Original Research Article

Dietary habits and physical exercise among nursing students in Riyadh, Saudi Arabia

Abstract College students can make inappropriate food choices owing to a lack of nutritional knowledge and understanding of dietary requirements. Increasing physical inactivity among college students is also a serious public health problem. To assess dietary habits and physical exercise among nursing students in Riyadh, Saudi Arabia. In 2018, this cross-sectional descriptive study was conducted at a single college with a convenience sample of 104 level-4—or second-year—undergraduate nursing students. Data were collected using a three-part self-assessment questionnaire. More than one-third of the students were overweight; two-thirds consumed unhealthy snacks, and most failed to drink enough water and were physically inactive. The prevalence of overweight and obesity suggests the significance of frequent educational campaigns and seminars on healthy eating and physical activity. Also, further research is needed to assess college students' knowledge and attitudes about healthy diet and the importance of regular physical exercise.

Keywords: *dietary habits, physical exercise, nursing students*

1. Introduction

In May 2004, the World Health Organization (WHO) adopted the "Global Strategy on Diet, Physical Activity and Health," which aimed to improve two major health-related factors: diet and physical activity [1]. The period of adolescence plays a crucial role in determining responsibilities and habits across the lifespan, and these can influence individuals' health status throughout their adult lives.

Poor nutrition and obesity are among the most important health concerns confronting society today, not only in terms of health status but also health care expenditures [2]. Obesity, in combination with unhealthy lifestyles, such as those characterized by physical inactivity, may increase the risk of chronic diseases [3]. Over the past few decades, Saudi Arabia has become increasingly westernized, and it now has one of the highest rates of obesity and overweight in the world [4].

College students can make unhealthy food choices owing to a lack of nutritional knowledge and understanding of dietary requirements and healthy food patterns. The diets of young adults, especially college students, are often characterized by poor eating habits and frequent fast-food consumption. As a consequence, overweight and obesity are becoming increasingly prevalent in this population [5]. Although many student behaviors are viewed as a temporary part of college life, unhealthy eating patterns developed during this period generally continue in adult life [6]. College life is an important stage for individuals because their behaviors are still amenable to change. College is considered an opportunity for growth and personal development, and is, therefore, an important time for health and nutrition education and reinforcement of healthy lifestyles [6].

Physical activity is an important element in the prevention of many chronic diseases such as type 2 diabetes mellitus, hypertension, hyperdyslipidemia, cardiovascular diseases, chronic respiratory diseases, and malignancies, and also plays a protective role against the development of overweight and obesity [7]. Moreover, regular physical activity is associated with increased health benefits and decreased risk of mortality; it improves aerobic ability, muscle strength, bodily dexterity, coordination, and metabolic functioning [8].

Globally, physical inactivity has been increasing and has become a major health problem because of modern trends, wherein capitalism and technological advances dictate the rules of social behavior. It is known that 70% of the world's population is physically inactive; it has been suggested that sedentary lifestyles result in two million deaths per year [9]. The WHO has ranked physical inactivity as the fourth leading risk factor for worldwide mortality, estimating that it is the main cause of about 30% of ischemic heart disease, 21–25% of breast and colon cancers, and 27% of diabetes mellitus [10].

Although most of these diseases manifest in adulthood, it is increasingly evident that disease development starts in childhood and adolescence, and regular engagement in physical activity in the first two decades of life is an effective preventive measure. For this reason, it is important to investigate the trends and patterns of

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physical activity among undergraduate students, with the understanding that it is during this period that personality and habits become intertwined and that college life facilitates the development of new relationships and presents opportunities for adopting sedentary behaviors [11].

The current study aimed to assess dietary habits and physical activity levels among university nursing students in Saudi Arabia. The research questions were as follows:

What are the dietary habits and food choices of nursing students?

What is the pattern of physical activity in nursing students?

2. Materials and Methods

2.1. Design

This qualitative study employed a cross-sectional design.

2.2. Setting

The study was conducted at a nursing college in Riyadh, Kingdom of Saudi Arabia.

2.3. Sample

All level-4 nursing students (N = 116) in the college were included in the sample; students at this level were chosen because they are at the beginning of their health profession courses and have not yet been exposed to materials related to nutrition, healthy diet, or physical exercise.

2.4 Data Collection Instrument

After extensive review of the related literature and similar studies, the researcher developed a structured self-report questionnaire consisting of three main parts:

2.4.1 Part I

Bio- and sociodemographic characteristics and anthropometric measurement data: age, marital status, monthly income, weight, height, body mass index, presence of disease (anemia, diabetes), and self-assessment of health status.

2.4.2 Part II

Current nutritional habits: eating breakfast; type of fat used in cooking; the number of daily meals; time of main meal; the number of snacks and time of consumption; average daily water intake; types of milk and dairy products consumed; frequency of consumption of different food groups, drinks, and sweets; the number of daily servings of fruits and vegetables; and whether anyone had advised the student to change their eating patterns.

2.4.3 Part III

Engagement in physical activity: time and number of days per week; membership in a sports club or gym; self-assessment of body weight; and whether anyone had advised the student to change their physical activity level.

The questionnaire was tested for validity through a review performed by a panel of 10 faculty members in medical, surgical, and community nursing. Reliability was assessed with Cronbach's alpha before the main data analysis, and the score was .90. The questionnaire was pilot tested with five students who were not included in the main study, and necessary modifications were made.

2.5 Ethical Considerations

The research proposal was approved by the concerned institution. The students were then informed about the study objectives, voluntary nature of participation, and their right to withdraw at any time during the study process without any effect on their coursework or grades. All participants provided written informed consent. Confidentiality was ensured throughout the study process, and the students were assured that all data would be used only for research purposes.

2.6 Data Collection Procedure

Data for this study were collected over two weeks in the 2018 spring semester. The questionnaire was distributed to all level-4 nursing students in lecture halls during their free time for two weeks, depending on student availability. The questionnaire required 20 to 30 minutes to complete, and the investigator was available to answer any questions.

2.7 Data Analysis

SPSS version 22 (IBM Corp., Armonk, NY, USA) was used to analyze the data. Means and standard deviations were used to report continuous variables, while frequencies and percentages were used for categorical variables.

3. Results

After excluding five students because they participated in the pilot test and another seven because of their absence on the days of data collection, the data of 104 students were analyzed. Table 1 presents the distribution of the sample's bio- and sociodemographic characteristics.

Table 1: Participants' Bio- and Sociodemographic Characteristics

Characteristics	Participants (N = 104)	
	n	%
Age (years) < 20 ≥ 20	 22 82	 21.2 78.8
Age Range Mean ± SD	18–23 20.3 ± 1.07	
Marital status Single	 104	 100.0
Weight (kg) Range Mean ± SD	 40–91 58.3 ± 11.06	
Height (cm) Range Mean ± SD	 142–185 158.6 ± 7.41	
BMI (weight/height2) Underweight (BMI < 18.5) Normal weight (BMI 18.5–24.9) Overweight (BMI 25–29.9) Obese (BMI ≥ 30.0)	 10 53 38 3	 9.6 51.0 36.5 2.9

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Monthly family income		
Adequate	70	67.3
Inadequate	19	18.3
Adequate plus savings	15	14.4
Presence of disease		
Diabetes	1	1.0
Anemia	22	21.2
Self-assessment of present health status		
Excellent	17	16.3
Good	59	56.7
Average	24	23.1
Poor	4	3.8

SD: Standard Deviation; BMI: Body Mass Index

The findings indicated that the 104 students, all of whom were female, were also all unmarried, and their ages ranged from 18 to 23 with a mean of 20.3 ± 1.07 years. Students' weights ranged from 40 to 91 kilograms and heights from 142 to 185 centimeters. Most (81.7%) reported that their family income was adequate or better. One-fifth (21.2%) reported being anemic, while only one (1.0%) reported being diabetic. Using weight and height to calculate body mass index, it was found that only about half (51.0%) were of normal weight while more than one-third (36.5%) were overweight and small percentages were underweighted (9.6%) and obese (2.9%). In their self-assessment of health status, more than half (56.7%) thought they were in good health while 23.1% and 16.3% reported average and excellent health, respectively. Only 3.8% rated their health as poor.

Table 2 illustrates the distribution of nutritional patterns among the participants. More than half (62.5% and 61.5%, respectively) usually ate breakfast and used vegetable oil for cooking. About the number of daily meals, 42.3% and 35.6% ate two and three meals, respectively, and the main meal for one-third of them (33.7%) was breakfast, taken from 4:00 to 10:00 a.m. Regarding snacks, most (70.2%) reported having one or two per day, and more than two-thirds (68.3%) consumed nuts, chocolate, crackers, chips, and/or cookies. Regarding consumption of water and milk and other dairy products, the highest proportion (37.5%) consumed four or five glasses of water daily, and more than half (61.5%) used whole (full fat) milk and dairy products.

Table 2: Participants' Nutritional Patterns

Pattern	Participants (N = 104)	
	N	%
Eat breakfast		
Usually	65	62.5
Sometimes	35	33.7
Never	4	3.8
# Kind of fat/oil mostly used in cooking	64	61.5
Vegetable oil	2	1.9
Margarine	13	12.5
Butter	4	3.8
Animal fat	5	4.8
None	26	25.0
I do not know		
Number of daily meals	6	5.8
1	44	42.3
2	37	35.6
3	14	13.5
4	1	1.0
5	2	1.9
> 5		
Main meal		
Breakfast	35	33.7
Lunch	47	45.2
Dinner	22	21.2
Main mealtime	35	33.7
4:00–10:00 a.m.	43	41.3
1:00–5:00 p.m.	26	25.0
6:00–10:00 p.m.		
Number of snacks per day	73	70.2
1–2	31	29.8
3–4		
# Type of snack		
Fruits	49	47.1
Vegetables	9	8.7
Nuts, chocolate, crackers, chips, cookies	71	68.3
Average daily water intake (glasses)	37	35.6
1–3	39	37.5
4–5	17	16.3
6–8	11	10.6
> 8		
Type of milk and dairy products consumed	64	61.5
Whole (full fat)	34	32.7
Low-fat (light)	1	1.0
Skimmed (no fat)	5	4.8
None		

Multiple response data

Table 3 presents the food groups represented in the participants' daily diet. More than half reported consuming vegetables (64.4%), fruit (69.2%), protein (53.8%), and milk or dairy products (57.7%) once daily, while fewer than half reported consuming carbohydrates (42.3%) and fats (45.2%) twice daily. Most (84.6%) reported consuming sugar once daily.

Table 3: Food Groups Represented in Participants' Daily Diets

Daily Food Group Intake	Participants (N = 104)	
	n	%
Vegetables		
Once	67	64.4
Twice	26	25.0
Thrice	11	10.6

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Fruit		
Once	72	69.2
Twice	24	23.1
Thrice	8	7.7
Protein		
Once	56	53.8
Twice	35	33.7
Thrice	10	9.6
Four or more times	3	2.9
Milk and dairy products		
Once	60	57.7
Twice	23	22.1
Thrice	14	13.5
Four or more times	7	6.7
Carbohydrates		
Once	22	21.2
Twice	44	42.3
Thrice	35	33.7
Four or more times	3	2.9
Fats		
Once	35	33.7
Twice	47	45.2
Thrice	19	18.3
Four or more times	3	2.9
7. Sugar		
Once	88	84.6
Twice	14	13.5
Thrice	2	1.9

Table 4 shows participants' daily consumption of fluids. The number of cups and bottles of tea and juice, respectively, consumed daily ranged from zero to ten, while the number of daily cups of coffee ranged from zero to nine. About one-quarter of the students (24%) reported consuming soft drinks (e.g., cola) daily.

Table 4: Participants' Daily Fluid Consumption

Daily Fluid Intake	Participants (N = 104)	
	n	%
#Coffee (cups)		
Arabic	67	64.4
Black	26	25.0
With sugar	11	10.6
With milk	68	65.4
Range	0–9	
Mean ± SD	2.21 ± 1.86	
#Tea (cups)		
Black	68	65.4
Green	6	5.8
Range	0–10	
Mean ± SD	1.23 ± 1.44	
Soft drinks (cans)		
None	65	62.5
Regular	25	24.0
Light	14	13.5
Range	0–3	
Mean ± SD	0.46 ± 0.71	
Juice (bottles)		
Long-life	32	30.8
Fresh	40	38.5
Range	0–10	
Mean ± SD	0.90 ± 1.12	

Multiple response data; SD: Standard Deviation

Table 5 presents participants' weekly dessert consumption. The majority reported eating sweets (79.8%), dates (80.8%), and chocolate (81.7%) one to four times; in addition, most of the students reported eating cake/cookies (74.0%) and ice cream (82.7%) one to four times. A small percentage (6.7%) reported not consuming candy, cake/cookies, or ice cream every week. Participants were asked if they had received any advice about changing their eating habits and, if so, from whom. More than half (60.6%) reported that a family member had advised them to change their eating patterns, and less than half were so advised by a physician (42.3%), friends or colleagues (43.3%), ~~or~~ and others (36.5%).

Table 5: Participants' Weekly Dessert Consumption and Person Who Gave Advice to Change Eating Patterns

Type of Dessert	Participants (N =104)	
	n	%
Sweets		
1–4	83	79.8
5–9	21	20.2
Dates		
None	4	3.8
1–4	84	80.8
5–9	12	11.5
10–14	4	3.8
Chocolate		
None	1	1.0
1–4	85	81.7
5–9	12	11.5
10–14	4	3.8
> 15	2	1.9
Candy		
None	7	6.7
1–4	82	78.8
5–9	10	9.6
10–14	1	1.0
> 15	4	3.8
Cake and cookies		
None	7	6.7
1–4	77	74.0
5–9	9	8.7
10–14	9	8.7
> 15	2	1.9
Ice cream		
None	7	6.7
1–4	86	82.7
5–9	3	2.9
10–14	6	5.8
> 15	2	1.9

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Person who advised to change eating patterns	44	42.3
	17	16.3
Physician	63	60.6
Nurse	45	43.3
Family member	38	36.5
Friend, colleague		

Multiple response data

Table 6 presents respondents' self-perceptions of their weight and the physical activities they participated in. Almost half (46.2%) perceived their body weight as normal, and 30.8% and 20.2% considered themselves overweight and underweight, respectively. More than half (61.5%) said they practiced physical exercise, and most of these participants (54.8%) exercised weekly. The majority (75%) were not members of any gym or sports club. Of those who did exercise, about half (48.1%) practiced light exercise. Of those who exercised weekly, the majority (86.5%) exercised from 10 to 30 minutes per week.

Table 6: Participants' Perceived Weight, Physical Activity Level, and Persons Who Gave the Advice to Increase Physical Activity

Physical Activities	Participants (N = 104)	
	N	%
Perceived weight		
Underweight	21	20.2
Normal weight	48	46.2
Overweight	32	30.8
I do not know	3	2.9
Practice physical exercise		
Yes	64	61.5
No	40	38.5
Frequency of physical exercise		
Daily	23	22.1
Weekly	57	54.8
Monthly	24	23.1
Membership in a sports club or gym		
Yes	26	25.0
No	78	75.0
Type of physical exercise		
Light	50	48.1
Moderate	34	32.7
Vigorous	20	19.2
Duration of physical exercise/week		
10–30 minutes	90	86.5
Up to 1 hour	11	10.6
> 1 hour	3	2.9
Persons Who advised to increase physical activity	35	33.7
Physician	15	14.4
Nurse	45	43.3
Family member	34	32.7
Friend/colleague	51	49.0

Multiple response data

In addition, Table 6 also shows the proportion of participants who reported that various persons had advised them to increase their physical activity level. About half of the sample (49%) had received such advice. Of those, 33.7% were so advised by a physician, 43.3% by a family member, and 32.7% by a friend or colleague.

4. Discussion

Nutritional issues and healthy eating patterns have been major concerns for health workers and the community, especially among certain groups such as children, adolescents, college students, and older adults. Attaining and maintaining a healthy lifestyle remain persistent challenges internationally, particularly for health professionals, who are tasked with promoting public health.

Over the last three decades, the prevalence rates of overweight and obesity have increased in many Arab and European countries [12]. The present study indicated that more than one-third of the participants were overweight and obese, while only half had normal body weight. Al-Isa's findings [13], which showed a high prevalence of overweight and obesity in Kuwait University students, were consistent with the present results. The results of a study conducted in the United Arab Emirates were also consistent, with a 35.7% prevalence of obesity among university students [14]. In addition, Al-Rethaiaa, Fahmy, and Al-Shwaiyat found that 21.8% of college students in Saudi Arabia were overweight and 15.7% were obese [15]; in Lebanon, the prevalence of overweight and obesity among female college students was 37.5% [3]. However, Kabir, Said, and Ismail reported contradictory findings, indicating that the prevalence of obesity among postgraduate students in a private university was 8.9% [16].

The main finding of the present study is that university students have poor dietary habits: a high percentage of them eat only two meals per day; sometimes eat breakfast; snack on nuts, crackers, chocolate, cookies, and chips twice daily; and have only one daily serving of fruit, vegetables, milk, and dairy products. Meanwhile, they consume carbohydrates, sugar, and fats twice daily, drink Arabic coffee and black tea, and have only four to five glasses of water. In addition, the majority of the participants reported using from one to four teaspoons of sugar daily and eating sweets, dates, chocolate, candy, cake, cookies, and ice cream every week. This result is similar to findings among private medical students in Malaysia [17]; it also supports Driskel, Kim, and Goebel, who found that college students usually have poor eating habits, eat few fruits and vegetables daily and consume high-fat and high-calorie foods [18]. The main finding of Hassan et al.'s study was that university students have unhealthy eating practices [19], while a study by Cousineau, Goldstein, and Franko agreed with the present results, finding that only 7.3% of students ate five or more servings of fruits and vegetables daily [20]. The present results are also similar to those of a study by Lee and Loke, wherein it was reported that fewer than half of university students ate fruits and vegetables

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daily [21]. Further, Gunes, Bekiroglu, Imeryuz, and Agirbasli found that fewer than half of their participants ate the daily recommended amount of fruits and vegetables [22], and a study in Saudi Arabia showed that most university students have irregular meals, with two main meals daily, while the majority eat sweets and chocolate six times per week [12].

The WHO defines physical activity as any bodily movement produced by the skeletal muscles that require energy expenditure [23]. The results of the present study indicate that the participants are physically inactive: more than one-third do not practice any physical exercise; more than half exercise only once weekly, and most are not members of any sports club or gym and perform only light physical activity for 10-30 minutes weekly. This result is in line with other studies; Al-Naggar, Bobryshev, and Mohd Noor reported that more than half of their participants were physically inactive [24], and in their Lebanese study, Musharrafieh et al. stated that only 26.4% of university students engaged in physical exercise [25]. Goje, Salmiah, Ariffin, and Jusoff presented similar results regarding physical inactivity [26]. Deliens, Deforche, De Bourdeaudhuij, and Clarys supported this result, finding that the pattern of physical activity among novice and senior students showed that both groups were physically inactive [27]. The prevalence of physical inactivity found in the present study is also consistent with other studies carried out with similar populations [28-30].

On the contrary, the findings of Qidwai, Ishaque, Shah, and Rahim indicated that more than half of the participants (52.1%) exercised regularly [31]; likewise, Staten, Miller, Noland, and Rayens reported that 39% and 41% of university students perform vigorous and moderate physical exercise, respectively [32]. In addition, Chan Sun and Azmutally reported that the majority of their sample engaged in 30 minutes of moderate physical activity five or more days weekly [33], which is similar to the results reported by Eyler [34] and Barnes and Schoenborn [35].

5. Conclusions

Based on the findings of the present study, it can be concluded that a high percentage of nursing students are either overweight or obese, most students have poor dietary habits, and the majority of students are physically inactive. Thus, the following recommendations can be made.

Educational programs focused on dietary improvement and physical activity promotion for university students should be adopted.

Strategies are needed to inculcate healthy eating habits in university students.

Frequent campaigns and educational seminars are encouraged to emphasize the benefits of healthy eating patterns and the importance of physical activity.

Research is needed to assess university students' knowledge and attitudes about a healthy diet and the importance of physical exercise.

Health education is a lifelong process, and colleges of nursing are in an ideal position to develop and implement health promotion programs.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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Suggestions:
1. Kindly take care of alignments
2. Table descriptions should be under the table
3. Some places it has mentioned as 'Samples', in some places 'Participants' and some places 'Respondent'. Kindly use same as everywhere.
4. For multiple responses mention 'N' next to the question
5. Kindly take care of grammar in sentences
6. Some data are mismatching, kindly check it
7. Check all the comments given then and there in the manuscript and incorporate

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