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Comparative Analysis of Dietary Fat Intake among Female University Students in Riyadh: A Cross-Sectional Assessment of Health Sciences versus Non-Health Sciences Disciplines

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Abstract

Background: In the global burden of non-communicable diseases, the top slot among them all is occupied by various cardiovascular diseases (CVD), which also claim primacy in mortality rates. Generally speaking, the pathophysiological pathway frequently involves either (or a combination of) elevated serum cholesterol levels, predominantly attributed to dietary patterns characterized by extremely high levels of saturated and trans-fat consumption. Day-to-day nutritional epidemiology among university students suggests that they represent a crucial demographic for the study of preventive interventions. **Objective:** This in-depth study and investigation were specifically aimed to quantitatively assess and compare prevailing patterns of dietary fat consumption between female students enrolled in health sciences and non-health sciences programs at major universities in Riyadh, Saudi Arabia. **Methodology:** This cross-sectional study was comprised of 434 Saudi female university students (age range: 18 - 25 years), utilizing a validated Block Dietary Fat Screener accompanied by anthropometric measurements and comprehensive demographic data collection. The sampling methodology consisted of a snowball technique that was spread across three major academic institutions in Riyadh. **Results:** Statistical analysis revealed a significant association between academic specialization and patterns of dietary fat consumption ($p = 0.012$). Paradoxically, students of health science exhibited a higher prevalence of very high fat intake (41.9%) compared with their non-health sciences counterparts

(27.6%). Surprisingly, anthropometric stratification revealed that it was the underweight students who demonstrated very high levels of fat consumption. A notable socioeconomic gradient was observed, with students from households earning 15,000 - 20,000 SR monthly showing the highest prevalence of very high-fat consumption (47.1%), although this association did not achieve statistical significance ($p = 0.104$). **Conclusion:** These findings challenge the conventional assumption that health sciences education correlates with superior dietary behaviors. The data suggests a critical need for enhanced education in nutrition, as well as intervention using various behavioral programs across all academic disciplines, particularly those addressing the disconnect between nutritional knowledge and dietary practices among students of health sciences. Future longitudinal studies are warranted in order to elucidate the temporal relationship between academic specialization and dietary behaviors.

Keywords

Cardiovascular Disease Risk Factors, Dietary Fat Consumption Patterns, Female University Students, Health Sciences Education, Nutritional Epidemiology, Saudi Arabia

1. Introduction

Cardiovascular diseases (CVD) have been classified by the World Health Organization (WHO) as the foremost causes of death among non-communicable diseases. In 2015, these diseases were responsible for 17.7 million fatalities worldwide, accounting for an astounding nearly 32% of all global deaths [1]. Projections indicate an alarming increase in the disease, up to 23.3 million fatalities by 2030 [2]. Aljefree and Ahmed's systematic research highlights a significant prevalence of CVD risk, especially among women in the Gulf countries [3]. Addressing widespread prevalent risk factors like physical inactivity, smoking, diabetes, poor dietary habits, obesity, high cholesterol, and hypertension can significantly reduce CVD occurrences [2].

In Saudi Arabia, 27% of women are overweight. Of these, 40.23% are obese, and 24.5% have hypercholesterolemia [4]. A survey in Jeddah, on the contrary, revealed a positive trend among students who were focused on maintaining standard body weight, following regular physical activities, and with an awareness of the dangers of cholesterol, blood pressure, blood sugar levels, and an eagerness to adopt a wholesome lifestyle [5]. Diet plays a crucial role, and excessive intake of saturated fat, trans fat, and cholesterol all lead to adverse effects on one's cardiovascular health [6]. The WHO recommends that total fat consumption should not exceed 30% of daily calorie intake, with saturated fat limited to 10% and trans fats to 1% [7] [8]. The substitution of saturated fatty acids and trans fatty acids with polyunsaturated fats is advised.

College, undeniably a crucial stage in one's life, almost always marks the formation

of a human being's lifestyle patterns, with students often ending up as the vulnerable segment exposed to developing unhealthy dietary habits because of rigorous academic demands [9]-[11]. Research indicates poor dietary patterns among college students, including high consumption of sugar-sweetened beverages, fast foods, fried foods, and insufficient intake of fruits, leafy greens, and vegetables [11]-[13]. Sedentary lifestyles, accompanied by prolonged computer usage and reduced physical activity, are prevalent [14]. Studies reveal a high prevalence and consumption of fast food among females, with Saudi women showing a higher rate of soft drink consumption than non-Saudi women [14]. Stress appears to be one of the factors that influence food choices, with females favoring sugary foods, leading to experiencing a loss of self-control and resorting to overeating more than males [15]. Contrary to expectations, it is surprising to note that medical and nutrition students do not consistently adopt healthier eating habits than the general populace [12] [16] [17].

University students are more likely to develop detrimental eating habits with potential long-term health impacts. It is generally the lifestyle habits of students that persist into adulthood during the university years [10]. In 1990, fat intake was within a healthy range at 24.6%, but there was a gradual 15.7% increase in fat consumption from 1900 to 1970 [18]. Numerous studies, including Yahia *et al.*, indicate a rising prevalence of fast food and consumption of high-fat items among university students, emphasizing the significance of this demographic group. Intake of foods with high levels of saturated fats has been linked to conditions like overweight, obesity, and non-communicable diseases such as CVDs [19]-[21]. Despite the American Heart Association's (AHA) recommendations to reduce the quantum of saturated fat in foods, a study involving 215 university students revealed that 95% did not comply, but persisted with a notably high content of total fats and saturated fat intake [22]. Another study reported that 47.1% of university students consumed fast food two or more times weekly [23].

Examining global fat consumption, a study conducted on Swedish female students concluded that energy contribution (E%) from fat intake showed a substantial increase beyond the acceptable range of 25 E% - 35 E%, reaching 37 E% [24]. In Albania, a cross-sectional study found notable variations in nutritional intake between home and out-of-home eating scenarios, revealing higher sugar, total fats, and protein intake at home [25]. Studies in the United Kingdom, the United States, Belgium, Sharjah, and Saudi Arabia highlighted diverse fat consumption patterns and associated factors among university students, underscoring the need for tailored interventions and close monitoring to promote healthy eating habits. However, these studies acknowledge limitations, such as the use of self-reported data and potential biases, emphasizing the importance of cautious interpretation [15] [26]-[28].

The current study seeks to investigate the levels of fat intake among female college students in Riyadh, focusing particularly on comparisons between health sciences and non-health sciences disciplines. It posits that students in health sciences

disciplines demonstrate lower fat consumption. In view of an apparent gap in the current literature, this research seeks to address it by emphasizing the importance of comprehending daily dietary practices among female students in Riyadh across various academic fields.

2. Methods and Materials

2.1. Research Design and Setting

This investigation was conducted as a cross-sectional study involving female university students in Riyadh.

2.2. Study Population

This research was conducted in Riyadh, specifically targeting female students aged between 18 and 25 years from the following three institutions: 1) Princess Nourah bint Abdulrahman University (PNU); 2) Imam Mohammad Ibn Saud Islamic University (IMSIU); and 3) King Saud bin Abdulaziz University for Health Sciences (KSAU-HS).

Healthy volunteers were recruited by social media platforms. We exclusively recruited female students from the three institutions in Riyadh, encompassing both health sciences and non-health sciences disciplines. The selected participants had an average age spanning from 18 to 25 years. Exclusion criteria included: having chronic conditions such as diabetes or any cardiovascular disease; individuals following specific dietary regimens; and expectant or lactating women.

2.3. Sampling Method

Participants were selected using the method of snowball sampling. An online survey was created using Google Forms to gather data from participants via multiple social media platforms, including WhatsApp, X, Telegram, and Snapchat. The research team validated and translated the questionnaire into Arabic beforehand. The translation process involved the following steps: 1) translation from English to Arabic, 2) review of the Arabic translation by a panel of readers, and 3) backward translation to ensure consistency between the original English version and the translated Arabic version.

2.4. Sample Size

The sample size for evaluating the dietary fat intake of students in Riyadh was calculated using the non-probability sampling equation:

$$\frac{Z^2 \times p \times (1-p)}{c^2} \tag{1}$$

This calculation was predicated upon a desired Confidence Level of 95%, an anticipated prevalence of 50%, and a Z score of 1.96. Ultimately, a sample comprising 385 units was selected, with each subgroup containing approximately 193 units.

2.5. Research Instrument

2.5.1. Demographic

Survey respondents were queried regarding their age, weight, height, field of expertise, and income.

2.5.2. Anthropometric Measurements

To determine the weight category, the Body Mass Index (BMI) was computed by dividing an individual's weight into kilograms by the square of their height in meters.

2.5.3. Food Frequency Questionnaire

The food frequency questionnaire (FFQ), sometimes known as the Block Dietary Fat Screener, was employed to assess the habitual fat consumption of the students [29]. The FFQ tool is a scientifically established questionnaire consisting of 17 components. It assesses the frequency of consumption of 41 regularly eaten high-fat foods, providing an indication of an individual's overall fat intake. The analysis tool employed prediction equations to create point estimates of total fat (grams), saturated fat (grams), percent of calories from fat, and cholesterol (grams) based on data acquired from the fat. The FFQ responses were collected and examined to categorize the participants based on the test criteria.

2.6. Statistical Analysis

Before proceeding with data processing and analysis, all collected data were consolidated into an Excel spreadsheet. Incomplete entries and data from participants who did not meet the specified criteria were excluded from further analysis. Descriptive statistics were then used to summarize demographic parameters and anthropometric data.

To investigate the relationships between specialization, BMI, income, and fat intake, the chi-square test was conducted using the Statistical Package for Social Sciences (SPSS) software. This statistical method was chosen for its suitability in examining associations among categorical variables in the dataset.

To investigate associations between academic specialization and dietary fat consumption patterns, chi-square tests of independence were performed. The significance level was set at $p < 0.05$. The relationships between BMI categories and fat consumption levels were similarly analyzed using chi-square tests.

To account for potential confounding variables, multivariate logistic regression analysis was performed. Adjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated, controlling for age, BMI, and socioeconomic status. The dependent variable was categorized as very high-fat intake versus other categories. Independent variables included academic specialization (health sciences vs. non-health sciences), age (continuous), BMI (categorical: underweight, normal weight, overweight, obese), and monthly household income (categorical: < 5000 SR, 5000 - 9999 SR, 10,000 - 14,999 SR, 15,000 - 19,999 SR, > 20,000 SR).

Pearson's correlation coefficient was used to examine the relationship between

age and fat intake. All statistical tests were two-sided, and p-values less than 0.05 were considered statistically significant. Results were presented with appropriate descriptive statistics, including frequencies, percentages, means with standard deviations, and adjusted odds ratios with 95% confidence intervals where applicable.

2.7. Ethical Consideration

The study was commenced following the obtention of ethical approval from the PNU IRB Committee number (22-1178). The Block Dietary Fat Screener was used to estimate fat consumption. Additionally, inquiries pertaining to age, gender, weight, height, area of expertise, and income were included. Emphasis is placed on upholding the dignity of individuals and safeguarding their privacy. The study's objectives and the participants' responsibilities must be clearly communicated to the voluntary participants. Prior to commencing the study, all participants were provided with consent documents that outlined the study's goals and would notify them of their right to decline participation in or withdraw from the study at any point in time during the study.

3. Results

The participants' overall characteristics are displayed in Table 1. A grand total of 434 individuals took part in the study, encompassing both health sciences students and those pursuing non-health sciences subjects. Health sciences majors obtain a higher income compared with non-health sciences majors. The average and variability of age and BMI among students in the field of health sciences were determined to be 19.7 ± 1.5. The average and variability of age and BMI among students who were not studying health sciences were 20.3 ± 1.52 and 22.42 ± 5.3, respectively. Furthermore, a majority of the university students from PNU, in both groups, had a BMI that fell within the normal to overweight range (22 ± 5.3). This encompasses the bulk of the participants from both groups.

Table 1. Characteristics of the students.

Variables	Health Sciences Students (n = 217)		Non-Health Sciences Students (n = 217)		Total (n = 434)	
	n	%	n	%	n	%
Income						
Less than 5000	15	6.9	23	10.6	38	8.8
5000 - 9999	40	18.4	48	22.1	88	20.3
10,000 - 14,999	38	17.5	28	12.9	66	15.2
15,000 - 19,999	33	15.2	18	8.3	51	11.8
More than 20,000	47	21.7	36	16.6	83	19.1
Don't know	44	20.3	64	29.5	108	24.9
Universities						
KSU	39	18.0	70	32.3	109	25.1

Continued

PNU	149	68.7	89	41.0	238	54.8
IMSIU	20	9.2	58	26.7	78	18.0
KSAU-HS	9	4.1	-	-	9	2.1
			Mean ± SD			
Age	19.73 ± 1.50		20.32 ± 1.52		20.02 ± 1.54	
BMI	22.82 ± 5.30		22.42 ± 5.33		22.62 ± 5.31	

n: number of participants; BMI: Body Mass Index; Underweight = <18 (kg/m^2); Normal weight = 18.5 - 24.9 (kg/m^2); Overweight = 25 - 29.9 (kg/m^2); Obesity class 1 = 30 - 34.9 (kg/m^2); Obese class 2 = 35 - 39.9 (kg/m^2); Morbid obese = >40 (kg/m^2); KSU: King Saud University; PNU: Princess Nourah bint Abdulrahman University; IMSIU: Imam Mohammad Ibn Saud Islamic University; KSAU-HS: King Saud bin Abdulaziz University for Health Sciences.

Table 2 depicts the link between fat consumption and the selected expertise. The results indicate that a higher percentage of non-health sciences students consume a very low amount of fat compared with students of health sciences (7.4% vs 4.6%). In addition, the survey revealed that students of non-health sciences had the highest proportion of students who consumed fat at both average and high levels, with percentages of 21.7% and 43.3%, respectively. Regarding very high-fat consumption, students in health sciences have a higher intake (41.9%) compared with students in non-health sciences (27.6%). The chi-square test results reveal a statistically significant association ($\chi^2 = 10.8$, $p < 0.05$). It indicated that a higher percentage of non-health science students consume a very low amount of fat compared with health sciences students (7.4% vs 4.6%).

Table 2. Association of fat consumption level and speciality.

			Speciality				
			Health Science Students	Non-Health Science Students	Total	χ^2	*p*-value
Fat Consumption	**Very Low**	n	10	16	26	10.8	0.012
		% within Speciality	4.6	7.4	6		
	Average	n	33	47	80		
		% within Speciality	15.2	21.7	18.4		
	High	n	83	94	177		
		% within Speciality	38.2	43.3	40.8		
	Very High	n	91	60	151		
		% within Speciality	41.9	27.6	34.8		
	Total	n	217	217	434		
		% within Speciality	100	100	100		

n: number of participants.

Table 3 reveals that underweight students had the highest percentage of very high-fat consumption compared with students in other BMI categories, while obese students had the lowest percentage (40.5% and 14.3%, respectively). Interestingly, in the high-fat consumption category, obese students had the highest proportion, while underweight students had the lowest proportion (51.4% and 36.9%, respectively). Furthermore, obese students had the highest proportion of students in the average and very low-fat consumption categories (25.7% and 8.6%, respectively). The value of χ^2 is 11.162, and the value of p is 0.265.

Table 3. Association between BMI categories and fat consumption level.

BMI categories	Fat Consumption n (% within BMI category)					X^2	*p*-value
	Very low (%)	Average (%)	High (%)	Very high (%)	Total (%)		
Underweight	5 (6)	14 (16.7)	31 (36.9)	34 (40.5)	84 (100)	11.162	**0.265**
Normal Weight	17 (6.9)	46 (18.6)	98 (39.7)	86 (34.8)	247 (100)		
Overweight	1 (1.5)	11 (16.2)	30 (44.1)	26 (38.2)	68 (100)		
Obese	3 (8.6)	9 (25.7)	18 (51.4)	5 (14.3)	35 (100)		

BMI: Body Mass Index; Underweight = <18 (kg/m^2); Normal weight = 18.5 - 24.9 (kg/m^2); Overweight = 25 - 29.9 (kg/m^2); Obesity class 1 = 30 - 34.9 (kg/m^2); Obese class 2 = 35 - 39.9 (kg/m^2); Morbid obese = >40 (kg/m^2); KSU: King Saud University; PNU: Princess Nourah bint Abdulrahman University; IMSIU: Imam Mohammad Ibn Saud Islamic University; KSAU-HS: King Saud bin Abdulaziz University for Health Sciences.

Table 4. Association between monthly income categories and fat consumption levels.

Income categories (SR)	Fat Consumption Levels n (% within income)					X^2	*p*
	Very low (%)	Average (%)	High (%)	Very high (%)	Total (%)		
Less than 5000	3 (7.9)	12 (31.6)	14 (36.8)	9 (23.7)	38 (100)	22.14	0.104
5000 - 9999	6 (6.8)	23 (26.1)	30 (34.1)	29 (33)	88 (100)		
10,000 - 14,999	2 (3)	10 (15.2)	28 (42.4)	26 (39.4)	66 (100)		
15,000 - 19,999	1 (2)	7 (13.7)	19 (37.3)	24 (47.1)	51 (100)		
More than 20,000	4 (4.8)	9 (10.8)	39 (47)	31 (37.3)	83 (100)		
Don't know	10 (9.3)	19 (17.6)	47 (43.5)	32 (29.6)	108 (100)		

n: number of participants; SR: Saudi Riyal.

The results of a chi-square test examining the association between various income groups and fat consumption are displayed in Table 4. The data revealed that individuals with higher incomes exhibit higher levels of fat consumption in comparison with those with lower incomes (37.3% vs 23.7%). A considerable percentage (7.9%) of individuals in the lower-income group have markedly low levels of fat intake. Moreover, nearly half (47.1%) of those earning 15,000 - 19,999 had a very high-fat consumption level, a notably higher proportion than in other income

groups. However, there are no significant differences between fat consumption levels and income ($\chi^2 = 22.14$, $p = 0.104$).

The research report (see Table 5) demonstrates that there is a higher prevalence of high-fat consumption among adolescents and young people, particularly females, who belong to the younger generation. Moreover, there is a well-established correlation between excessive intake of saturated fat and the onset of several disorders, including CVDs19-21.

Table 5. The estimated community prevalence of fat consumption among the younger generation on a global platform.

Publication Year	Country	Authors	Population	Age Groups	Sample Size	Method	Results
2020	Swedish	Bergström, *et al.* [24]	Female Nutrition students	18 - 30	729	Self-reporting all food and drink intake.	Substantial change in fat intake (from 31.7 E% to 37.5 E%). *Energy contribution (E%).
2018	Albania	Llanaj, *et al.* [25]	University students	18 - 24	289	24-hour dietary recall using a single day Automated Multiple Pass Method (AMPM).	The average daily sugar and dietary fat intake for AH was 76.9 g and 173.7 g, respectively, compared with 33.7 g and 142.0 g for OH.
2018	United Kingdom	Vidal, *et al.* [27]	Undergraduate medical students	Mean age 19	523	Measured by the Block Screening Questionnaire for Fat Intake.	Higher levels of perceived stress were linked to increased fat intake, and this link was stronger in males than in females. Almost over (40%) of students reported consuming an excessive amount of fat.
2016	United States of America	Yahia *et al.* [10]	University students	Mean age of 20 year	231	Food Frequency Questionnaire (FFQ).	Consumption of fat and cholesterol was adversely correlated with nutrition knowledge, and nutrition scores were negatively correlated with consumption of saturated fat and cholesterol.
2018	Belgium	Deliens *et al.* [26]	University students	18 - 25	185	Self-reported online questionnaire.	In terms of fruit & vegetable and fat consumption, (90.3%) and (50.8%) of students, respectively, did not meet the recommendation.
2019	United Arab Emirates	Cheikh *et al.* [28]	University students	18 - 45	401	24-h dietary recall.	48% of students exceeded the recommended intake of total fat.
2020	Saudi Arabia	Mohamed *et al.* [15]	University students	18 - 29 year	400	Self-administered questionnaire (sociodemographic, FFQ, and Cohen's Perceived Stress Scale).	Women eat more fat (82.0%).

OH = Out of Home; AH = At Home; AMPM = Automated Multiple Pass Method; PR = Prevalence Ratios; UPC = Universidad Peruana de Ciencias Aplicadas; FFQ = Food Frequency Questionnaire.

The socioeconomic gradient observed in the initial analysis persisted after controlling for other variables. Students from households earning 15,000 - 19,999 SR

monthly showed the highest adjusted odds of very high fat intake (adjusted OR = 1.76, 95% CI: 1.15 - 2.69, $p = 0.009$). This relationship remained significant even after adjusting for potential confounders, suggesting an independent effect of household income on dietary fat consumption patterns.

Multivariate Analysis of Fat Consumption Patterns:

To further investigate the relationship between academic specialization and fat intake while accounting for potential confounding variables, we conducted a multivariate analysis adjusting for age, BMI, and socioeconomic status. This analysis included all 434 participants (217 health sciences and 217 non-health sciences students) (Table 6).

Table 6. Adjusted odds ratios for very high fat intake by income category.

Income Category (SR)	Adjusted OR (95% CI)	*p*-value
<5000 (reference)	1.00	-
5000 - 9999	1.42 (0.98 - 2.06)	0.064
10,000 - 14,999	1.65 (1.12 - 2.43)	0.011
15,000 - 19,999	1.76 (1.15 - 2.69)	0.009
20,000	1.58 (1.04 - 2.40)	0.032

OR: Odds Ratio; CI: Confidence Interval; Adjusted for age, BMI, and academic specialization.

After adjusting for these confounding variables, the association between specialization and fat intake remained statistically significant ($p < 0.05$). As shown in Figure 1, students of health sciences exhibited a notably higher prevalence of very high fat intake (41.9%) compared with non-health sciences students (27.6%), with an adjusted odds ratio (OR) of 1.89 (95% CI: 1.24 - 2.87). This indicates that health sciences students were nearly twice as likely to have very high fat intake even after controlling for other variables.

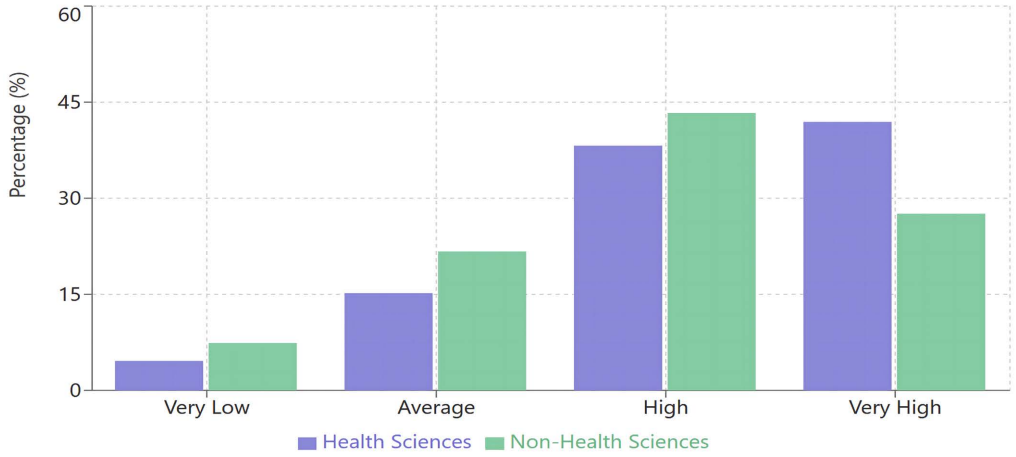

Figure 1. Fat intake distribution by academic specialization after adjustment for age, BMI, and socioeconomic status.

The age-adjusted analysis revealed a weak negative correlation with fat intake ($r = -0.12$, $p < 0.05$), suggesting that younger students tended to have a slightly higher fat intake. Consistent with our earlier findings, BMI showed no significant independent association with fat intake patterns after adjustment ($p = 0.265$).

The socioeconomic gradient observed in the initial analysis persisted after controlling for other variables. Students from households earning 15,000 - 19,999 SR monthly showed the highest adjusted odds of very high fat intake (adjusted OR = 1.76, 95% CI: 1.15 - 2.69, $p = 0.009$). This relationship remained significant even after adjusting for potential confounders, suggesting an independent effect of household income on dietary fat consumption patterns.

4. Discussion

The current investigation identified a substantial correlation between the field of specialization and the intake of dietary fat. Remarkably, students of health sciences showed the highest percentage of fat consumption. Therefore, the hypothesis was disproven. In a study conducted in Saudi Arabia, Ibrahim *et al.* discovered that 73.4% of medical students consumed foods that were high in fat [30]. Another study found that only 30.4% of medical students had a very high intake of dietary fat. The elevated levels of fat intake seen among health sciences students could perhaps be attributed to insufficient education in nutrition, time constraints, or perceived psychological strain.

Among medical students and physicians, a survey revealed that 70% of participants expressed dissatisfaction with the nature of the nutrition instructions provided [31]. A study conducted in Saudi Arabia discovered a correlation between elevated perceived stress levels and increased consumption of dietary fat [27]. Furthermore, some other research has indicated that females exhibit a higher susceptibility to stress compared with males [15] [32]. Majeed *et al.*, found that female medical students were unable to maintain a balanced diet due to time constraints [33]. These characteristics may correlate with an elevated level of fat consumption among students of health sciences.

Regarding students in non-health sciences, 43.3% had a high level of fat consumption. Cheikh *et al.* observed a roughly equivalent prevalence (42.4%) of excessive fat intake among female university students [28]. Furthermore, a survey conducted among a sample of female university students revealed that around 50% of the participants admitted to consuming fast food on a frequency of two or more occasions per week [23]. This could be attributed to a lack of nutritional literacy among students who are not studying health sciences.

Basing on our current understanding, this study is the first to discover that there is no substantial correlation between fat intake and BMI among university students ($p = 0.265$). Similarly, research conducted on older persons found no correlation between BMI and fat consumption [34]. In contrast, Abdel-Megeid *et al.* conducted a study that revealed a strong and positive association between

the consumption of fat and BMI [35]. The underlying cause for the observed correlation between fat consumption and BMI remains ambiguous and exhibits variability across different research. Moreover, there is a scarcity of research examining the correlation between fat consumption and BMI among university students.

The present investigation revealed that students belonging to the highest income bracket exhibited a greater incidence of extremely high fat intake in comparison with those in the lowest income bracket (37.3% vs. 23.7%, respectively). Nevertheless, this discovery did not yield statistically significant results. Similarly, a study carried out in Brazil revealed that individuals with higher incomes ingested greater quantities of saturated fat [36]. Nevertheless, a separate study carried out in Brazil yielded conflicting findings, indicating that individuals with lower income had a greater overall fat consumption. According to the authors, those with lower incomes may depend on government-provided food, which is frequently rich in fat, due to their restricted availability of healthy and economical food choices [37].

On the whole, the present study revealed that the majority of students had a significant intake of dietary fat. This can be attributed to a scarcity of nutrition and healthy lifestyle courses. Then there is the aspect of time constraints among university students; this sometimes results in the selection of convenient items from vending machines, which frequently have a high-fat content. Moreover, dietary patterns might be influenced by cultural or societal standards pertaining to food and eating habits.

The persistence of this relationship after controlling for confounders points to potential systemic factors within health sciences education that may inadvertently contribute to poor dietary choices. Several mechanisms might explain this paradox. First, the rigorous academic demands of health sciences programs may lead to stress-induced eating behaviors, as supported by previous research showing correlations between perceived stress levels and increased dietary fat consumption among medical students [27]. Second, the time-intensive nature of health sciences curricula might limit students' ability to prepare healthy meals, leading to greater reliance on convenient, often high-fat food options. This aligns with Majeed *et al.*'s findings that time constraints significantly impact medical students' ability to maintain healthy and balanced diets [33].

These findings have important implications for nutrition education in health sciences curricula. The observed patterns suggest potential inadequacies in current educational approaches for promoting optimal dietary behaviors. Integration of stress management strategies and practical dietary guidance may be necessary to address the multifaceted factors influencing food choices among students of health sciences, as supported by previous research [16] [17]. Hence, this study offers an assessment of the rate of fat intake among female university students in Riyadh and examines the impact of their academic disciplines on their fat consumption patterns. Furthermore, it can enhance consciousness and serve as a

foundation for forthcoming research to facilitate the establishment of suitable interventions by policymakers.

5. Conclusion

In conclusion, this study establishes a noteworthy correlation between the field of specialization and dietary fat consumption among female university students in Riyadh, Saudi Arabia. Contrary to expectations, students of health sciences—surprisingly—exhibited the highest fat intake, potentially attributed to factors like insufficient nutrition education, time constraints, and perceived stress. The study underscores the need for enhanced awareness, nutrition education programs, and improved access to healthier food options within the university campuses. It aligns with previous research indicating high-fat consumption among medical students and emphasizes the importance of addressing lifestyle factors influencing dietary choices. Despite limitations, such as a small sample size and reliance on self-reported data, the study provides valuable insights into patterns of fat intake. The observed prevalence of high-fat consumption among students of both health sciences and non-health sciences highlights a broader issue of inadequate nutrition and lifestyle education. Cultural and societal factors also contribute to dietary habits, emphasizing the need for comprehensive interventions. The study offers a unique contribution by comparing fat consumption between different academic disciplines and shedding light on potential influencing factors. It emphasizes the significance of future research, particularly among male students, and the exploration of factors like food cost, methods of preparation, and stress in understanding dietary choices. Policymakers can utilize these findings to implement focused programs that address the various factors that influence dietary patterns among university students. This will help promote healthier lifestyles and mitigate the risks associated with consuming excessive amounts of fat.

Data Availability Statement

The datasets generated and analyzed during this current research are available from the corresponding author upon request.

Ethics Statement

The document accurately and thoroughly presents the authors' original research and analysis.

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Authors' Contributions

The authors' responsibilities were as follows: TA designed the research and had primary responsibility for obtaining ethical approval. TA, AMA, HAD, LKA, HKA, and WKA conducted the research and performed the statistical analysis. TA, RA, and NA translated the questionnaire. TA, AMA, HAD, LKA, HKA, and WKA drafted the manuscript. TA, ATA, RA, and NA contributed to subsequent versions. TA was responsible for the final content of the manuscript, and all authors read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

AHA: American Heart Association; CVD: Cardiovascular Disease; IMSIU: Imam Mohammad Ibn Saud Islamic University; KSAU-HS: King Saud bin Abdulaziz University for Health Sciences; PNU: Princess Nourah bint Abdulrahman University.

Appendix

Consent Form for Research Participation

We are clinical nutrition students from Princess Nourah bint Abdulrahman University—College of Health and Rehabilitation Sciences, working on research entitled "Fat Consumption among Female University Students in Health Sciences and Non-Health Sciences in Riyadh, Kingdom of Saudi Arabia". The purpose of the study is to determine the extent of fat consumption among female students in Riyadh.

Your participation will be through filling out a questionnaire specific to the research. The questionnaire contains three sections: 1) General data; 2) Personal data; 3) A questionnaire to measure fat consumption. This is conducted by asking several questions that have been previously tested, and the questionnaire is considered reliable and trustworthy. There are no side effects from your participation in this research, and you have the right to participate or not participate in the study, and the identity of the participants will not be disclosed.

If you find it difficult to understand some points related to the research or the form, you can contact the research team via email to inquire about the study: ClinicalNutritionst@gmail.com.

This research has been approved by the Research Ethics Unit—Princess Nourah University under the supervision of Dr. Tarfa Albrahim—Associate Professor Clinical Nutrition Program—tialbrahim@pnu.edu.sa.

You may withdraw from participating in the research at any time without giving reasons, and there will be no penalties for withdrawal.

I agree to participate in this study:

o Yes

o No

1) General information

1. Gender:
    - o Male
    - o Female
2. Do you live in Riyadh?
    - o Yes
    - o No
3. Are you a current university student:
    - o Yes
    - o No
4. Do you suffer from chronic diseases?

- o Yes
- o No

5. Are you on a diet?
   - o No
   - o Yes (mention the type of diet below, such as for weight loss, diabetes, and high cholesterol)
   - o Other
6. Are you currently pregnant or breastfeeding?
   - o Yes
   - o No

2) Personal data

1. Age:
2. Height (cm):
3. Weight (kg):
4. Are you a student at one of the following universities:
   - o King Saud University
   - o Princess Nourah bint Abdulrahman University
   - o Imam Muhammad Islamic University
   - o King Saud bin Abdulaziz University for Health Sciences (Riyadh)
   - o Other
5. Specialization:
6. What category best describes your family's monthly income:
   - o Less than 5000 Saudi Riyals per month
   - o From 5000 to 9999 Saudi Riyals
   - o From 10,000 to 14,999 Saudi Riyals
   - o From 15,000 to 19,999 Saudi Riyals
   - o More than 20,000 thousand
   - o I don't know

3) Dietary Fat Screener©

NUTRITIONQUEST / BLOCK DIETARY DATA SYSTEMS
www.nutritionquest.com

Name : _____

Age: _____

Sex: ○ Male ○ Female

Think about your eating habits over the past year or so. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Mark one bubble for each food.

Meals and Snacks	(0) 1/ MONTH or less	(1) 2-3 times a MONTH	(2) 1-2 times a WEEK	(3) 3-4 times a WEEK	(4) 5+ times a WEEK	Score
Hamburgers, ground beef, meat burritos, tacos	○	○	○	○	○	_____
Beef or pork, such as steaks, roasts, ribs, or in sandwiches	○	○	○	○	○	_____
Fried chicken	○	○	○	○	○	_____
Hot dogs, or Polish or Italian sausage	○	○	○	○	○	_____
Cold cuts, lunch meats, ham (not low-fat)	○	○	○	○	○	_____
Bacon or breakfast sausage	○	○	○	○	○	_____
Salad dressings (not low-fat)	○	○	○	○	○	_____
Margarine, butter or mayo on bread or potatoes	○	○	○	○	○	_____
Margarine, butter or oil in cooking	○	○	○	○	○	_____
Eggs (not Egg Beaters or just egg whites)	○	○	○	○	○	_____
Pizza	○	○	○	○	○	_____
Cheese, cheese spread (not low-fat)	○	○	○	○	○	_____
Whole milk	○	○	○	○	○	_____
French fries, fried potatoes	○	○	○	○	○	_____
Corn chips, potato chips, popcorn, crackers	○	○	○	○	○	_____
Doughnuts, pastries, cake, cookies (not low-fat)	○	○	○	○	○	_____
Ice cream (not sherbet or non-fat)	○	○	○	○	○	_____
					Fat Score =	_____

Dietary Fat Screener©

How well are you doing?

How to score your answers

- Mark one bubble for each food.
- At the top of each column is a number. At the right side of the page, beside each food, write the number that appears at the top of the column you marked (see the example below).

EXAMPLE

Meals and Snacks	(0) 1/ MONTH or less	(1) 2-3 times a MONTH	(2) 1-2 times a WEEK	(3) 3-4 times a WEEK	(4) 5+ times a WEEK	Score
Hamburgers, ground beef, meat burritos, tacos	○	○	◉	○	○	2
Beef or pork, such as steaks, roasts, ribs, or in sandwiches	○	◉	○	○	○	1

Add up these numbers for all of your answers and refer to the scoring key below.

Scoring key:

If your score is:

0-7: Your fat intake is very low, probably less than 25% of calories. Congratulations!

8-14: Your fat intake is about like most Americans, probably between 30% and 35% of calories. Experts recommend that it be less than 30%. Try eating some of your high-scoring foods less often, and eat more fruits and vegetables.

15-22: Your diet is quite high in fat, probably higher than the U.S. average of 35% of calories. Look at the foods you scored highest on. You don't have to give up your favorites, just eat them less often or in smaller portions. Try lower-fat milk, low-fat salad dressing. And fill up on grains, fruits and vegetables!

23+: Your diet is very high in fat, probably 40-50% of calories! Look at the foods you scored highest on, and eat them less often. Switch to 2% milk, and low-fat lunch meats and salad dressing. Most of the food you eat should come from bread, rice, cereals, fruits and vegetables.