



Food Consumption Pattern among Canteen and Home Cooked Food Users in Relation to Obesity Risk Among Saudi Students in Qassim Region

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Abstract

Many nutritional standards and behaviors are created in the college environment, which may have long-term consequences for the individual. Because of the significant amount of time teenagers spend at college on a typical weekday, it has been estimated that one-third of their food and drink is eaten at college canteens. The current research investigation employed a questionnaire to evaluate the eating behaviors of male and female college participants. There were 206 participants in the study, which consisted of with approximately the same proportion of men (52.9%) and women (47.1%). The participants' average age was 22.6 years, with men being a little older than women on average. The majority of participants resided at home and had bachelor's degrees. Males had greater mean heights and weights, according to anthropometric measures, which led to slightly higher mean Body Mass Index (BMI). The prevalence of underweight individuals was higher among females, while overweight and obesity were more common in males. The majority of participants never bought food from the college canteen and usually ate meals at home. Breakfast consumption varied, with a significant proportion skipping breakfast on schooldays. Differences between genders were observed in the consumption of specific food items and exercise frequency, but no significant correlations were found between incidence of obesity and food consumption patterns. The study highlights the need for dietary interventions based on large scale research studies to address the concerning levels of obesity among college students and improve their overall health and well-being.



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Introduction

The college environment serves as a crucial arena where numerous dietary norms and habits are established, potentially impacting individuals throughout their future lives.¹ The educational period is crucial for establishing a healthy lifestyle, which includes eating a balanced diet and engaging in enough exercise. As a consequence, university students' eating patterns become more important. In college, young adults first experience independent living and take on more responsibility for their risk-taking and health-related activities.² Given that adolescents spend a considerable amount of time at school on an average weekday, it has been estimated that approximately one third of their food and beverage consumption occurs within the college environment.^{3,4}

Several studies have indicated that, for most students, convenience outweighs nutritional concerns.^{5,6,7} University students' eating habits fluctuate² and are impacted by their own notions, which highlights the need of developing positive perspectives toward leading healthier lifestyles.⁸ Food and drinks readily accessible in and around colleges can shape adolescents' eating behaviors, which tend to persist over time. The influence of food outlets in proximity to colleges, known to promote access to unhealthy food and beverages, can have long-term consequences on consumption patterns.⁹ Obesogenic settings, which encourage high-calorie intake and sedentary behavior in teenagers, are believed to be major contributing factors to the rapid increase in overweight and obesity among adolescents.¹⁰ Fast food consumption is recognized as one of the significant determinants of the rising obesity rates,¹¹ as it exhibits strong positive associations with weight gain. Moreover, it has been reported that college-going adolescents consume fast food both occasionally and regularly, which may contribute to an increased risk of obesity and related health complications, leading to elevated healthcare costs.¹²

Over the past few decades, out-of-home eating has witnessed a significant increase and has assumed a prominent role in dietary habits.^{13,14} Several studies have shown that dining out is linked to greater calorie consumption because of characteristics like higher energy density or bigger serving sizes.¹⁵⁻²⁰ Food

preferences are influenced by psychosocial and environmental variables, and consumers frequently lack access to nutritional information that would allow them to make well-informed choices.²¹ Out-of-home dining provides extra nutritional issues compared to eating at home or self-catering, such as reduced intake of micronutrients, notably vitamin C, calcium, and iron. According to other research, eating meals made away from home more frequently is linked to lower intakes of nutrient-dense foods such fruits, vegetables, dietary fiber, and vitamin C as well as greater intakes of fats and oils, higher body weights, and higher body mass index (BMI).^{22,23}

University canteens are a significant contribution to out-of-home dining since many students leave their family environment when they join university and migrate to university towns.^{9,21} More than two thirds of students at university campuses are said to eat meals that are cooked away from home.⁹ College canteens can increase nutritional risks, but they can also be a key location for promoting good nutrition and overall well-being.²⁴ Adolescent eating behavior is a complex subject that often involves the interplay of various influences and factors, such as peer influence and the need for socializing while eating, which frequently leads to detrimental eating behaviors. Additionally, it is common for young teenagers to receive pocket money, and this increasing autonomy, facilitated by pocket money, can disrupt the food habits established at home. Given that the school food environment significantly influences food choices, further research is necessary to gain a better understanding of teenage consumption behavior. Specifically, understanding the transition of students away from home-packed lunches and canteen meals towards the appeal of off-campus retail food is crucial for effectively promoting healthier food choices.⁹

Hence, the present study aims to enhance our understanding of the food consumption patterns among college-going youth in the Qassim region by employing quantitative data in conjunction with qualitative interviews. The investigation focuses on examining the behavior and demographic characteristics of students categorized as regular and infrequent users of college cafeterias, as well as those who never or seldom utilize the canteen.

Study Design

A cross-sectional study was conducted among students at Qassim University, Saudi Arabia, between January and February 2023. Ethical approval was obtained from the Committee of Research Ethics, Institutional Review Board, Qassim university, Saudi Arabia (Approval No. 22-16-06 dated 14.12.2022).

The data collection involved using a self-reported online questionnaire adopted from a previous study⁹ and anthropometric measurements. The questionnaire was designed to gather information on anthropometric parameters and eating habits among college students of Saudi Arabian ethnicity. The study included college students studying at pre-university (PYP), undergraduate, and post-graduate levels in Qassim University. This cross-sectional research utilized an online survey to collect data. The sample size was determined using the finite population adjustment formula, given by $n = (N * Z^2 * p * q) / ((N-1) * e^2 + Z^2 * p * q)$, with a 95% confidence level. The finite population in this case was 300 individuals. The formula took into

account various factors, including the population size (N), the desired confidence level expressed as a Z-score, the estimated proportion (p) of a specific characteristic or outcome in the population, and the desired margin of error (e). After conducting the calculation, a proposed sample size of 210 students was determined, considering an anticipated attrition rate of 10%. The recruitment of participants was conducted with the consent of the Deans of the Colleges of Qassim University, and the questionnaire link was shared through email and WhatsApp groups. The students received information about the study and given guidelines on how to complete the questionnaire honestly and completely before start. The research recruited a total of 206 students. BMI was determined using anthropometric data, such as height and weight, and represented as the ratio of body weight (kg) to square of height (m²), or kg/m². The National Institutes of Health (NIH) guidelines for underweight, normal weight, overweight, and obesity were used to classify each student's nutritional status. Obesity was further classified into three grades: Grade 1, Grade 2, and Grade 3 or morbid obesity.²⁵

Table 1: Demographic characteristics of study participants

Variable	Male	Female	Total
Number of students	109 (52.9%)	97 (47.1%)	206 (100%)
Age (Years)	23.0 ^a ± 5.38	22.2 ^a ± 5.16	22.6 ± 5.28
Height (kg)	171.4 ^a ± 6.36	158.6 ^b ± 5.09	165.4 ± 8.64
Weight (cm)	72.3 ^a ± 16.90	56.1 ^b ± 11.70	64.7 ± 16.72
BMI	24.6 ^a ± 5.54	22.3 ^a ± 4.43	23.5 ± 5.16
Underweight	13 ^a (11.9 %)	16 ^b (16.5 %)	29 (14.1 %)
Normal	50 ^a (45.9 %)	59 ^b (60.8 %)	109 (52.9 %)
Overweight	26 ^a (23.9 %)	14 ^b (14.4 %)	40 (19.4 %)
Obese Grade 1	16 ^a (14.7 %)	6 ^b (6.2 %)	22 (10.7 %)
Obese Grade 2	3 ^a (2.8 %)	2 ^b (2.1 %)	5 (2.4 %)
Obese Grade 3	1 ^a (0.9 %)	0 ^a (0%)	1 (0.5 %)
Education Level	PYP = 17 ^a (15.6%)	PYP = 15 ^a (15.5%)	PYP = 32 (15.5%)
	Bachelor = 87 ^a (79.8%)	Bachelor = 77 ^b (79.4%)	Bachelor = 164 (79.6%)
	Master = 5 ^a (4.6%)	Master = 5 ^a (5.2%)	Master = 10 (4.9%)
Accommodation	Home = 96 ^a (88.1%)	Home = 87 ^b (89.7%)	Home = 183 (88.8%)
	Hostel = 6 ^a (5.5%)	Hostel = 1 ^b (1.0%)	Hostel = 7 (3.4%)
	Private = 7 ^a (6.4%)	Private = 9 ^a (9.3%)	Private = 16 (7.7%)

*PYP: Preparatory year program. **Values are Mean ± SD wherever applicable, #Different superscript letter in rows indicate statistical differences at p≤0.05.

Data Analysis

The study utilized an online survey method, and no personal identification information such as names, addresses, phone numbers, or email addresses was gathered. All the data collected during the study was solely intended for research purposes and handled with utmost confidentiality, ensuring the privacy of the participants. The Statistical Package for Social Sciences (SPSS) version 20 (IBM, USA) was used to analyze the data. The results of the analysis were presented as means \pm standard deviations. Since all the variables analyzed were non-parametric, Chi-square tests were conducted to test their significance. The reported P values were based on two-tailed tests. Statistical differences were deemed significant at a P value less than 0.05.

Results

Sample Demographics

Table 1 shows the demographic characteristics of the research participants. The sample population consisted of a total of 206 participants, with 109 (52.9%) males and 97 (47.1%) females. The mean age of the participants was 22.6 ± 5.28 years, with males having a slightly higher mean age of 23.0 ± 5.38 years compared to females with a mean age of 22.2 ± 5.16 years. Furthermore, the majority of participants held a bachelor's degree, with 79.8% of males, 79.4% of females, and a total of 79.6%. A smaller proportion had completed the Primary Year Programme (PYP) (15.6% of males, 15.5% of females, and 15.5% in total), and a minority held a master's degree (4.6% of males, 5.2% of females, and 4.9% in total). In terms of accommodation, the majority of participants resided at home, accounting for 88.1% of males, 89.7% of females, and 88.8% in the total sample. A smaller proportion stayed in hostels (5.5% of males, 1.0% of females, and 3.4% in total), while a small portion opted for private accommodations (6.4% of males, 9.3% of females, and 7.7% in total).

In terms of anthropometric measurements, males had a higher mean height (171.4 ± 6.36 cm) compared to females (158.6 ± 5.09 cm). Similarly, males had a higher mean weight (72.3 ± 16.90 kg) compared to females (56.1 ± 11.70 kg). Consequently, the mean BMI for males (24.6 ± 5.54) was slightly higher than that for females (22.3 ± 4.43). Analyzing the BMI categories, the prevalence of underweight individuals was 11.9% for males and 16.5% for

females, with an overall prevalence of 14.1% in the total sample. The majority of participants fell into the normal weight category, with 45.9% of males, 60.8% of females, and an overall prevalence of 52.9%. The prevalence of overweight individuals was 23.9% for males, 14.4% for females, and 19.4% in the total sample. Among the obese participants, 14.7% of males, 6.2% of females, and 10.7% in the total sample were classified as Obese Grade 1. The prevalence of Obese Grade 2 and Obese Grade 3 individuals was relatively lower, with 2.8% and 0.9% for males, 2.1% and 0% for females, and 2.4% and 0.5% in the total sample, respectively.

Dietary Habits of Sample Population

Responses of the participants to a dietary habits' questionnaire are presented in Table 2. The table includes various questions related to dietary habits, with response categories and the corresponding number and percentage of male and female respondents.

The first question in the table asks about the frequency of buying food from the canteen. The majority of respondents from both genders indicated that they never buy food from the canteen (39.4% of males and 36.1% of females). A smaller percentage reported buying food from the canteen on a regular basis, with the highest frequency being "1 day per week" (27.5% of males and 21.6% of females). The second question focuses on breakfast consumption during a normal school week. The responses indicate that the highest proportion of both male and female participants reported eating breakfast on all five school days (29.4% of males and 44.3% of females). However, a notable percentage of respondents (11.9% of males and 7.2% of females) stated that they never eat breakfast on schooldays.

Regarding breakfast consumption on weekends (Friday and Saturday), a significant proportion of both genders reported usually eating breakfast on weekends (43.1% of males and 63.9% of females). Conversely, a considerable percentage indicated either never eating breakfast on weekends (25.7% of males and 16.5% of females) or usually not eating breakfast on weekends (31.2% of males and 19.6% of females). The next set of questions asks about the locations where participants generally eat their meals. The majority of both male and female respondents reported eating breakfast, lunch, and

dinner at home. A small percentage mentioned eating in the canteen, while an even smaller proportion stated eating in restaurants or hotels.

The questionnaire also included questions about the participants' consumption patterns of certain food items. For example, when asked about avoiding refined sugar/sugary foods, the responses indicated notable gender differences in the consumption patterns of refined sugar and sugary foods. Among the participants, 53.2% of males reported occasionally avoiding these food items, while a higher percentage of 63.9% of females indicated the same behavior. These findings highlight a gender-related disparity, with a greater proportion of females demonstrating occasional avoidance of refined sugar/sugary foods compared to males. On the other hand, a greater percentage of males (46.8%) than females (36.1%) stated that they never try to avoid refined sugar/sugary foods. In terms of snack consumption, the responses indicated that the most common frequency for eating salty snacks was "1-2 times per week" for both males (33.9%) and females (35.1%). Similarly, for sugar-sweetened beverages and soft drinks, the most frequent response category was "occasionally" for both genders.

The table also includes questions about the consumption frequency of specific food items such as Arabic sweets, fried foods, fruits/salads, fresh fruits, fresh fruit juice, vegetables, milk, dairy products, red meat, chicken, fish, legumes/beans, whole grains/cereals/baked foods, fast foods, and traditional breakfast. The responses varied across the different food items and frequency categories, with no consistent pattern observed between males and females. Lastly, the questionnaire asked about the participants' exercise frequency. The responses indicate that the majority of both genders reported exercising occasionally (36.7% of males and 37.1% of females) or 1-2 times per week (18.3% of males and 14.4% of females).

Furthermore, though the data on the dietary habits of the participants, including their food purchasing behaviors, meal consumption locations, and the frequency of consuming various food items revealed differences in some dietary patterns between males and females, no significant correlations were established between the incidence of obesity and different patterns associated with the consumption of food at home or at canteen.

Table 2: Participants response for dietary habits questionnaire

Question	Response Category	Male	Female
How often do you buy food from canteen?	A. 1 day per week	30 (27.5%)	21 (21.6%)
	B. 2 days per week	14 (12.8%)	14 (14.4%)
	C. 3 days per week	13 (11.9%)	16 (16.5%)
	D. 4 days per week	3 (2.8%)	4 (4.1%)
	E. Everyday	6 (5.5%)	7 (7.2%)
	F. Never	43 (39.4%)	35 (36.1%)
In a normal school week from Sunday to Thursday, how many days do you eat breakfast?	A. 1 day	13 (11.9%)	7 (7.2%)
	B. 2 days	24 (22.0%)	14 (14.4%)
	C. 3 days	20 (18.3%)	10 (10.3%)
	D. 4 days	5 (4.6%)	11 (11.3%)
	E. 5 days	32 (29.4%)	43 (44.3%)
	F. I never eat breakfast on schooldays	15 (11.9%)	12 (7.2%)
How often do you eat breakfast on weekends? (Friday and Saturday)	A. I never eat breakfast on weekends	28 (25.7%)	16 (16.5%)
	B. I usually don't eat breakfast on weekends	34 (31.2%)	19 (19.6%)
	C. I usually eat breakfast on weekends	47 (43.1%)	62 (63.9%)
Where do you generally eat your breakfast?	A. At home	75 (68.8%)	82 (84.5%)
	B. In canteen	14 (12.8%)	12 (12.4%)

	C. Restaurant/hotel	20 (18.3%)	3 (3.1%)
Where do you generally eat your lunch?	A. At home	81 (74.3%)	84 (86.6%)
	B. In canteen	9 (8.3%)	7 (7.2%)
	C. Restaurant/hotel	19 (17.4%)	6 (6.2%)
Where do you generally eat your dinner?	A. At home	74 (67.9%)	75 (77.3%)
	B. In canteen	7 (6.4%)	3 (3.1%)
	C. Restaurant/hotel	28 (25.7%)	19 (19.6%)
Do you try to avoid refined sugar/sugary foods?	A. Never	51 (46.8%)	35 (36.1%)
	B. Occasionally	58 (53.2%)	62 (63.9%)
How often do you usually eat salty snacks? (e.g. potato chips, popcorn and similar)	A. 1-2 times per week	37 (33.9%)	34 (35.1%)
	B. 3-4 times per week	18 (16.5%)	14 (14.4%)
	C. Daily	15 (13.8%)	13 (13.4%)
	D. Never	16 (14.7%)	6 (6.2%)
	E. Occasionally	23 (21.1%)	30 (30.9%)
How often you drink sugar-sweetened beverages?	A. 1-2 times per week	29 (26.6%)	21 (21.7%)
	B. 3-4 times per week	16 (14.7%)	15 (15.5%)
	C. Daily	14 (12.8%)	11 (11.3%)
	D. Never	16 (14.7%)	12 (12.4%)
	E. Occasionally	34 (31.2%)	38 (39.2%)
How often you drink soft drinks?	A. 1-2 times per week	24 (22.0%)	22 (22.7%)
	B. 3-4 times per week	27 (24.8%)	10 (10.3%)
	C. Daily	13 (11.9%)	6 (6.2%)
	D. Never	15 (13.8%)	19 (19.6%)
	E. Occasionally	30 (27.5%)	40 (41.2%)
How often you eat Arabic sweets (namoura, konafah, halewet, etc.)?	A. 1-2 times per week	30 (27.5%)	15 (15.5%)
	B. 3-4 times per week	14 (12.8%)	5 (5.2%)
	C. Daily	4 (3.7%)	3 (3.1%)
	D. Never	17 (15.6%)	20 (20.6%)
	E. Occasionally	44 (40.4%)	54 (55.7%)
How often you eat fried foods?	A. 1-2 times per week	36 (33.0%)	30 (30.9%)
	B. 3-4 times per week	20 (18.3%)	11 (11.3%)
	C. Daily	10 (9.2%)	5 (5.2%)
	D. Never	10 (9.2%)	13 (13.4%)
	E. Occasionally	33 (30.3%)	38 (39.2%)
How often you eat fruits/salads?	A. 1-2 times per week	39 (35.8%)	33 (34.0%)
	B. 3-4 times per week	16 (14.7%)	19 (19.6%)
	C. Daily	9 (8.3%)	5 (5.2%)
	D. Never	8 (7.3%)	12 (12.4%)
	E. Occasionally	37 (33.9%)	28 (28.9%)
How often you eat fresh fruits?	A. 1-2 times per week	33 (30.3%)	30 (30.9%)

	B. 3-4 times per week	11 (10.1%)	10 (10.3%)
	C. Daily	10 (9.2%)	7 (7.2%)
	D. Never	12 (11.0%)	13 (13.4%)
	E. Occasionally	43 (39.4%)	37 (38.1%)
How often you drink fresh fruit Juice?	A. 1-2 times per week	29 (26.6%)	28 (28.9%)
	B. 3-4 times per week	12 (11.0%)	6 (6.2%)
	C. Daily	3 (2.8%)	3 (3.1%)
	D. Never	17 (15.6%)	17 (17.5%)
	E. Occasionally	48 (44.0%)	43 (44.3%)
How often you eat fresh vegetables?	A. 1-2 times per week	28 (25.7%)	27 (27.8%)
	B. 3-4 times per week	15 (13.8%)	21 (21.6%)
	C. Daily	10 (9.2%)	4 (4.1%)
	D. Never	20 (18.3%)	12 (12.4%)
	E. Occasionally	36 (33.0%)	33 (34.0%)
How often you eat cooked vegetables?	A. 1-2 times per week	31 (28.4%)	25 (25.8%)
	B. 3-4 times per week	17 (15.6%)	15 (15.5%)
	C. Daily	11 (10.1%)	10 (10.3%)
	D. Never	18 (16.5%)	11 (11.3%)
	E. Occasionally	32 (29.4%)	36 (37.1%)
How often you consume milk?	A. 1-2 times per week	22 (20.2%)	19 (19.6%)
	B. 3-4 times per week	19 (17.4%)	13 (13.4%)
	C. Daily	10 (9.2%)	7 (7.2%)
	D. Never	20 (18.3%)	29 (29.9%)
	E. Occasionally	38 (34.9%)	29 (29.9%)
How often you eat dairy products (Cheese etc.)?	A. 1-2 times per week	25 (22.9%)	17 (17.5%)
	B. 3-4 times per week	24 (22.0%)	17 (17.5%)
	C. Daily	8 (7.3%)	10 (10.3%)
	D. Never	14 (12.8%)	18 (18.6%)
	E. Occasionally	38 (34.9%)	35 (36.1%)
How often you eat red meat?	A. 1-2 times per week	35 (32.1%)	22 (22.7%)
	B. 3-4 times per week	26 (23.9%)	6 (6.2%)
	C. Daily	6 (5.5%)	3 (3.1%)
	D. Never	12 (11.0%)	24 (24.7%)
	E. Occasionally	30 (27.5%)	42 (43.3%)
How often you eat chicken?	A. 1-2 times per week	9 (8.3%)	8 (8.2%)
	B. 3-4 times per week	35 (32.1%)	32 (33.0%)
	C. Daily	39 (35.8%)	23 (23.7%)
	D. Never	7 (6.4%)	7 (7.2%)
	E. Occasionally	19 (17.4%)	27 (27.8%)
How often you eat fish?	A. 1-2 times per week	10 (9.2%)	6 (6.2%)
	B. 3-4 times per week	3 (2.8%)	5 (5.2%)
	C. Never	37 (33.9%)	40 (41.2%)
	D. Occasionally	59 (54.1%)	46 (47.4%)

How often you eat legumes/beans?	A. 1-2 times per week	21 (19.3%)	10 (10.3%)
	B. 3-4 times per week	8 (7.3%)	7 (7.2%)
	C. Daily	5 (4.6%)	2 (2.1%)
	D. Never	20 (18.3%)	22 (22.7%)
	E. Occasionally	55 (50.5%)	56 (57.7%)
How often you eat whole grains/cereals/baked foods?	A. 1-2 times per week	18 (16.5%)	18 (18.6%)
	B. 3-4 times per week	19 (17.4%)	13 (13.4%)
	C. Daily	11 (10.1%)	15 (15.5%)
	D. Never	14 (12.8%)	18 (18.6%)
	E. Occasionally	47 (43.1%)	33 (34.0%)
How often do you usually eat fast foods (Burger, sandwich etc.)?	A. 1-2 times per week	39 (35.8%)	29 (29.9%)
	B. 3-4 times per week	29 (26.6%)	14 (14.4%)
	C. Daily	8 (7.3%)	6 (6.2%)
	D. Never	9 (8.3%)	4 (4.1%)
	E. Occasionally	24 (22.0%)	44 (45.4%)
How often do you usually eat traditional breakfast? (Arabic bread with lentils/shakshuka)	A. 1-2 times per week	29 (26.6%)	16 (16.5%)
	B. 3-4 times per week	21 (19.3%)	19 (19.6%)
	C. Daily	15 (13.8%)	14 (14.4%)
	D. Never	9 (8.3%)	13 (13.4%)
	E. Occasionally	35 (32.1%)	35 (36.1%)
How frequently do you exercise?	A. 1-2 times per week	20 (18.3%)	14 (14.4%)
	B. 3-4 times per week	10 (9.2%)	10 (10.3%)
	C. Daily	12 (11.0%)	11 (11.3%)
	D. Never	27 (24.8%)	26 (26.8%)
	E. Occasionally	40 (36.7%)	36 (37.1%)

*Pearson correlations were performed wherein R square values did not reach significance levels at 95% confidence levels.

Discussion

Obesity has become a major public health concern in Saudi Arabia, and its prevalence among college students is particularly alarming. Many studies have documented a high prevalence of obesity among this population. A study conducted by Al-Rethaiaa *et al.*,²⁶ found that the overall prevalence of obesity among college students in Saudi Arabia was 35.6%. Similarly, another study by Al-Qahtani²⁷ reported a prevalence of 31.2% among male college students and 42.8% among female college students. These findings highlight the significant burden of obesity among college students highlight the significant role dietary habits found to play in the risk of obesity. Several studies have explored the correlation between dietary habits and obesity risk among this population. A study conducted by Al-Hazaa,²⁸ found that a high consumption of fast food and sugary

beverages was associated with an increased risk of obesity among college students. Similarly, a study by Al-Rethaiaa *et al.*,²⁶ reported that unhealthy eating habits, such as skipping breakfast and consuming high-calorie snacks, were positively correlated with obesity among college students in Saudi Arabia.

The present study focused on examining the behavior and demographic characteristics of students categorized as regular and infrequent users of college cafeterias, as well as those who never or seldom utilize the canteen. These demographic characteristics provide valuable insights into the composition of the study participants, enabling a comprehensive understanding of the sample's distribution and representation. In our study the overall prevalence of overweight and obesity was found to be 33% which is consistent with previous

studies conducted among the Saudi population. In a cross-sectional study by Al-Rethaiaa *et al.*,²⁶ the prevalence of obesity among college students in Saudi Arabia was found to be 35.6%. The prevalence of obesity among adolescents in Qatar was examined in the Arab Teens Study conducted.²⁹ The study found a high prevalence of obesity among Qatari adolescents, with similar socio-cultural backgrounds to Saudi Arabia. Although this study was conducted in Qatar, it provides valuable insights into the regional context. This suggests a shared risk factor profile, including sedentary behaviors and unhealthy dietary habits, among adolescents in the Gulf region.²⁹

The present study aimed to assess the dietary habits of male and female participants based on their responses to a dietary habits' questionnaire. The findings revealed some interesting patterns and similarities with previous studies conducted among the Saudi population. In terms of food purchasing habits, the majority of both male and female participants reported never buying food from the canteen. This finding aligns with a study by Al-Rethaiaa *et al.*,²⁶ which found that Saudi adolescents tend to avoid purchasing food from school canteens due to concerns about the quality and healthiness of the available options. However, it is worth noting that a considerable proportion of participants reported purchasing food from the canteen on a daily basis, indicating a reliance on these facilities for their meals. Regarding breakfast consumption during school days, the majority of participants reported eating breakfast daily, with a higher proportion of females than males adhering to this habit. This is consistent with findings from previous studies conducted in Saudi Arabia, such as Alghadir *et al.*,³⁰ who reported a higher prevalence of daily breakfast consumption among female Saudi college students. These findings highlight the importance of promoting regular breakfast consumption, particularly among males, as it has been associated with improved cognitive function and academic performance.

Interestingly, a substantial proportion of participants reported not eating breakfast on weekends, with a higher percentage among males. This finding is in line with a study conducted by Al-Hazzaa *et al.*,²⁸ among Saudi adolescents, which reported a decrease in breakfast consumption on weekends

compared to weekdays. The reasons behind this trend could be attributed to differences in routines, availability of time, or cultural factors that may influence breakfast habits during weekends.

The majority of both male and female participants reported consuming breakfast at home, indicating a preference for home-cooked meals. This finding is consistent with studies conducted among Saudi populations, such as Al-Hazzaa *et al.*,²⁸ and Al-Rethaiaa *et al.*,²⁶ which highlighted the role of family meals and home-cooked food in the Saudi culture. This preference for home-cooked meals may contribute to a healthier dietary pattern, as homemade meals are often associated with better nutrient quality and portion control.

When it comes to lunch and dinner consumption, a high proportion of participants reported eating these meals at home, irrespective of gender. This finding is consistent with studies conducted in Saudi Arabia, including Al-Hazzaa *et al.*,²⁸ and Musaiger *et al.*,²⁹ which reported a preference for home-cooked meals among Saudi individuals. This preference for home-cooked meals may be attributed to cultural norms, cost-effectiveness, and a perception of greater control over the quality and hygiene of the food consumed. Regarding specific food choices, a significant proportion of participants reported avoiding refined sugar/sugary foods, indicating a growing awareness of the potential health risks associated with excessive sugar consumption. This finding is consistent with a study by Almuraished *et al.*,³¹ which reported that Saudi adults were increasingly trying to limit their intake of sugary foods and beverages.

In terms of snack consumption, both males and females reported consuming salty snacks occasionally or 1-2 times per week, while a considerable proportion reported occasional consumption of sugar-sweetened beverages and soft drinks. These findings align with studies conducted in Saudi Arabia, such as Al-Hazzaa *et al.*,²⁹ and Al-Otaibi,³² which reported high consumption of unhealthy snacks and beverages among Saudi adolescents and adults. These results highlight the need for targeted interventions to promote healthier snack choices and reduce the intake of sugary and high-fat snacks and beverages.

In relation to exercise frequency, the majority of participants reported exercising occasionally or 1-2 times per week. This finding is consistent with studies conducted among Saudi populations, such as Al-Hazzaa *et al.*,²⁸ and Alghadir *et al.*,³⁰ which reported low levels of physical activity among Saudi adolescents and college students. These findings underscore the importance of promoting regular physical activity among Saudi individuals, as it has numerous health benefits and can contribute to the prevention of chronic diseases.

Most interestingly, though a great diversity was observed in the dietary habits of the participants, including their food purchasing behaviors, meal consumption locations, and the frequency of consuming various food items revealed differences in some dietary patterns between males and females, no significant correlations were established between the incidence of obesity and different patterns associated with the consumption of food at home or at canteen. This particular observation is consistent with the dietary habits of adolescents in Saudi Arabia as reported in other studies,^{26,28,30,31,32} wherein, unhealthy dietary habits, including a high consumption of fast food and sugary beverages, were prevalent among this age group associated with low levels of physical activity and high rates of sedentary behaviors, such as excessive screen time, among adolescents contributing to high prevalence of obesity. However, in our study no such observations were made though it was found that majority of respondents exercised occasionally and also, they consumed food both at home, canteen and restaurants. This shows that the food supplied at canteens and the respondents made informed choices at restaurants in order to practice good dietary habits.

Limitations of the Study

Despite the valuable insights gained from this study, it is important to acknowledge certain limitations that may have influenced the findings. First, the study relied on self-reported data, which introduces the potential for recall bias and social desirability bias. Participants may have provided inaccurate or exaggerated responses regarding their dietary habits, exercise frequency, and other variables. Secondly, the study had a relatively small sample size, which may limit the generalizability of the results to larger

populations. A larger and more diverse sample could provide a more comprehensive understanding of the demographic characteristics and dietary habits of the target population. Additionally, the study focused on a specific geographical region or institution, which restricts the applicability of the findings to other contexts. Further research conducted in different settings would be beneficial to capture a broader representation of demographic characteristics and dietary habits. Moreover, the cross-sectional nature of the study design limits our ability to establish causal relationships between variables. Longitudinal studies or experimental designs would provide more robust evidence on the associations between demographic characteristics, dietary habits, and health outcomes. Lastly, the study did not consider other potential confounding variables, such as socioeconomic status, cultural factors, or medical conditions, which could influence dietary habits and weight status. Considering these limitations, caution should be exercised when interpreting the findings and generalizing them to larger populations.

Conclusion

In conclusion, the research findings shed light on the demographic characteristics and dietary habits of the study participants. The sample population consisted of both males and females, with variations observed in terms of age, education level, and accommodation choices. Anthropometric measurements indicated significant differences between males and females in terms of height, weight, and BMI. The prevalence of overweight individuals was higher among males, while the prevalence of underweight individuals was higher among females. The majority of participants fell into the normal weight category, with relatively low rates of obesity. Dietary habits, as revealed through the questionnaire responses, indicated variations in food purchasing behaviors, breakfast consumption patterns, meal locations, and the frequency of consuming specific food items. Notable gender differences were observed in the avoidance of refined sugar/sugary foods, with a higher proportion of females demonstrating occasional avoidance. Overall, these findings contribute to our understanding of the diverse dietary patterns and highlight the importance of promoting healthy eating behaviors. Future research can delve deeper into the underlying factors influencing these habits

and explore their implications for long-term health outcomes.

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Conflict of interest

The authors declare no conflicts of interest.

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