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 in Riyadh, Saudi Arabia, 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*

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1. Introduction

- The World Health Organization (WHO) has identified obesity as a global health problem in which almost 1.5 billion adults were overweight in 2008, and an additional 200 million men and 300 million women were obese (1). Young adults are at risk of developing obesity, especially when transitioning into university life as they become responsible for their daily eating and lifestyles. (2)
- The years spent at the university represent a critical period that can influence both the quality of lifestyle and eating habits following long-term impact. Unhealthy eating habits, insufficient physical activity, both affect the current health of teenagers and endanger their health as the adults of the future (3). During the university years, while the rate of sufficient and regular nutrition, exercise, and the number of dental and medical examinations decreases, the rate of eating fast food, and drug abuse increase. (4)
- 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. Having healthy dietary habits, undertaking sufficient physical activity, and tackling overweight and obesity are fundamental aspects of the prophylactic ways of ensuring health (5).
- Western dietary habits, coupled with a sedentary lifestyle, are potential contributors to the prevalence and rapid increase in the incidence of obesity in Saudi Arabia (6). The prevalence of physical activity among adolescents in Saudi Arabia ranged from 4% to 44.5%. Fast foods consumption, skipping breakfast, and low fruit and vegetable consumption were the most reported unhealthy dietary habits (7).
- Few studies have reported valid comprehensive data on lifestyle habits of Saudi college females. Unhealthy lifestyle habit appears prevalent among Saudi college females. Efforts toward promoting physical activity, decreasing sedentary behavior, and insufficient sleep and improving dietary habits in Saudi females are needed to reduce future risks of non-communicable diseases and maintain high quality of life (8)
- 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, 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 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 (9).

- 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 quantitative 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. Participants
- 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 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.
- 2.6 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 participants' bio- and sociodemographic characteristics.

• Characteristics	• Participants (N = 104)	
	• Frequency	• Percentage
• Age (years) • < 20 • ≥ 20	• • 22 • 82	• • 21.2 • 78.8
• 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 • Inadequate • Adequate plus savings	• • 70 • 19 • 15	• • 67.3 • 18.3 • 14.4
• Presence of disease • Diabetes • Anemia	• • 1 • 22	• • 1.0 • 21.2
• Self-assessment of present health status • Excellent • Good • Average • Poor	• • 17 • 59 • 24 • 4	• • 16.3 • 56.7 • 23.1 • 3.8

- Table 1: Participants' Bio- and Sociodemographic Characteristics
- 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.

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

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- Table 2: Participants' Nutritional Patterns
- # Multiple response data (N 104)
- 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.

Daily Food Group Intake	Participants (N = 104)	
	Frequency	Percentage
Vegetables		
Once	67	64.4
Twice	26	25.0
Thrice	11	10.6
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 3: Food Groups Represented in Participants' Daily Diets
- 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.

Daily Fluid Intake	Participants (N = 104)	
	Frequency	Percentage
#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	

- Table 4: Participants' Daily Fluid Consumption
- # Multiple response data (N 104).
- 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 others (36.5%).

Type of Dessert	Participants (N =104)	
	Frequency	Percentage
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 • 1–4 • 5–9 • 10–14 • > 15	• • 1 • 85 • 12 • 4 • 2	• • 1.0 • 81.7 • 11.5 • 3.8 • 1.9
• Candy • None • 1–4 • 5–9 • 10–14 • > 15	• • 7 • 82 • 10 • 1 • 4	• • 6.7 • 78.8 • 9.6 • 1.0 • 3.8
• Cake and cookies • None • 1–4 • 5–9 • 10–14 • > 15	• • 7 • 77 • 9 • 9 • 2	• • 6.7 • 74.0 • 8.7 • 8.7 • 1.9
• Ice cream • None • 1–4 • 5–9 • 10–14 • > 15	• • 7 • 86 • 3 • 6 • 2	• • 6.7 • 82.7 • 2.9 • 5.8 • 1.9
• Person who advised to change eating patterns • Physician • Nurse • Family member • Friend, colleague	• • 44 • 17 • 63 • 45 • 38	• • 42.3 • 16.3 • 60.6 • 43.3 • 36.5

- Table 5: Participants' Weekly Dessert Consumption and Person Who Gave Advice to Change Eating Patterns
- # Multiple response data (N 104)
- Table 6 presents participants' 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.

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

- Table 6: Participants' Perceived Weight, Physical Activity Level, and Persons Who Gave the Advice to Increase Physical Activity
- # Multiple response data (N 104)
- 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 participants (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

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and European countries [7]. The present study indicated that more than one-third of the participants were overweight and obese, while only half had normal body weight. Syed N 2020 findings which showed relatively high prevalence of overweight and obesity among the participants were consistent with the present results [6]. The results of a study conducted in the United Arab Emirates were also consistent, with a 35.7% prevalence of obesity among university students [10]. In addition, Al-Rethaiaa A et al 2010 stated that 21.8% of college students in Saudi Arabia were overweight and 15.7% were obese [11]; in Turkey; Ikisik H 2021, stated that the mean body mass index values of both genders were higher compared to the results of similar studies conducted in our country and in the world [4,12,13]. However, Kabir, S et al 2014 reported contradictory findings, indicating that the prevalence of obesity among postgraduate students in a private university was less than tenth of the population [14].

- 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 of 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. The current study demonstrates high prevalence of Kuwaiti students that reported unhealthy dietary habits such as: high fast food intake, meal skipping, and low fruits and vegetables consumption. Alsejari M 2019 agreed the result of the present study and found that; many of the Kuwaiti university students daily consumed chocolate, brownies and cakes as sugary snacks and high proportion of them consumed daily potato chips and ice cream [15].
- This result is similar to findings of Sayed N et al 2020 who proved that; body mass index was associated with students' dietary habits related to consuming food, snacks, and drinking soft beverages while watching television playing video games, communicating through online social media on mobile phones or computers [6]; it also supports. Alzamil H et al 2019 agreed with the present study and found that; high proportion of the participants consumed breakfast or vegetables 5 days per week, whereas the corresponding proportions for fresh fruit were low adding; proportions of college females who consumed less healthy foods for 3 and more times per day every week were ranging from 21.1% for French fries to 60.4% for chocolates and or candy [8]. The main finding of Hassan et al.'s study was that university students have unhealthy eating practices [16], Further, Gunes F et al, found that fewer than half of their participants ate the daily recommended amount of fruits and vegetables [17], these findings also were consistent agreed and supported with previous research results on college students from different countries [2,18-22].
- On the other hand, Rehman S et al 2021 contradicting this result and reported; study showed that the majority of students have a balanced diet [4].
- 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 R et al 2013 reported that more than half of their participants were physically inactive [24], and in their Lebanese study, Musharrafieh et al. stated that only about fourth of university students engaged in physical exercise [25]. Goje et al 2014 presented similar results regarding physical inactivity [26]. Deliens, T et al 2015 supported this result, finding stated that the pattern of physical activity among novice and senior students showed that both groups were physically inactive [27], in addition Alzamil H 2019 reported that most of these female students were physically inactive and had high sedentary behavior [8] and Jayed A et al 2021 added; less physical activity and low eating fitness were factors related with overweight among youthful grown-ups' university students [21].
- . Nearly half of the college females were physically inactive, had high sedentary life. The prevalence of physical inactivity found in the present study is also consistent with other studies carried out with similar populations proved that the majority of college students have unhealthy lifestyle habits including low levels of physical activity [20,28- 33].
- On the contrary, the findings of Qidwai W et al 2010 indicated that more than half of the participants perform exercise regularly [34]; likewise Chan S et al 2013 who reported that the majority of their participants engaged in 30 minutes of moderate physical activity five or more days weekly [35], which is similar to the results reported by Almeida F et al 2022 reported that about two third of the students exercise one to three days per a week [36].

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.

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- 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 used 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 the personal efforts of the authors.

- **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.

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