ANALYSIS NUTRITIONAL KNOWLEDGE, ATTITUDE, AND PRACTICE AMONG PHARMACY STUDENTS AT HAI DUONG CENTRAL COLLEGE OF PHARMACY

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ABSTRACT

Objectives: To assess the nutritional knowledge, attitudes, and practices (KAP) and to identify factors associated with dietary behaviors among students at Hai Duong Central College of Pharmacy. **Background:** Inadequate nutrition is a significant public health challenge, particularly among university students in health-related fields. This study aimed to assess the nutritional knowledge, attitudes, and practices (KAP) and to identify associated factors among students at Hai Duong Central College of Pharmacy, Vietnam. **Methods:** A cross-sectional study was conducted on 385 students using a standardized, self-administered questionnaire. Data were analyzed using descriptive statistics and logistic regression to identify predictors of dietary habits. **Results:** The findings revealed a significant gap between nutritional knowledge and dietary practices. While students demonstrated a moderate level of nutritional knowledge (average score: 55.84%), their practical application was limited. Logistic regression analysis identified "eating out" (OR=3.5, p<0.001) and "stress-eating" (OR=2.8, p<0.001) as the strongest risk factors for unhealthy dietary habits. Conversely, higher nutritional knowledge was a significant protective factor (OR=0.75, p=0.021). Although 52.99% of students understood the principles of a balanced diet, only 26.75% reported a preference for healthy foods, indicating the strong influence of personal taste and convenience. **Conclusion:** Pharmacy students at Hai Duong Central College of Pharmacy possess moderate nutritional knowledge that is poorly translated into practice. The significant disparity between awareness and behavior suggests that educational interventions alone are insufficient. Comprehensive strategies that address the food environment, psychological stressors, and practical barriers are essential to sustainably improve students' nutritional habits and overall health.

Keywords: *Nutritional Knowledge, Attitude, Practice (KAP), Pharmacy Students, Health Education.*

I. INTRODUCTION

Proper nutrition is fundamental to maintaining health, preventing disease, and enhancing quality of life. However, nutritional imbalances, encompassing both overnutrition (leading to obesity and type 2 diabetes) and undernutrition (resulting in malnutrition and micronutrient deficiencies), remain a pressing global health concern [8], [10].

University students, particularly those in health-related disciplines, represent a unique and vulnerable population. They face a confluence of challenges, including high academic pressure, newfound independence, and significant lifestyle changes, all of which can negatively impact their dietary choices. Habits formed during this critical period such as reliance on processed foods, emotional eating, and poor calorie management can establish long-term health trajectories. Previous studies, both internationally and in Vietnam, have shown that university students often have limited nutritional knowledge and suboptimal dietary practices [6], [7], [9].

As future healthcare professionals, the knowledge, attitudes, and personal health

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behaviors of pharmacy students are of paramount importance. Their ability to provide credible health and wellness counsel to future patients is intrinsically linked to their own understanding and application of health principles. Despite this, there is a scarcity of research specifically targeting the nutritional KAP of pharmacy college students in Vietnam.

Therefore, this study was conducted to assess the nutritional knowledge, attitudes, and practices of students at Hai Duong Central College of Pharmacy. The findings aim to inform the development of targeted interventions to promote healthier dietary behaviors within this key population.

II. MATERIALS AND METHODS

2.1. Study design

A cross-sectional descriptive study was conducted at Hai Duong Central College of Pharmacy, a leading institution for pharmaceutical education in the region. Data were collected from January to May 2025.

2.2. Participants and sampling

The study population comprised all full-time students enrolled at the college. The minimum sample size was calculated using the formula for a single population proportion: $n = Z^2(1-\alpha/2) * p(1-p) / d^2$. Using a 95% confidence level (Z=1.96), an estimated prevalence (p) of 50% (0.5) for suboptimal dietary practices (to maximize sample size), and a margin of error (d) of 5% (0.05), the required sample size was 384. A final sample of 385 students who consented to participate was included in the analysis.

- **Inclusion criteria:** All registered students who were present during the data collection period and provided voluntary informed consent.
- **Exclusion criteria:** Students with physical disabilities affecting anthropometry (e.g., scoliosis), congenital disorders, or those with acute or chronic illnesses known to affect nutritional status at the time of the survey.

2.3. Data Collection

Data were collected using a structured, self-administered questionnaire designed based on validated instruments, including resources from the World Health Organization (WHO) [10]. The questionnaire was pilot-tested on 30 students to ensure clarity and cultural appropriateness. The final instrument consisted of three sections:

- Socio-demographic and anthropometric data: Age, gender, height, and weight.
- Nutritional Knowledge: 30 items assessing understanding of macronutrients, micronutrients, balanced diet principles, and the link between diet and chronic diseases.
- Attitudes and Practices: Questions using a 5-point Likert scale (*1=Strongly Disagree to 5=Strongly Agree*) and frequency scales to measure attitudes towards healthy eating, dietary habits (e.g., meal skipping, fast-food consumption), and physical activity.

2.4. Data Analysis: Data were cleaned, coded, and analyzed using SPSS version 20.0. Descriptive statistics (frequencies, percentages, mean ± standard deviation) were used to summarize the data. Logistic regression was performed to identify factors associated with unhealthy dietary practices (defined by frequent fast-food consumption). A p-value of < 0.05 was considered statistically significant.

2.5. Ethical Considerations: The study protocol was approved by the Scientific Council of Hai Duong Central College of Pharmacy. Written informed consent was obtained from all participants after explaining the study's objectives. Confidentiality was maintained by anonymizing all data.

III. RESULTS

3.1. Socio-demographic and anthropometric characteristics

Table 1. ***Age and gender distribution of study participants***

Gender			Age Group (years)			
	Frequency (n)	Percentage (%)	18-20	21 – 30	31-40	>40
Male	94	24,42	79	10	3	2
Female	291	75,58	213	43	26	9

A total of 385 students participated, with a majority being female (75.58%, n=291), reflecting the typical gender distribution in the pharmacy field in Vietnam (*Table 1*). The largest age group was 18-20 years (73.43%), corresponding to the standard age of college entry.

Table 2. ***Anthropometric characteristics of study participants by gender***

Height distribution			Weight distribution		
Height (cm)	Male (n=94)	Female (n=291)	Weight (kg)	Male (n=94)	Female (n=291)
<150[1]	0 (0.0%)	18 (6.2%)	<40	0 (0.0%)	2 (0.7%)
150-159.9	0 (0.0%)	206 (70.8%)	40-49.9	2 (2.1%)	160 (55.0%)
160-169.9	20 (21.3%)	58 (19.9%)	50-59.9	78 (83.0%)	101 (34.7%)
≥170	39 (41.5%)	9 (3.1%)	60-69.9	14 (14.9%)	28 (9.6%)
Total	**94 (100%)**	**291 (100%)**	>80	0 (0.0%)	0 (0.0%)
			Total	**94 (100%)**	**291 (100%)**

Data are presented as frequency, n (%). Percentages are calculated within each gender group (column percentages).

[1] The "<140" and "140-150" categories were combined due to the low frequency in the "<140" group.

Regarding anthropometrics (*Table 2*), male students predominantly had heights of 160 cm or taller, with the most common weight range being 50-60 kg (82.98%). Female students were most commonly between 150-160 cm tall (70.79%), with weights concentrated in the 40-50 kg (54.48%) and 50-60 kg (41.56%) ranges.

3.2. Nutritional status (BMI)

Table 3. ***Distribution of Body Mass Index (BMI) categories by gender***

BMI Category (kg/m ²)[1]	Male (n=94)	Female (n=291)	Total (n=385)
Underweight (<18.5)	3 (3.2%)	76 (26.1%)[2]	79 (20.5%)
Normal weight (18.5–24.9)	89 (94.7%)	239 (82.1%)	328 (85.2%)
Overweight (25.0–29.9)	2 (2.1%)	16 (5.5%)	18 (4.7%)
Obese (≥30.0)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	**94 (100.0%)**	**291 (100.0%)**	**385 (100.0%)**

[1] BMI categories are based on the WHO classification for Asian populations.
[2] The original Vietnamese table separated "Severe underweight (<16)" and "Underweight (16-18.5)". These have been combined into a single "Underweight (<18.5)" category as no participants were in the <16 group, and this combined category is standard in international reporting.

Based on the BMI classification for Asian populations (*Table 3*), the majority of both male (94.68%) and female (82.13%) students were within the normal weight range. However, a higher proportion of female students were underweight (12.37%) compared to males (3.19%). The prevalence of overweight/obesity was low in both genders. No cases of severe malnutrition (BMI < 16) or obesity (BMI > 30) were recorded.

3.3. Nutritional knowledge, attitudes, and Practices

Table 4. ***Knowledge***

Question	Male (n)	Female (n)	Total (%)
1. Understands that nutritional needs vary by age, gender, and health status	15 (16.0%)	177 (60.8%)	192 (49.9%)[1]
2. Understands the role of macronutrients (protein, lipid, glucid)	10 (10.6%)	162 (55.7%)	172 (44.7%)
3. Understands the role of fiber and vitamin-rich foods	18 (19.1%)	170 (58.4%)	188 (48.8%)
4. Understands the role of micronutrients (vitamins, minerals)	14 (14.9%)	170 (58.4%)	184 (47.8%)
5. Understands the harmful effects of an unhealthy diet	25 (26.6%)	252 (86.6%)	277 (71.9%)
6. Knows the principles of a balanced diet among food groups	21 (22.3%)	183 (62.9%)	204 (53.0%)
7. Can differentiate between healthy and unhealthy foods	15 (16.0%)	162 (55.7%)	177 (46.0%)

Data represent the number and percentage of students who answered each question correctly. Percentages for Male and Female columns are calculated within each gender group. The "Total" column percentage is calculated based on the total sample (n=385).

A high percentage of students, 71.95%, recognized the "harmful effects of an unhealthy diet," and 55.84% understood that nutritional needs vary according to individual factors. This foundational knowledge reflects the success of general public health messaging. However, a deeper analysis reveals significant knowledge gaps: only 48.83% understood the specific roles of fiber and vitamins, and just 47.79% understood micronutrients. The lowest scores were observed in knowledge of macronutrients (44.68%) and the ability to differentiate between healthy and unhealthy foods (45.97%), indicating an incomplete and superficial understanding of nutrition.

A gender-based analysis revealed a consistent trend: female students demonstrated a higher percentage of correct answers across most categories, suggesting a greater interest in health and nutrition. However, when this finding is juxtaposed with the higher prevalence of underweight status among female students, it raises a critical hypothesis: this interest may be driven by body image goals, potentially leading to a selective and incomplete

Table 5. *Prevalence of dietary habits, attitudes, and health perceptions by gender*

Habit, Attitude, or Perception	Male (n=94)	Female (n=291)	Total (n=385)
Dietary Behaviors			
1. Regularly consumes fast food	32 (34.0%)	189 (64.9%)	221 (57.4%)
2. Frequently eats late at night	38 (40.4%)	140 (48.1%)	178 (46.2%)
3. Frequently eats out	35 (37.2%)	214 (73.5%)	249 (64.7%)
4. Snacks between meals	14 (14.9%)	210 (72.2%)	224 (58.2%)
5. Consumes carbonated drinks	36 (38.3%)	158 (54.3%)	194 (50.4%)
6. Reads food labels before consumption	33 (35.1%)	160 (55.0%)	193 (50.1%)
7. Eats regular meals daily	40 (42.6%)	190 (65.3%)	230 (59.7%)
Attitudes & Preferences			
8. Prefers healthy food	13 (13.8%)	90 (30.9%)	103 (26.8%)
9. Has a preference for sweet foods	19 (20.2%)	183 (62.9%)	202 (52.5%)
10. Eats primarily for satiety ("just to feel full")	12 (12.8%)	169 (58.1%)	181 (47.0%)
Psychological Factors & Beliefs			
11. Eats more or less when stressed (Stress eating)	21 (22.3%)	167 (57.4%)	188 (48.8%)
12. Eats based on emotions (Emotional eating)	18 (19.1%)	180 (61.9%)	198 (51.4%)
13. Believes nutrition affects health status	33 (35.1%)	290 (99.7%)	323 (83.9%)
Health Status & Goals (Self-Reported)			
14. Reports an underlying health condition	2 (2.1%)	38 (13.1%)	40 (10.4%)
15. Reports being overweight or obese	2 (2.1%)	19 (6.5%)	21 (5.5%)
16. Has specific health goals	16 (17.0%)	118 (40.5%)	134 (34.8%)

A high prevalence of eating out was observed, with 64.68% of students doing so regularly. Fast food consumption was also common, reported by 57.40% of students, indicating a widespread preference for convenience-based eating. A significant portion of students (50.86%) had a habit of late-night eating, which could adversely affect their health. Furthermore, more than half of the students reported a preference for sweets (52.47%) and consumed carbonated beverages (50.39%), both of which can negatively impact nutritional status. While 58.18% of students reported snacking, only 26.75% expressed a preference for healthy foods. Stress-related eating was also prevalent, with 48.83% of students altering their food intake when stressed, reflecting the strong influence of psychological factors on dietary behavior. Only 50.12% of students had a habit of reading food labels before consumption.

The descriptive analysis reveals a significant gap between nutritional attitudes and practices. While 83.90% of students recognized the importance of nutrition, only 34.81% had established specific health goals. Dietary behaviors appeared to be heavily influenced by psychological factors, with 51.43% engaging in emotional eating and nearly half (47.01%) adopting an attitude of

"eating just to feel full," prioritizing convenience over quality.

3.4. Predictors of unhealthy dietary habits

To quantify the influencing factors, a logistic regression model was employed. The dependent variable was defined as the "habit of consuming fast food" (Yes/No). Independent variables included nutritional knowledge score, gender, the habit of stress-eating, and the habit of eating out. The analysis identified eating out as the strongest predictor of fast food consumption (OR=3.50, p<0.001), followed by stress-eating (OR =2.80, p<0.001). Conversely, nutritional knowledge acted as a significant protective factor (OR=0.75, p=0.021), where each additional point in the knowledge score was associated with a 25% reduction in the odds of frequent fast food consumption. Gender did not have a significant effect in the model (p=0.350).

IV. DISCUSSION

This study provides valuable insight into the nutritional KAP of pharmacy students in Vietnam, a demographic crucial to the future of public health. The sample's characteristics, with a female majority (75.58%) and a concentration in the 18-20 age group, are consistent with other studies on health-science students in Vietnam [6] and reflect the transition to independent living, a critical period for habit formation.

The central finding is the stark contrast between students' moderate nutritional knowledge and their suboptimal dietary practices. While students could identify broad concepts, such as the dangers of an unhealthy diet, their understanding of actionable principles (e.g., macronutrient balance, specific food choices) was lacking. This superficial knowledge is insufficient to drive meaningful behavioral change, a phenomenon observed in other student populations [2]. They know *what* they should do, but not necessarily *how* or *why* at a practical level.

The logistic regression results powerfully illustrate this gap. The strongest predictors of poor dietary habits were environmental and psychological factors-"eating out" (convenience) and "stress-eating"-rather than a lack of knowledge. In fact, knowledge was a protective factor, but its effect was overshadowed by these more potent behavioral drivers. This highlights a critical flaw in interventions that focus solely on education.

The study also uncovers a "vicious cycle" linking poor nutrition and low physical activity. A diet lacking in sustained energy (from skipping meals or consuming processed foods) can lead to lethargy and reduced motivation for exercise. In turn, a sedentary lifestyle eliminates a key channel for stress relief, potentially increasing reliance on emotional eating [3], [5]. This creates a dual health risk: a subset of students, particularly females, are underweight and potentially under-nourished, while the broader population engages in habits (high intake of energy-dense, nutrient-poor foods) that predispose them to future overweight, obesity, and non-communicable diseases [1].

V. CONCLUSION

This study concludes that pharmacy students at Hai Duong Central College of Pharmacy exhibit a significant knowledge-practice gap in nutrition. Their dietary behaviors are more strongly influenced by convenience, environment, and psychological stress than by their academic knowledge.

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