supplement use are to promote overall wellness, fill nutrient gaps, and increase energy[69]. Another study by Begdache et al. had suggested that the most frequently cited reason for DS use was to “promote overall health and

prevent illness," followed by "to increase energy, increase intake, promote healthy hair, skin, and nails, build muscle/improve athletic performance, and boost immunity"[60]. Also, people commonly take them to supplement their diet, reduce fever, heal wounds, prevent illness, cure infection and treat diseases [70].

According to our results, the number of participants that use DS for weight loss is 24 from 151 with percent of 15.9% and the remaining participants with a number of 127 and percent of 84.1% do not use DS to weight loss. In addition, a number of participants that use DS to increase academic focus are 51 from 163 with a percent of 31.3% and the remaining participants with number of 112 and a percent of 68.9% do not increase their academic focus and do not know about these features in DS using. So, the majority of study sample do not use the DS to increase academic focus.

Many studies rated as weak to moderate quality suggest greater weight loss for patients taking Green tea extract compared to placebo[71]. In addition, enhanced effects on attention, focus, and memory cells were observed in some studies that supplemented with tyrosine, caffeine, or ginseng, and a handful of studies showed improved executive function with tyrosine, omega-3, or caffeine supplementation[72].

The results of our current study indicate that dietary supplement users most frequently receive information from the internet 31%, nutrition specialists 28%, and social media 15%. This is followed by friends, family, books, and others. A study performed by Hegazi et al. Among students in an Egyptian

university reported the main sources of information were the internet, health-care providers, and coaches. Besides that, Male users depended primarily on the internet; however, female users received information from healthcare providers. In addition, practicing exercise, non-smoking, and dietary patterns were associated with DS use[73].

There are some adverse events accompanying users of dietary supplements, nearly 6% of percents such as nausea, constipation, stomach ache, skin sensitivity, diarrhea, rapid heart rate in a small and close rate, and the highest percentage was for an option other than that. Scientific evidence suggests that supplementation food [herbal or complementary nutritional products and micronutrients (vitamins and minerals)], can be beneficial to a group of persons whose diet is not balanced, and has evidence of deficiency of a particular nutrient in their body. However, it has seen an increase in consumption of these supplements in people involved in physical or athletic activity, and also the adverse events. It commonly involves cardiovascular manifestations from energy products or weight-loss among young adults and swallowing problems, usually associated with micronutrients among older adults[74]. Furthermore, a study by Samreen et al. had mentioned that 8.2% of students suffered from side effects, including 5.6% who suffered from nausea, vomiting, and diarrhea and 2.6% who suffered from headache, confusion, and disorientation[75]. Also, use of certain DS may cause significant harm including side effects such as liver, or kidney damage, cancer, heart attack or stroke[76].

Most of the students answered that their diet is moderately healthy with 62% followed by 22% unhealthy and 16% healthy. And that 36% of students eat two meals a day, 35% three times, 26% unspecified, and 3% rarely. Moreover, almost 75% of students answered that exercise is intermittent, 16% regularly, 9% always. And their answers about having breakfast always, usually, sometimes, and rarely a little were in order. Also, a large proportion of the students were non-smokers.

Diet and physical activity have a very important role in maintaining health and disease prevention. Regular physical activity reduces the risk of obesity, cardiovascular disease, diabetes, high blood pressure, stress, and some type of cancer[77]. Studies also reported that individuals with higher economic status and healthier lifestyles were more likely to use DSs. Evidence indicates that users of dietary supplements are looking for wellness and consciously adopting a variety of lifestyle habits that they consider contributing to a healthy life[78]. Furthermore, students who did not smoke and were physically active were more likely to use DSs[79]. Almost one-third of regularly exercising university students, use any kind of sports supplements, with swimming potentially more prevalent. Vitamins were the most common supplements in use, associated with a healthy lifestyle as a primary goal of exercising regularly. In connection with almost all supplement categories, the use of an electronic fitness tracker had a strong association with supplements consumption[80]. Some people use ergogenic aids to prepare the body for exercise, reduce the chance of injury during training and promote recovery from exercise[81].

56.6% of participants are non-users of dietary supplements in general with a number of 215 participants from all sample participants, nearly 25% of students are previous users.

When students were asked why they did not use DS, they answered as follows:

1. I think supplements DS ineffective most of the students answered slightly agree followed by a disagree.

2. DS cost a lot of money majority of students answered agree slightly followed by “agree”.

3. My knowledge about DS is poor most students answered agree slightly followed by “agree”.

4. My diet is balanced and I don't need DS most of the students answered disagree and agree slightly followed by agree.

5. I have had previous negative effects when taking DS major of students answered disagree followed by “agree” slightly.

There are students who do not like dealing with drugs or DS and are interested in tacking nutritional needs from food, see that they do not need it, also believe it is ineffective or may lead to negative effects that are difficult to solve. In addition, they may do not have enough information about it, don't know what to take, how much to take, do not like to try new or strange things, even if there are a lot of stimulating advertisements or

encouragement from those close to them. And others may have stopped using it on the recommendation of a doctor or nutritionist. Another reason for people to stop using nutritional supplements is that they are expensive and lack the required comfort and fitness when using them and the lack of sufficient evidence of the efficacy of some nutritional supplements[82].

Our study found that students' knowledge of users was higher than that of non-users, and there was a difference between them when they answered questions related to knowledge, while there is no difference between users and non-users in their perception about it. When examining individual questions, users demonstrated better knowledge of dietary supplement effectiveness, regulation, and safety compared to non-users. Several earlier studies showed that higher use of DSs was associated with knowledge about supplements and attitudes of individuals[83]. Some studies revealed that the lack of knowledge related to the nutritional values of DS contributes to improper DS consumption; in which consumers are unable to know their food goals. The journal of ADA reported that the attitude of DS is closely related to the good knowledge of DS. Despite that, a large number of athletes who regularly use DS don’t have an accurate knowledge of DS; in which it is essential to educate them to make sure they have the appropriate DS option. Additionally, many factors could contribute to the knowledge, attitude, and practice of DS; such as educational and social factors. Although pharmacists themselves are the most knowledgeable team about dietary supplements, they still have poor knowledge regards the proper usage of DS[84]. The current study showed that no significant

difference between users and non-users about overall perception of dietary supplements.

5.2 Strength and Limitation

- It is the best study conducted to investigate the use of DS in Palestine
- The main strength of the study is that it adds to the literature by substantiating an answer to some recommendations. In addition, its findings can be generalized to college students at large.
- There were some limitations to this study. First, this survey used an Internet-based questionnaire. The height and weight were not measured. Second, the response of the students in wanting to participate was moderate, some of them were cooperative and some others were not. So collecting data took a long time. Third, there was an inability to control participants to answer questions as required from them (even when instructed to not do so).

5.3 Conclusion

Dietary supplement use is prevalent among college students and (43.4%) of college students surveyed were consuming dietary supplements. MVM was reported as the most common dietary supplement used among the students in this study sample accounting for 27% of overall products. Users and non-user are different in their knowledge about DS but there is no significant difference between them according to perception about it. The

most common reasons for using DS were boosting energy level, followed by strengthening the immune system, strengthening hair and nails, and improving memory. In addition to users most frequently receive information from the internet, nutrition specialist, and social media. The results of this study suggest that more educational programs on dietary DS are necessary, also appropriate educational intervention is necessary to enable university students to avoid adverse effects from DSs. Farther more, doing further study on the general population can be necessary.

5.4 Recommendations for population

1. It is necessary to know that DSs are intended to supplement the diet, not to replace nutritious foods, and some groups may need Dietary supplements because the vitamins or minerals they need are difficult to obtain in sufficient quantities from the diet.

2. Take Dietary supplements on the basis of medical advice and in specific doses, as high doses of some nutrients can cause harmful effects.

3. In general, it is always recommended to follow a healthy and balanced diet, pay attention when reading the labels on the package of DS The labels on the supplement package mention the active ingredients and nutrients, the allowable serving size, and the number of nutrients in each serving.

4. More research is needed to determine the effectiveness of some Dietary supplements, and as we mentioned previously, it is recommended to

speak to a doctor before starting any new vitamins or supplements, as these substances can interact with other medications that a person may be taking, and some vitamins may be ineffective Unless a person is deficient, in general, a balanced diet and healthy lifestyle that includes enough sleep is sufficient to give most people the energy they need to perform their daily activities.

References

1. Office Of Dietary Supplements. (2020, September 3). *Dietary Supplements. National Institute Of Health*. https://ods.od.nih.gov/factsheets/WYNTK-Consumer/

2. Food And Drug Administration. (2015, Julia 15). *FDA 101: Food And Drug. U.S Food and Drug*. https://www.fda.gov/consumers/consumer-updates/fda-101-dietary-supplements.

3. Harvard Medical School. (2015, August). *Harvard Health publishing*. https://fc-lc.com/GU3Cm.

4. Hamulka, J., Jeruszka-Bielak, M. (2020). Dietary Supplements during COVID-19 Outbreak. Results of Google Trends Analysis Supported by PLifeCOVID-19 Online Studies. *Nutrients* ;13(1):54.

5. Naqvi, A. A., Ahmad, R.(2018). Dietary supplement use among undergraduate male students in health and non-health cluster colleges of a public-sector university in Dammam, Saudi Arabia. *BMC Complementary and Alternative Medicine*, 18(1), 269.

6. Chen, S., Binns, C. (2014). Prevalence of Dietary Supplement Use in Healthy Pre-School Chinese Children in Australia and China. *Nutrients*, 6(2), 815–828.

7. Kobayashi, E., Sato, Y. (2017). The Prevalence of Dietary Supplement Use among College Students: A Nationwide Survey in Japan. *Nutrients*, 9(11),1250.

8. Lieberman, H. R., Marriott, B. P. (2015). *Patterns of dietary supplement use among college students Clinical Nutrition*, 34(5), 976–985.

9. Office Of Dietary Supplements. (2020 ,September 3). *Dietary Supplements*. National Institute Of Health. https://ods.od.nih.gov/factsheets/WYNTK-Consumer/

10. Féart, C.(2020). Dietary Supplements: Which Place between Food and Drugs? *Nutrients*, 12(1), 204.

11. Walrand, S.(2018). Dietary supplement intake among the elderly hazards and benefits. *Current Opinion in Clinical Nutrition and Metabolic Care*, 21(6):465-470.

12. Samreen, S., Siddiqui, N. A. (2020). Prevalence and Use of Dietary Supplements Among Pharmacy Students in Saudi Arabia. *Risk Management and Healthcare Policy*, Volume 13, 1523–153.

13. Alkarasneh, A., F., Islam, A. (2021). Prevalence, reasons, and determinants of dietary supplements use among undergraduate female students of health and non-health colleges in a Saudi public university. *Plos One*, 16(3):e0247295.

14. Hoseini, A., Dehdari, T. (2021). Qualitative exploration of the factors influencing the use of dietary supplements in Iranian women: introduction to areas of focus for developing interventions. *Science Direct*; 7(4):e06672.

15. Blumberg, J., B., Cena, H. (2018). The Use of Multivitamin/ Multimineral Supplements: A Modified Delphi Consensus Panel Report. *Clinical-Therapeutics*, 40(4):640-657.

16. Droz, N., & Marques-Vidal, P.(2014). Multivitamins/multiminerals in Switzerland: not as good as it seems. *Nutrition Journal*, 13(1);24.

17. Biesalski, H. K., & Tinz, J. (2017). Multivitamin/mineral supplements: Rationale and safety. *Nutrition*, 36; 60–66.

18. Fingeret, M.,Vollenweider, P. (2018). No association between vitamin C and E supplementation and grip strength over 5 years: the Colaus study. *European Journal of Nutrition*, 58(2):609-617.

19. Homan, E. M. (2018). *DIETARY SUPPLEMENTS AND COLLEGE STUDENTS: USE, KNOWLEDGE, & PERCEPTION*. Nutrition and Dietetics.etd.online.edu. master thesis.

20. Kreider, R. B., Kalman, D. S. (2017). International Society of Sports Nutrition position stand: safety and efficacy of creatine supplementation in exercise, sport, and medicine. *Journal of the International Society of Sports Nutrition*, 14(1);18.

21. Pruitt, R., Lemanski, A. (2018). Herbal supplements. *The Nurse Practitioner*, 43(5), 32–37.

22. Willoughby, D; Hewlings, S. (2018). Body Composition Changes in Weight Loss: Strategies and Supplementation for Maintaining Lean Body Mass, a Brief Review. *Nutrients*, 10(12), 1876.

23. Lubowiecki-Vikuk, A., Król-Zielińska, M. (2019). Consumption of dietary supplements to support weight reduction in adults according to sociodemographic background, body mass index, waist-hip ratio, body fat and physical activity. *Journal of Health, Population and Nutrition*, 38(1),31.

24. Axon, D. Vanova, J. (2017). Dietary Supplement Use, Knowledge, and Perceptions Among Student Pharmacists. *American Journal of Pharmaceutical Education*. 81(5):92.

25. Lieberman, H. R., Marriott, B. P. (2015). Patterns of dietary supplement use among college students. *Clinical Nutrition*, 34(5), 976–985.

26. Pillay, L., & Pillay, K. (2019). Dietary supplement use among dietetics students at the University of KwaZulu-Natal. *Health SA Gesondheid*, 24,1289.

27. Kenton, W. (2020, November 28). *Food and Drug Administration. Investopedia*. https://www.investopedia.com/terms/f/fda.asp.

28. Dickinson, A.(2011). History and overview of DSHEA. *Fitoterapia*, 82(1), 5–10.

29. Bhutta, Z. A., Das J., K. (2013). Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *Lancet 2013*; 382:452-477.

30. Marik, P. E., & Flemmer, M. (2012). Do Dietary Supplements Have Beneficial Health Effects in Industrialized Nations. *Journal of Parenteral and Enteral Nutrition*, 36(2), 159–168.

31. Bruins, M., Bird, J. (2018). Considerations for Secondary Prevention of Nutritional Deficiencies in High-Risk Groups in High-Income Countries. *Nutrients*, 10(1), 47.

32. Ouellette, C. D., Yang, M. (2012). Assessment of Nutrient Adequacy with Supplement Use in a Sample of Healthy College Students. *Journal of the American College of Nutrition*, 31(5), 301–310.

33. Horino, M., Bahar, L. (2020). Dietary Inadequacy, Micronutrient Deficiencies, and Approaches to Preventing Poor Nutrition in the Gaza Strip. Food Nutr. *Bull*; 41(4):503-511.

34. Al-alimi, A., Bashanfer, S. (2018). Prevalence of Iron Deficiency Anemia among University Students in Hodeida Province, Yemen. *Anemia*, 2018, 1–7.

35. Nimri, L. F. (2018). Vitamin D status of female UAE college students and associated risk factors. *Journal of Public Health*, 40(3), e284-e290.

36. Kobayashi, E., Sato, Y. (2017). The Prevalence of Dietary Supplement Use among College Students: A Nationwide Survey in Japan. *Nutrients*, 9(11), 1250.

37. Pillay, L., & Pillay, K. (2019). Dietary supplement use among dietetics students at the University of KwaZulu-Natal. *Health SA Gesondheid*, 24.

38. Alfawaz, H., Khan, N. (2017). Prevalence of dietary supplement use and associated factors among female college students in Saudi Arabia. *BMC Women's Health*, 17(1):116.

39. Naqvi, A. A., Ahmad, R. (2018). Dietary Supplement Use Among Students of Pharmacy Colleges in the City of Karachi, Pakistan: Prevalence, Opinions, and Attitudes. *J Diet Suppl*. 2019;16(2):166-178.

40. Sirico, F., Miressi, S. (2018). Habits and beliefs related to food supplements : Results of a survey among Italian students of different education fields and levels. *PLOS ONE*, 13(1), e0191424.

41. Pruitt, R., Lemanski, A. (2018). Herbal supplements. *The Nurse Practitioner*, 43(5), 32–37.

42. Mamtani, R., Cheema, S. (2015). Herbal and nutritional supplement use among college students in Qatar. *East Mediator Health J*, 21(1):39-44.

43. Bukic, J., Rusic, D. (2018). Differences among health care students' attitudes, knowledge and use of dietary supplements: a cross-sectional study. *Complementary Therapies in Medicine*. 41:35-40.

44. Begdache, L., Kianmehr, H. (2020). College Education on Dietary Supplements May Promote Responsible Use In Young Adults. *Journal of Dietary Supplements*, 17(1):67-80.

45. Schmitz, S. M., Lopez, H. L. (2020). Serious Adverse Events Reported with Dietary Supplement Use in the United States: A 2.5 Year Experience. *Journal of Dietary Supplements*, 17(2):227-248.

46. Tashakkori, A., & Creswell, J. W. Editorial: Exploring the Nature of Research Questions in Mixed Methods Research. *Journal of Mixed Methods Research*, 1(3), 207–211.

47. Sutton, J., & Austin, Z. (2015). Qualitative Research: Data Collection, Analysis, and Management. *The Canadian Journal of Hospital Pharmacy*, 68(3): 226–231.

48. Marshall, G. J. Trends in the Southern Annular Mode from Observations and Reanalyses. *Journal of Climate*, 16(24), 4134–4143.

49. Walliman. N. (2010). *Research Methods: The Basics. Books*. Google: 208.

50. Trochim, W. M. The Qualitative Debate. *Research Methods Knowledge Base*,7(4).

51. Creswell, J. W., Plano Clark, V. L. (2011). *Designing and Conducting Mixed Methods Research*, 5(10).

52. Onwuegbuzie, A. J., Johnson, R. B. (2011) Assessing legitimation in mixed research: a new framework. *Qual Quant* 45, 1253–1271.

53. Corbetta, P. *Social Research: Theory Methods and Techniques*. SAGE Publications Ltd., London.

54. Al Alami, S. (2015). Research within the Field of Applied Linguistics: Points to Consider. *Theory and Practice in Language Studies*, 5(7):1330.

55. Chiba, T. Kobayashi, E. (2020). An educational intervention improved knowledge of dietary supplements in college students. *Journal of BMC Public Health*, 20(1):633.

56. Kamiński, M., Kręgielska-Narożna, M. (2020). Determination of the Popularity of Dietary Supplements Using Google Search Rankings. *Nutrients*, 12(4), 908.

57. Begdache, L., Kianmehr, H. (2018). College Education on Dietary Supplements May Promote Responsible Use In Young Adults. *Journal of Dietary Supplements*, 1–14.

58. Lieberman, H. R., Marriott, B. (2015). Patterns of dietary supplement use among college students. *Clinical Nutrition* 34: 976–985.

59. Alfawaz, H., Khan, N. (2017). Prevalence of dietary supplement use and associated factors among female college students in Saudi Arabia. *BMC Womens Health*;17:116.

60. Begdache, L., Kianmehr, H. (2020). College Education on Dietary Supplements May Promote Responsible Use In Young Adults. *Journal of Dietary Supplements*, 17(1):67-80.

61. Pillay, L., & Pillay, K. (2019). Dietary supplement use among dietetics students at the University of KwaZulu-Natal. *Health SA Gesondheid*, 24,1298.

62. Jovičić-Bata, J., Grujičić, M. (2019). Epidemiology of dietary supplement use in Serbia: Report from Novi Sad. *Complementary Therapies in Medicine*, 102228.

63. Kobayashi E, Sato Y. (2017). The Prevalence of Dietary Supplement Use among College Students: A Nationwide Survey in Japan. *Nutrients*; 9:1250.

64. Albusalih, F. A., Naqvi, A. A. (2017). Prevalence of Self-Medication among Students of Pharmacy and Medicine Colleges of a Public Sector University in Dammam City, Saudi Arabia. *Pharmacy (Basel)*; 5: 51.

65. Al-Johani WM ., Al-Dawood KM.(2018). Consumption of vitamin and mineral supplements and its correlates among medical students in Eastern Province, Saudi Arabia. *J Fam Community Med*; 25: 169–74.

66. Loney, T. (2019). Prevalence of, and factors associated with health supplement use in Dubai, United Arab Emirates: a population-based cross-sectional study. *BMC Complement Altern Med*;19(1):172.

67. Asher, G. N., Corrbett, A. H. (2017). Common Herbal Dietary Supplement-Drug Interactions. *Am Fam Physician*; 96(2):101-107.

68. Samreen, S., Siddiqui, N. A. (2020). Prevalence and Use of Dietary Supplements Among Pharmacy Students in Saudi Arabia. *Risk Management and Healthcare Policy*, Volume 13, 1523–1531.

69. Dickinson, A., MacKay, D. (2015). Consumer attitudes about the role of multivitamins and other dietary supplements: report of a survey. *Nutr J*. 14(1):66.

70. Aina, B., & Ojedokun, O. (2014). Knowledge and use of dietary supplements by students of College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria. *Journal of Basic and Clinical Pharmacy*, 5(2), 34.

71. Wharton, S., Bonder, R. (2019). The safety and effectiveness of commonly-marketed natural supplements for weight loss in populations with obesity: A critical review of the literature from 2006 to 2016. *Critical Reviews in Food Science and Nutrition*, 1–17.

72. Pomeroy, D. E., Tooley, K. L. (2020). A Systematic Review of the Effect of Dietary Supplements on Cognitive Performance in Healthy Young Adults and Military Personnel. *Nutrients*, 12(2), 545.

73. Hegazi, N., Hasan, A. A.(2020). Popularity of the Consumption of Dietary Supplements and its Associated Factors among Students in an Egyptian University: A Cross-sectional Study. *Open-Access-Macedonian-Journal-of-Medical-Sciences*, 8(E):566-573.

74. Roever, L. (2015). Dietary Supplements and Adverse Events. *Open Access Emergency Medicine*, 5(6):e140.

75. Samreen, S., Siddiqui, N. A. (2020). Prevalence and Use of Dietary Supplements Among Pharmacy Students in Saudi Arabia. *Risk Management and Healthcare Policy*, Volume 13, 1523–1531.

76. Stickel, F., Kessebohm, K.(2011). Review of liver injury associated with dietary supplements. *Liver Int*; May; 31(5):595-605.

77. Kołodziej, G., Cyran-Grzebyk, B. (2019). Knowledge Concerning Dietary Supplements among General Public. *BioMed Research International*, 2019, 1–12.

78. Dickinson, A., & MacKay, D. (2014). Health habits and other characteristics of dietary supplement users: a review. *Nutrition Journal*, 13(1).

79. Samreen, S., Siddiqui, N. A. (2020). Prevalence and Use of Dietary Supplements Among Pharmacy Students in Saudi Arabia. *Risk Management and Healthcare Policy*, Volume 13, 1523–153.

80. Vinnikov, D., Romanova, Z. (2018). Prevalence of supplement use in recreationally active Kazakhstan university students. *J Int Soc Sports Nutr* 15, 16 .

81. Arensberg, M.E, Costello, R.(2014). Summit on human performance and dietary supplements summary report. *Nutr Today*; 49:7-15.

82. Ciancito, L .(2016, March 29). *8 Reasons Why You Shouldn't Take Supplements*. Spoon University.

83. Samreen, S., Siddiqui, N. A. (2020). Prevalence and Use of Dietary Supplements Among Pharmacy Students in Saudi Arabia. *Risk Management and Healthcare Policy*, Volume 13, 1523–153.

84. Shahwan, M., Zain Al Abdin, S. M .(2018). Knowledge and Practice of Dietary Supplement and Micronutrients among Medical Students at Ajman University. *Journal Of Pharmaceutical Science*,10(1)85-90.

Annexes

Annex (1)

Arabic version of the consent form

الموضوع: الموافقة على المشاركة في دراسة علمية لرسالة ماجستير في الصحة العامة.

عنوان الدراسة: نمط استخدام المكملات الغذائية بين طلاب الجامعة: دراسة مقطعية.

الطالبة: أسيل مازن راجح أبو حسن

المشرف الأكاديمي: د. إياد العلي

تحية طيبة وبعد

أنا الطالبة أسيل مازن أبو حسن من مدينة جنين أقوم بدراسة عن المكملات الغذائية بين طلاب جامعة النجاح في فلسطين كمتطلب لاستيفاء درجة الماجستير في الصحة العامة/جامعة النجاح الوطنية.

يهدف هذا البحث الى دراسة استخدام المكملات الغذائية بين الطلاب والاعتقاد والمعرفة عنها. تتطلب الدراسة تعبئة الاستبانة من قبل الطلاب.

نرجو من حضرتكم التكرم بالموافقة على المشاركة في تلك الدراسة حيث لا يوجد مخاطر من الاشتراك بها، والمعلومات التي سنحصل عليها ستبقى سرية ولن تستخدم إلا لأغراض البحث العلمي فقط ولك الحق في الانسحاب متى تشاء من الدراسة.

مع وافر الاحترام

الطالبة: أسيل مازن أبو حسن

الجوال: 0594154041

Aseelabuhassan123@gmail.com

Annex (2)

English version of the consent form

Consent Form

Subject: consent to participate in a scientific study for the Master of Public Health program.

Study Title: Pattern of dietary supplement use among college students: A cross-sectional study

Student: Aseel Mazen Rajeh Abu Hassan

Academic Supervisor: Dr. Iyad Al-Ali

Hello,

I am Aseel Mazen Abu Hassan, from Jenin; I am conducting a study on dietary supplements among An-Najah National University students in Palestine as a requirement for a master's degree in Public Health from An-Najah National University.

This research aims to study the use, perception and knowledge of dietary supplements among students. The study requires the students to fill out a questionnaire.

We hope that you will kindly agree to participate in this study where there is no risk due to participation and that all the collected information will remain confidential and for research purposes only. You have also the right to withdraw from the study whenever you want

Respectfully,

Student: Aseel Mazen Abu Hassan

Mobile:0594154041

E-mail:Aseelabuhasan123@gmail.com

Annex (3)

Questioner

A study on dietary supplements patterns among An-Najah College students.

Dear students,

We put in your hands this questionnaire to complete our study. We hope for your cooperation with us in answering the questions of this questionnaire accurately and objectively. You have complete freedom and will to participate and you have the full right to take the time to think about participating or not. We assure you that all the information collected for research purposes only, strict confidentiality will be maintained and the information will not be used for others purposes.

We thank you very much.

Notice

The questionnaire consists of 4 sections for users of dietary supplements; answer all sections except for section four.

For non-users of dietary supplements, answer all sections except for the third section

Aseel Mazin

Dr. Iyad Ali

Section one: Primary data

1.Age

a)17 – 19
b)20 – 22
c)over 22

2. Gender

a)Male
b)Female

3. Marital status

a)Unmarried
b)Married
c)Engaged
d)Separated

4. The nature of housing

a)University Housing

b)With family

5. College

a)Engineering and information technology
b)Sciences
c)Humanities
d)Arts
e)Law
f)Medicine and health sciences
g)Educational sciences and teacher preparation
h)Islamic Law
l)Graduate Studies
l)Economics and Social Sciences
m)Veterinary medicine and agriculture

6. School year
a)First
b)Second
c)Third
d)Four or more

Lifestyle

7.How well do you know about dietary supplements

a)Extensive knowledge
b)Know fairly
c)Not very familiar
d)I have no knowledge at all

8.Evaluate your diet

a)Very healthy
b)Moderately healthy
c)Unhealthy

8.Exercising

a)Regularly
b)Intermittently
c)Always

9.Eating meals during the day

a)Once
b)Twice
c)Three times
d)Unspecified

10.Having breakfast

a)Always

b)Usually

c)Sometimes

d)Rarely

11. I'm on a diet

a)Yes
b)No

12.Your smoking habit

a)exists
b)Does not exist
c)Former smoker

13.I completed a college-level training course in the field of human nutrition

a)Yes
b)No

14.You are allergic to a certain food

a)Yes

b)No

15.Suffering from health problems that restrict eating normally

a)Yes
b)No

Section Two: Perception and Knowledge

Perception

A. Labels on nutritional supplements are useful for understanding whether they are suitable for use

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

B. Food supplements can be used as a substitute for a good diet

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

C. Dietary supplements can have harmful side effects

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

D. The necessity of consulting with experts when using nutritional supplements

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

E. Dietary supplements can eliminate bad habits such as smoking

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

F. Dietary supplements can eliminate bad habits such as lack of exercise

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

knowledge

A. The efficacy of dietary supplements has been supported by long-term or short-term clinical studies

- Yes
- No
- I do not know

B. Herbal supplements are safe to use because they come from "natural sources".

- Yes
- No
- I do not know

C. Supplement contents are not standardized among manufacturers

- Yes
- No
- I do not know

D. Some nutritional supplements can interact with medications, causing danger to the body

- Yes
- No
- I do not know

E. The food supplement industry is not subject to strict control compared to food and medicine

- Yes
- No
- I do not know

The third section is for (users of nutritional supplements) from No.

1-18

1. What kind of food supplement do you take, you can choose more than one answer

- Vitamins and minerals
- Vitamins only
- Metals only
- Amino acids and protein
- Essential fatty acids
- herbs
- others

2. I care about reading the label attached to the supplement

- Yes
- No

3.Select the type of supplement you take, you can choose more than one answer

- capsule
- Tape
- Powder
- liquid
- Spray

4.Take the nutritional supplement

- daily
- Weekly
- Monthly
- Seasonally

5.I started taking the supplement

- a month ago
- Less than a year ago
- A year or more ago

6.How often do you take the supplement during the day

- once
- twice
- Three times

7.I looked for information about the nutritional supplement before buying it

- Yes
- No
- I do not know

8.A family member takes the nutritional supplements

- Yes
- No
- I do not know

9.I experienced negative effects from taking the nutritional supplements

- Yes
- No
- I do not know

10.Taking nutritional supplements increases your focus in the study

- Yes
- No
- I do not know

11.Taking the nutritional supplement increases your academic achievement

- Yes
- No
- I do not know

12.I spend on nutritional supplement consumption per month

- Less than 50 shekels
- From 50 to 99 shekels
- From 100 to 150 shekels
- More than 150 shekels

13.I take the food supplement for (you can choose more than one) answer

- Building muscles
- Boosting energy level
- Improving sleep
- As a meal replacement
- strengthening the immune system
- Opening the appetite
- Reducing stress
- Strengthening hair and nails
- Improving memory and cognition
- Improving physical performance
- Preserving the sense of hearing
- Preserving the sense of sight

14.Do you use dietary supplements to lose weigh

- Yes
- No

15.Get information on nutritional supplements from (you can choose more than one answer)

- Books
- Internet
- Family
- Friends
- Nutritionists
- Social networking sites
- Others

16.You suffer from the following symptoms (if any and even if they occur for a short time) when taking nutritional supplements, you can choose more than one answer

- Nausea
- Diarrhea
- constipation
- Accelerated heart rate
- Skin sensitivity
- Stomach pain
- Others

17.Your response to negative effects, if any, you can choose more than one answer

- Stop using dietary supplements immediately
- I do nothing
- Complaint to the factory
- go to the doctor

18.I discussed the negative effects that I was exposed to with the nutritionist

- Yes
- No

Section Four (for non-users of nutritional supplements) from No. 1-5

1.Have you ever taken a dietary supplement

- Yes
- No

2.I took the supplement when I was

- I have never eaten it
- From the age of 10 years and under
- From the age of 10 to 19
- From the age of 20 and over

3. I stopped using the dietary supplements (If you are a previous user of it)، you can choose more than one answer

- For financial reasons
- I don't think it was effective
- I don't know enough about her
- Forgetting to take it on time

- As a result of the negative effects attached to it
- On medical recommendation

4.While using nutritional supplements previously, I experienced the following symptoms (if any)، you can choose more than one option

- Nausea
- constipation
- Diarrhea
- Accelerated heart rate
- Skin sensitivity
- Stomach pain
- Other
- I have never used it before

5.I do not use supplements because

5.a. I think supplements are ineffective

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

5.b. Supplements cost a lot of money

I strongly agree

I agree

neutral

I do not agree

I strongly disagree

5.c. My knowledge about nutritional supplements is poor

I strongly agree

I agree

neutral

I do not agree

I strongly disagree

5. d. My diet is balanced and I do not need nutritional supplements

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

5.e. I have experienced previous negative effects when taking it

- I strongly agree
- I agree
- neutral
- I do not agree
- I strongly disagree

The end
Thank you so much for your co-operation

جامعة النجاح الوطنية
كلية الدراسات العليا

نمط استخدام المكملات الغذائية لدى طلبة جامعة النجاح الوطنية – نابلس: دراسة مقطعية

إعداد
أسيل مازن راجح أبو حسن

إشراف
د. إياد العلي

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في الصحة العامة، بكلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس، فلسطين.
2021

نمط استخدام المكملات الغذائية لدى طلبة جامعة النجاح الوطنية– نابلس: دراسة مقطعية

إعداد

أسيل مازن راجح أبو حسن

إشراف

د. إياد العلي

الملخص

خلفية الدراسة

المكملات الغذائية هي المنتجات التي تحتوي على واحد أو أكثر من المكونات الغذائية (بما في ذلك الفيتامينات والمعادن والأعشاب أو غيرها من النباتات والأحماض الأمينية والمواد الأخرى) أو مكوناتها؛ تستخدم لتكملة النظام الغذائي. يتم تناول هذه المكملات عن طريق الفم في شكل حبوب، أو كبسولات، أو أقراص، أو سائل.

المكملات الغذائية هي عناصر مغذية تعمل على تحسين الصحة العامة ورفاهية الفرد بالإضافة إلى تقليل مخاطر الأمراض وتشير الدلائل إلى ارتفاع معدل انتشار هذه المنتجات في جميع أنحاء العالم خاصة بين طلاب الجامعات. يختلف انتشار استخدام المكملات باختلاف المجموعات العرقية لمجموعة متنوعة من الظروف الغذائية والاقتصادية والجوانب الثقافية. بالإضافة الى ذلك يعيش العديد من طلاب الجامعات بمفردهم عندما يحصلون على قبولهم في الكلية في مساكن منفصلة ويقومون بإعداد وجبات الطعام الخاصة بهم. قد يعيش بعض الطلاب مع أسرهم، لكن غالبًا لا يتناولون العشاء معهم بانتظام بسبب التزامات أخرى مثل الأنشطة أو الوظائف بدوام جزئي أو خطط العشاء مع أصدقائهم. أيضًا، يتخطى العديد من طلاب الجامعات وجبة الإفطار. يذكر الأفراد أنهم يستخدمون المكملات الغذائية كتفضيل عام لتعزيز الصحة العامة، وتطوير الأداء والطاقة، وعلاج حالات صحية معينة، وتعزيز التغذية (لأن الطبيب أوصى بذلك وهو مفيد لهم) وأن يغيروا أسلوب حياتهم إلى الأفضل، يسعى البعض لاستخدامها عوضا عن بعض مصادر

الغذاء أو عادات الأكل التي تحد من تناول الفيتامينات والعناصر الغذائية الأساسية واللازمة ل الجسم.

المنهجية

في هذه الدراسة، تم إجراء البحث على أساس منهج البحث الكمي.

حيث تم جمع البيانات الرقمية من خلال الاستطلاعات عبر الإنترنت، والتي تم تصميمها وفقًا للأدبيات ذات الصلة. بعد ذلك، تم توحيد عنصري مقياس مختلفين فيما يتعلق بالمتغيرات. وعليه تم تطبيق التحليل الوصفي وعرضت النتائج في جداول. شملت الدراسة طلاباً على مقاعد الدراسة وخريجين من جميع التخصصات في جامعة النجاح، تم الحصول على بيانات البحث من 380 مشارك.

النتائج

تم إجراء التحليل الإحصائي باستخدام SPSS، وأظهرت نتائج الدراسة ما يلي: أولاً، هناك اختلاف في معرفة المكملات الغذائية بين المستخدمين وغير المستخدمين، وبالتالي تم قبول الفرضية 1. ثانيًا، لا يوجد فرق في التصور والاعتقاد عن المكملات الغذائية بين المستخدمين وغير المستخدمين، وبالتالي تم رفض الفرضية 2. ثالثًا، هناك استخدام واسع النطاق للفيتامينات المتعددة والمعادن بين طلاب الكلية، وبالتالي تم قبول الفرضية 3)، وأخيرًا، لا يوجد تأثير معنوي لاستخدام DS على فقدان الوزن وزيادة التركيز الأكاديمي وفقًا لاستجابات المشاركين، وبالتالي تم رفض الفرضية الرابعة. بالإضافة إلى ذلك، كان حوالي 43.4٪ (العدد= 165) من حجم العينة (العدد= 380) يستخدمون المكملات الغذائية. وكانت الفيتامينات المتعددة والمعادن المكمل الغذائي الأكثر شيوعًا بين الطلاب في عينة الدراسة هذه حيث يمثل 27 ٪ من إجمالي المنتجات. كانت الأسباب الأكثر شيوعًا لاستخدام المكملات الغذائية هي زيادة مستوى الطاقة، يليها تقوية جهاز المناعة وتقوية الشعر والأظافر وتحسين الذاكرة. بالإضافة إلى أن المستخدمين يتلقون المعلومات بشكل متكرر من الإنترنت وأخصائي التغذية ووسائل التواصل الاجتماعي.

الخاتمة

ينتشر استخدام المكملات الغذائية بين طلاب الجامعة منهم المستخدمين ومنهم مستخدمين سابقين، تشير نتائج هذه الدراسة إلى أن المزيد من البرامج التعليمية حول المكملات الغذائية ضرورية، كما أن التدخل التربوي المناسب ضروري لتمكين طلاب الجامعة من تجنب الآثار الضارة التي قد ترافق استخدام المكملات الغذائية. علاوة على ذلك، قد يكون من الضروري إجراء مزيد من الدراسات حول عامة السكان .