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Research Article

Gender Difference in Nutritional Knowledge, Dietary Pattern and Nutritional Status of Undergraduates in Al Hawash University, Syria

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Abstract

Introduction:

Limited nutritional knowledge during early life can contribute to unhealthy eating habits, increasing the risk of obesity and related non-communicable diseases later in life. This study investigated gender differences in nutritional knowledge, dietary patterns, and the prevalence of overweight/obesity among students at Hawash University, a private tertiary institution in Syria.

Materials and Methods:

A total of 129 students were selected from the university's six colleges. Data were collected using a semi-structured questionnaire covering personal and lifestyle characteristics, dietary habits, and physical activity levels. Body Mass Index (BMI) was calculated from weight and height measurements. Descriptive statistics and chi-square tests were used for data analysis, with significance set at $p < 0.05$.

Results:

The mean age of the participants was 20.89 ± 3.89 years. A majority (64%) received a monthly allowance of ≥500,000 Syrian pounds, while 79.9% and 78% had fathers and mothers, respectively, with university degrees. About 40.2% did not engage in physical exercise. Over two-thirds (69.2%) consumed fewer than three meals per day, and 59.8% skipped breakfast. Dietary diversity scores were average (71.0%) or high (20.6%) among participants. The mean BMI was 24.60 ± 3.70, with 63.6% having a BMI <25 and 36.4% classified as overweight/obese (BMI ≥25). Nutritional knowledge levels were low (10.7%), average (72.9%), or high (16.4%). No significant gender differences were observed in BMI, nutritional knowledge, or dietary diversity.

Conclusion:

The findings highlight insufficient nutritional knowledge, poor dietary habits, and a high prevalence of overweight/obesity among university students. There is a critical need for enhanced nutrition education and health promotion initiatives targeting this population.

Keywords: nutrition; nutritional knowledge; diets; bmi

Introduction

Adolescence and early adulthood represent a critical developmental stage for establishing health-promoting behaviors and preventing chronic diseases [1]. During this transitional period, young adults gain independence in making dietary and lifestyle choices that may lead to unhealthy eating patterns and physical inactivity. University students constitute a particularly vulnerable population where targeted health promotion programs could significantly reduce future risks of obesity, cardiovascular diseases, diabetes, hypertension, and other lifestyle-related conditions [1]. The lack of adequate nutritional knowledge frequently results in poor food selection, negatively impacting students' nutritional status and contributing to growing public health challenges of malnutrition and obesity in academic settings. Multiple interrelated factors influence these adverse health outcomes, including sedentary behaviors [2], insufficient nutrition education [3], excessive snacking [4], breakfast omission [5], higher personal disposable income [6], elevated parental socioeconomic standing [7], and biological sex differences [8]. This research investigation focuses on analyzing gender-based disparities in dietary diversity scores, nutrition-related knowledge, and anthropometric measurements among undergraduates at a private Syrian university in Homs. The study outcomes may provide critical evidence for developing tailored nutritional interventions and educational programs aimed at improving dietary practices and overall health status within university student populations.

Materials and methods

Study Design and Setting

This cross-sectional study was conducted among 129 undergraduate students at Al Hawash University in Syria. The university comprises five colleges: College of Medicine and Health Sciences, College of Law, College of Social and Management Sciences, College of Engineering, and College of Pharmacy, offering both undergraduate and postgraduate programs.

Study Population and Sampling

The sample size was determined using a 95% confidence interval (Z) with 0.05 precision, based on an estimated 50% prevalence of eating patterns, yielding a minimum required sample of 129 participants. This sample was proportionally allocated across the colleges: Medicine and Health Sciences (40), Law (6), Social and Management Sciences (10), Engineering (14), and Pharmacy (59). Participants were further distributed across departments and by gender within each college.

Data Collection Instruments and Procedures

Data were collected using a structured interviewer-administered questionnaire with five sections addressing: (1) socio-demographic characteristics (age, gender, parental education, monthly allowance), (2) lifestyle factors, (3) feeding patterns, (4) anthropometric measurements, and (5) nutrition knowledge and dietary diversity.

Anthropometric measurements followed standardized protocols:

- Weight was measured to the nearest 0.1 kg using a calibrated Harson bathroom scale (model H89 DK BLUE FA00333), with participants removing shoes and extraneous items, standing motionless in an upright position.

- Height was measured to the nearest 0.1 m using a stadiometer, with participants standing shoeless in full upright position.

- BMI was calculated as weight (kg)/height (m^2) and classified per WHO guidelines: <18.5 (underweight), 18.5-24.9 (normal), 25.0-29.9 (overweight), and ≥30 (obese).

Data Analysis

The collected data were analyzed to assess nutritional knowledge, dietary patterns, and weight status among participants, with particular attention to gender-based differences.

Dietary Diversity Assessment

Dietary diversity was evaluated using the Dietary Diversity Score (DDS), which quantifies the number of distinct food groups consumed within the previous 24 hours (FAO, 2007). Based on 24-hour dietary recall data, we categorized foods into nine groups: (1) starchy staples, (2) dark green leafy vegetables, (3) vitamin A-rich fruits/vegetables, (4) other fruits/vegetables, (5) organ meats, (6) meat/fish, (7) eggs, (8) legumes/nuts/seeds, and (9) dairy products. Scores were classified as: low (<3 food groups), medium (4-5 groups), or high (≥6 groups).

Nutrition Knowledge Evaluation

Nutrition knowledge was assessed through 15 domain-specific questions (1 point per correct answer). Total scores were categorized as: good (11-15), average (6-10), or low (0-5).

Data Analysis Methods

All data were processed using SPSS version 20. After data cleaning (identifying and addressing missing/incomplete entries), we performed descriptive analyses (frequencies/percentages for categorical variables) and chi-square tests to examine variable associations.

Ethical Considerations

The study protocol received approval from multiple ethics committees (Al Hawash, Tartous, and Homs Universities, plus affiliated hospitals). All participants provided written informed consent after receiving study details. Participation was voluntary, anonymous, and uncompensated. Data collection occurred during non-academic periods to avoid disruption. Strict confidentiality measures were maintained throughout.

Results:

Participant Characteristics

The cohort (n=129) had a mean age of 20.89±3.89 years, with 68.2% >20 years old. Gender differences emerged in maternal education (83.5% of males vs. 74.8% of females had university-educated mothers). Financially, 49.6% received ≥500,000 Syrian pounds monthly, while 36.0% received <500,000.

Lifestyle Patterns

Most participants abstained from alcohol (62.1%) and smoking (59.7%), but consumed soft drinks (76.7%). Physical activity levels were low, with only 17.3% exercising daily and 40.2% reporting no weekly exercise.

Key tables

(Tables 1-2) present detailed distributions of these characteristics. The results demonstrate notable variations in socioeconomic factors and health behaviors across the study population.

Charateristics	Male Freq (%)	Female Freq (%)	Total Freq (%)
Age (years)			
<20	11 (23.9)	50 (60.2)	61(47.2)
≥20	35 (76.1)	33 (39.8)	68 (52.8)
Monthly allowance			
<500,000.00 SP	25 (54.3)	40 (48.2)	65 (50.4)
≥500,000.00 SP	21 (45.7)	43 (51.8)	64 (49.6)
Father education			
Post-secondary or less	16 (34.7)	27 (32.5)	43 (33.3)
University degree	30 (65.3)	56 (67.5)	86 (66.7)
Mother education			
Post-secondary or less	13 (28.3)	34 (40.9)	47 (36.4)
University degree	33 (71.7)	49 (59.1)	82 (63.6)
Mean age (male)=21.20±2.06. Mean age (female)=20.71±1.78. Mean age (total)=20.89 ±3.89			

Table 1: Respondents' personal characteristics

Charateristics	Male Freq (%)	Female Freq (%)	Total Freq (%)
Taking alcohol			
Yes	18 (58.2)	31 (25.2)	49 (37.9)
No	28 (41.8)	52 (74.8)	80 (62.1)
Smoking			
Yes	24 (30.4)	28 (20.7)	52 (40.3)
No	22 (69.6)	55 (79.3)	77 (59.7)
Taking soft drink			
Yes	29 (74.7)	70 (76.3)	99 (76.7)
No	17 (25.3)	13 (23.7)	30 (23.3)
Body exercise			
Daily	10 (16.5)	23 (17.8)	33 (25.5)
Occasionally	15 (57.0)	30 (36.3)	45 (34.9)
Rarely	21 (26.5)	30 (45.9)	51 (39.6)
Body exercise/week			
None	21 (31.6)	30 (45.2)	51 (39.6)
1-3 times	15 (49.4)	30 (41.5)	45 (34.9)
≥4 times	10 (19.0)	23 (13.3)	33 (25.5)
Hour of body exercise/day			
<1	20 (50.6)	52 (68.1)	72 (55.8)
≥1	26 (49.4)	31 (31.9)	57 (44.2)

Table 2: Lifestyle characteristics of respondents

Feeding habits of respondents

Table 3 shows the feeding habits of the respondents. About one third (30.8%) took three or more meals in a day and 72.0% skipped meals. The major meal skipped was breakfast (59.8%) and 64.5% took it ≤3 times in a week. Females took more meals than males.

Charateristics	Male Freq (%)	Female Freq (%)	Total Freq (%)
Number of meals/days			
<3	27 (72.2)	31 (67.4)	58 (45.0)
3	17 (21.5)	29 (14.1)	46 (35.6)
>3	2 (6.3)	23 (18.5)	25 (19.3)
Skipping meals			
Yes	30 (69.6)	48 (73.3)	78 (60.4)
No	16 (30.4)	35 (26.7)	51 (39.6)
Meal skipped			
Breakfast	32 (67.0)	44 (55.6)	66 (51.1)
Lunch	14 (33.0)	32 (37.8)	56 (43.5)
Dinner	0 (0.0)	7 (6.6)	7 (5.4)
Number breakfast/week			
≤3	24 (68.4)	44 (62.2)	68 (52.7)
4-5	17 (21.5)	28 (28.1)	45 (34.9)
6-7	5 (10.1)	11 (9.7)	16 (12.4)

Table 3: Feeding habits of respondents

Dietary diversity of respondents

Figure 1 reveals the dietary diversity of the respondents with 71.0% having medium dietary diversity with more females (74.8%) than males (64.6%).

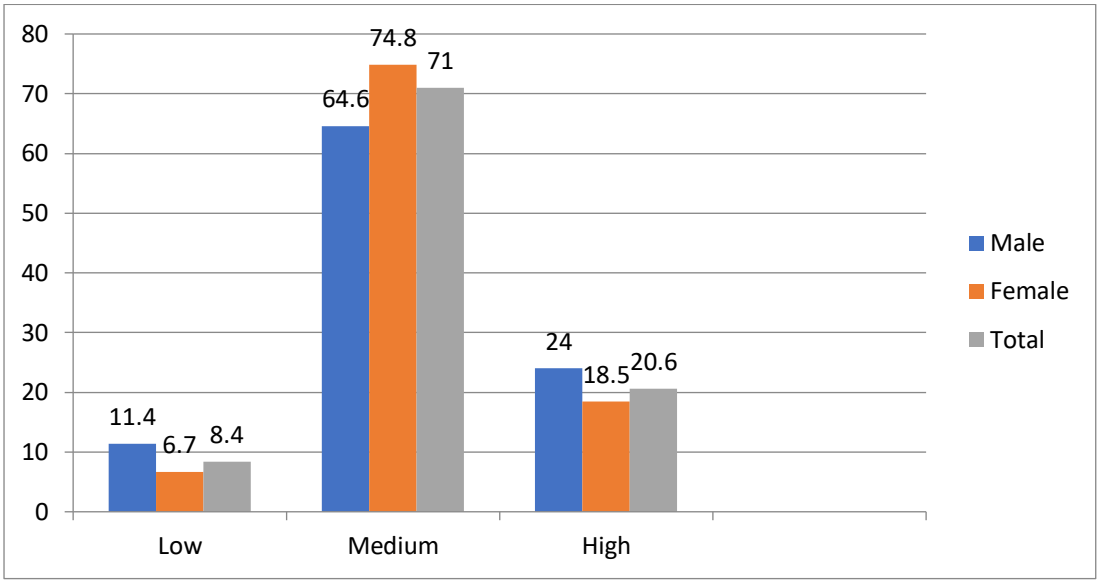

Figure 1: Dietary diversity of respondents

Nutritional knowledge of respondents

Figure 2 shows the nutritional knowledge of the respondents. Only 16.4% of the respondents had good knowledge while majority (72.9%) had average knowledge.

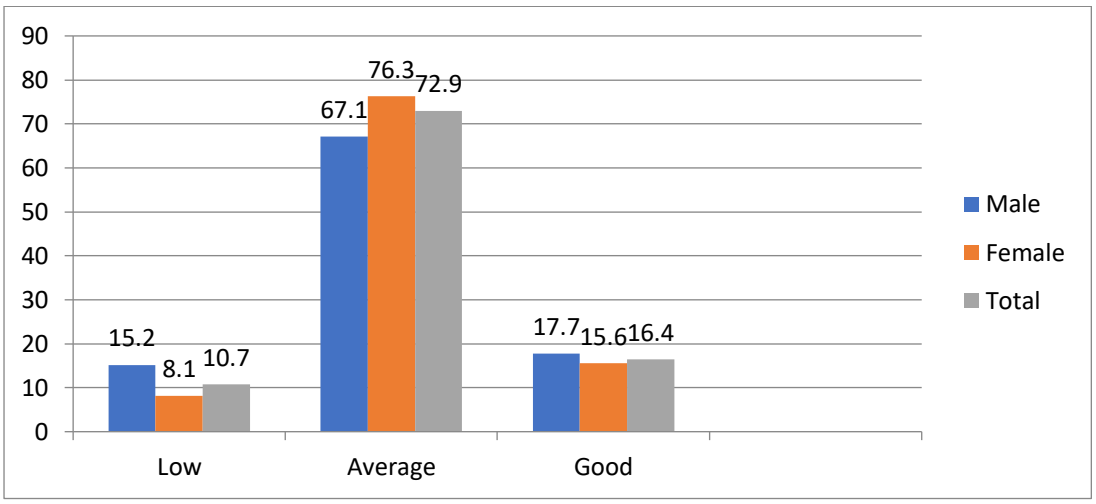

Figure 2: Nutritional knowledge of respondents

Weight perception and Body Mass Index of respondents

ssRespondents' weight perception and BMI are shown in tables 4. Majority (70.5%) believed that they had normal weight, 23.2% were satisfied with their weight and 34.1% were dissatisfied. Only 37.4% were trying to lose weight. More than one third (36.5%) of the respondents were overweight/obese and 6.1% were underweight.

Charateristics	Male Freq (%)	Female Freq (%)	Total Freq (%)
Weight perception			
Underweight	14 (30.4)	21 (25.3)	35 (27.1)
Normal weight	29 (63.0)	62 (74.7)	91 (70.5)
Overweight	3 (7.6)	0 (0.00)	3 (2.4)
Obesity	0 (0.0)	0 (0.0)	0 (0.0)
Satisfied with current weight			
Very satisfied	16 (34.7)	31 (23.0)	47 (36.4)
Satisfied	4 (8.71)	26 (56.3)	30 (23.3)
Dissatisfied	20 (43.6)	24 (17.0)	44 (34.1)
Very dissatisfied	6 (13.0)	2 (3.7)	8 (6.2)
Tried to lose weight in the last 12months			
Yes	12 (29.1)	26 (42.2)	38 (27.8)
No	34 (70.9)	57 (57.8)	91 (72.2)

BMI			
Underweight			
(<18.5)	4 (8.7).	11 (13.2)	15 (11.6)
Normal weight			
(18.5-24.99)	39 (84.7)	67 (80.7)	106 (82.2)
Overweight			
(25.0-29.99)	3 (6.51)	5 (6.10)	8 (6.2)
Obesity			
(≥30)	0 (0.00)	0 (0.00)	0 (0.00)

Table 4: Weight perception and BMI of respondents

Gender differences in dietary diversity, nutritional knowledge and Body Mass Index of respondents

Tables 5 shows the gender differences in dietary diversity, nutritional knowledge and BMI of the respondents. There was no gender difference in dietary diversity, nutritional knowledge and body mass index of the respondents.

	Gender Male N (%)	Female N (%)	Total	Chi-square N	p-value
Dietary diversity					
Low (<3)	9 (50.0)	9 (50.0)	18	2.803	0.246
Average (3-5)	21 (33.6)	41 (66.4)	62		
Good (6-7)	16 (43.2)	34 (56.8)	49		
Knowledge					
Low (0-5)	13 (52.2)	11 (47.8)	24	3.022	0.221
Average (6-10)	23 (34.0)	43 (66.0)	66		
Good (11-15)	10 (40.0)	30 (60.0)	40		
BMI					
<18.5	4 (38.5)	11 (61.5)	15	2.360	0.501
18.5-24.99	39 (37.4)	67 (62.6)	106		
25.0-29.99	3 (43.2)	5 (56.8)	8		
≥30.0	0 (00.0)	0 (0.00)	00		

Table 5: Dietary diversity, nutritional knowledge and BMI by gender of respondents

Discussion:

Personal Lifestyle and Characteristics

The study participants were primarily adolescents and young adults from high socioeconomic backgrounds, mirroring trends observed at Igbinedion University, Nigeria, where 85% of students had parents with tertiary education [7]. These students received higher monthly allowances compared to their counterparts in public universities [5,6,10] and exhibited sedentary lifestyles similar to Saudi Arabian university students [9]. However, our participants showed higher physical activity levels than students at Al-Hawash University (where only 4% exercised 3–5 times weekly) [2] or Pakistani students in Bahawalpur (2% vigorously active) [3]. Notably, those with higher allowances frequently consumed energy-dense snacks, a known risk factor for overweight/obesity.

Feeding Patterns and Dietary Diversity

While over half of students consumed ≥3 meals daily, nearly two-thirds skipped meals—particularly breakfast (50% of 129 participants). This aligns with findings among Indian [14] and Nigerian students in Sagamu (>66% skipped breakfast) [8], though lower than other Nigerian studies (≤50%) [12,13]. Meal skipping, especially breakfast, correlates with weight gain and cardiovascular risks [15,16], while snack consumption associates with overweight in Nigerian university students [1].

Dietary diversity was average for nearly half of participants—higher than Indian students with low diversity (35%) [14] but lower than another Indian cohort (61% high diversity) [17]. Unlike the gender disparities observed in India [14,26], our study found no gender differences in diversity scores. Poor dietary variety links to abnormal weight gain [14], and dietary habits significantly associate with obesity in private university students [18].

Nutritional Knowledge

Approximately half of participants (predominantly female) demonstrated average nutritional knowledge—lower than Nigerian public university students (52–75% good knowledge) [2,11].

Overweight and Obesity:

About 6.2% of the students were overweight and obese.

This prevalence is lower than that seen in University of Uyo, Nigeria students with a prevalence of 42% [19], and lower than the prevalence among university students in Saudi Arabia at 52% [9]. It is also lower than the prevalence among Saudi Arabian university students in 2022 and Egyptian students in 2020, which were at 37% [20]. Additionally, it is lower than Indian students at 26% [3], Sudanese students at 14% [21], and other Nigerian students, which were approximately one-quarter [5,6,8].

A higher percentage of female participants were overweight and obese, but this difference was not statistically significant. This aligns with the results reported by Riggs [22] in American students and students at the University of Uyo, Nigeria [19].

Weight Perception:

Approximately 5.2% of the respondents believed they were overweight or obese, a lower figure than the 26% reported among American college students.[22]. Over a third of the students expressed dissatisfaction with their current weight, contrasting sharply with the 50% rate among American students. The percentage of those desiring to shed weight was also lower at 65%, in comparison to American students. [1,22].

The difference between the number of students who were overweight and obese and those who perceived they were overweight and obese is minimal.

This suggests that a significant portion of the students were aware of their weight status.

Gender differences in Dietary Diversity, Nutritional Knowledge and Body Mass Index:

It was noted that there were no notable variations in dietary diversity, nutritional Knowledge, and BMI between genders.

Several studies have reported conflicting findings compared to the current study. Samuel et al. [23] discovered a significant gender difference in BMI among secondary school adolescents in Owo LGA, Nigeria. Sholeye et al. [8] found that females were more likely to be overweight and obese, while Magulod Jr and Capili [24] and Alkazemi [25] observed higher weight in males. Kumar et al. [14] noted a significant gender difference in dietary diversity score among Indian students, with males having a higher score than females. In 2019, males were found to have higher weight than females among university students in Asia [24]. A study at the University of Nigeria, Nsukka, revealed that females had significantly better nutrition knowledge than males [2]. In Saudi Arabia, male students were more obese than females [9], while in Sagamu, Nigeria, females were more obese than males among university students of Health and Allied Sciences [8]. Additionally, dietary diversity scores were higher in males than females among students in Karnataka, India [26].

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