Survey on the eating behavior of first-year medical students at University of Medicine and Pharmacy, Hue University

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Abstract

Background: Nutrition is closely related to human health. Unhealthy diet increases the risk of non-communicable diseases such as cardiovascular disease, diabetes, hypertension, overweight and obesity. Changing eating habits and unhealthy behaviors can last a long time and affect the future. **Objectives:** (1) To describe the eating behaviors of first-year medical students at University of Medicine and Pharmacy, Hue University, (2) To identify some factors related to the eating behaviors of these students. **Methods:** A cross-sectional study was conducted on 312 students at Hue University of Medicine and Pharmacy from July 2023 to August 2024. Data were collected by direct interview based on a structured questionnaire. We used a multivariate logistic regression model to identify factors associated with students' eating behavior. **Results:** There was 58.3% of students with poor behavior. Some factors associated with students' eating behaviors were sex, monthly allowance, physical activity, bedtime, time spent for using the Internet, desire to change diet, with a significance level of $p<0.05$. **Conclusion:** Medical students have a high proportion of poor eating behavior. Our study emphasizes the importance of getting more than six hours of sleep and reducing internet use among students, while also providing education on healthy diets to encourage positive changes in eating habits. Additionally, encouraging students to engage in physical activities contributes to maintaining a healthy lifestyle.

Keywords: *Eating behaviors, associated factors, medical students.*

1. INTRODUCTION

Unhealthy diet increases the risk of non-communicable diseases such as cardiovascular diseases, diabetes, hypertension, and obesity. According to the World Health Organization, non-communicable diseases cause 41 million deaths annually, accounting for 74% of all global deaths, with 77% of these deaths occurring in low- and middle-income countries [1].

University students aged 18 to 25 are in a transitional phase from adolescence to adulthood, during which they undergo significant changes in eating behaviors, which refers to food consumption shaped by environmental, social, and biological factors [2]. Additionally, eating disorder, which encompass a range of psychological conditions characterized by profound disruptions in eating habits and attitudes, are widely reported among this population [3]. Previous studies indicated that university students tend to consume high amounts of sweetened foods, canned foods, and fast food, while consuming low amounts of whole grains, nuts, fruits, and vegetables. Prolonged these unhealthy eating behaviors have been documented to not only affect health but also reduce academic performance [4-6].

A study at a university in Spain found that 61.0% of students preferred pasta, followed by meat at 59.1% and salad at 32.5%. The least popular foods were vegetables at 16.8%, fruits at 13.6%, dairy products at 12.2%, and legumes at 9.8% [7]. Another study in Vietnam revealed that 82.2% of students consumed fast food, with 59.6% consuming it at all main meals. This fast food consumption was often accompanied by other types of food, especially soft drinks, which appeared in half of the meals [8]. Notably, eating behaviors have been found to influence sleep quality. Specifically, students who skipped breakfast, snacked late at night, or replaced main meals with snacks had poorer sleep quality by 1.20 times, 1.24 times, and 1.25 times, respectively, compared to others [9]. Additionally, poor eating habits may prevent students from meeting nutrient recommendations. For example, only 1 in 10 students in Australia met the recommendations for fruit or vegetable consumption, and less than one-

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third met the requirements for fiber, calcium, and potassium [4].

Medical students have a high awareness of health [4]. However, a previous study in China found that medical students were at a high risk of chronic diseases due to unhealthy eating habits [10]. Another study showed that 31% and 24% of students met requirement for fruit and vegetable consumption, respectively, while approximately 50% of students exhibit high consumptions of potatoes and sweeten foods in Germany [11]. Medical students typically face a heavy academic load, balancing theoretical learning and hospital practical training, which may influence their eating behaviors [12]. In particular, first-year students experience changes in their study environment, adapting to new methods, acquiring new knowledge, and adjusting to life away from home. These challenges may create pressure and impact their eating behaviors. Thus, it is necessary to explore eating behaviors and associated factors among these students to provide recommendations for improving their health and academic performance. Our study aimed to describe the eating behaviors of first-year medical students at the University of Medicine and Pharmacy, Hue University, and identify factors associated with these behaviors.

2. MATERIALS AND METHODS

2.1. Study Participants

- Selection criteria: First-year medical students at the University of Medicine and Pharmacy, Hue University.

- Exclusion criteria: We excluded students who refused to participate.

2.2. Research Time and Location

The research was conducted at the University of Medicine and Pharmacy, Hue University, from July 2023 to August 2024.

2.3. Study Design

- We conducted a cross-sectional study

2.4. Sampling Method

Sample Size

The sample size was determined using the formula for estimating a proportion

$$n = Z^2_{(1-\alpha/2)} \times \frac{p(1-p)}{d^2} = 227$$

n: Minimum sample size of the study

Z: Distribution factor at (1-α/2) confidence level

p: Estimated proportion of the population

d: Precision level

We applied findings from a previous study conducted among medical students in Saudi Arabia, where 69.3% exhibited poor eating behaviors. This study used the same aspects to assess eating habits, including breakfast consumption, intake of soft drinks and fast food, and fruit and vegetable consumption [13] and a desired error of 6% (0.06). Totally, we had 312 students in our analysis.

Sampling Method

- Step 1: We obtained a list of first-year regular medical classes at the University of Medicine and Pharmacy, Hue University from Undergraduate training Office, inlcuing four classes as follows: Y23A, Y23B, Y23C, and Y23D, with 119, 119, 120, and 116 students, respectively.

- Step 2: Randomly selected students from the lists of these four classes (evenly distributed from class Y23A to Y23D) to participate in the study. Finnally, we had the number of students as follows: Y23A: 80, Y23B: 80, Y23C: 81, and Y23D: 71.

2.5 Data collection and assessment

The questionnaire inclued 4 parts:

Part 1: General information: sex, ethnicity, religion, monthly allowance, BMI, means of transportation to school, cohabitants.

BMI Assessment (Body Mass Index): BMI= (Weight)/(Height X Weight) = kg/m^2

Underweight (BMI) <18.5; Normal (BMI) 18.5 – 22.9; Overweight, Obese (BMI) ≥23

Part 2: Eating Behavior

Eating behaviors were assessed using 8 questions based on the Global School-based Health Student Survey and a previous study on eating behavior and related factors among students in two secondary schools in Hue city. The questions included:

(1) Do you regularly have breakfast:

(2) Do you regularly eat green, red, or yellow vegetables

(3) Do you regularly eat fruits?

(4) Do you regularly drink soft drinks?

(5) Do you regularly consume fast food?

(6) Do you regularly consume dairy products?

(7) Do you regularly have meals at the proper time?

(8) Do you often add fish sauce/salt/soy sauce to your food?

- For questions 2 and 3, we used the picture book for dietary surveys by the National Institute of Nutrition in 2014 [14-16]. We assessed vegetable and fruit intake based on the National Institute of Nutrition's recommendation (≥240 g/day) [17].

- We assessed eating behavior as follows:

Questions (1), (2), (3), (4), (5), and (6) were scored on a 5-point scale:

5 = Every day; 4 = 5-6 times/week; 3 = 3-4 times/week; 2 = 1-2 times/week; 1 = Never

Questions (7) and (8) were scored on a 4-point scale: 4 = Never; 3 = Rarely; 2 = Sometimes; 1 = Often

- The highest possible score was 38 points. Based on the average score, we classified eating behavior as follows: Unhealthy eating behavior: total score <22 points; Healthy eating behavior: total score ≥22 points

Part 3: Student Lifestyle

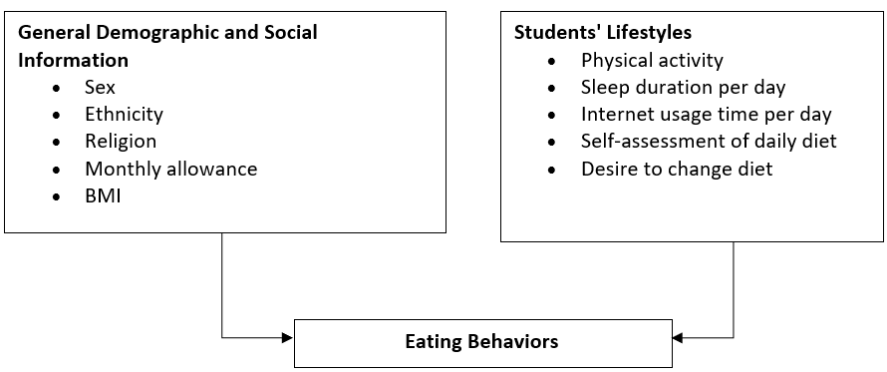
Student lifestyle was assessed using 4 self-compiled questions:

- Sleep duration per day: ≥6 hours, <6 hours
- Internet usage time per day: ≥4 hours, <4 hours
- Self-assessment of daily diet: Very unhealthy, unhealthy, moderate, healthy, very healthy
- Desire to change the diet: Very unwilling, unwilling, neutral, willing, very willing

Part 4: Physical activity: We evaluated based on the Global Physical Activity Questionnaire (GPAQ) [18].

- Achieved: Accumulating at least 60 minutes of moderate to vigorous-intensity physical activity daily or at least 3 times a week of vigorous-intensity activity (150 minutes/week).
- Not achieved if the above standards were not met [18].

Theoretical Framework of the Study



2.7 Data analysis

Data was entered and analyzed using using Epidata 3.1 software and SPSS 20.0 software, respectively. Results were described using frequency and percentages. Multivariate logistic regression models were used to identify factors related to eating behaviors. A p-value of <0.05 was considered statistically significant

2.8. Research Ethics

The study was approved by the Ethics Committee in Biomedical Research of the University of Medicine and Pharmacy, Hue University (Decision No. 1884/QĐ-ĐHYD dated April 26, 2024). Students who opted to participate provided informed consent and retained the right to withdraw at any time. All collected data were maintained with strict confidentiality and used solely for research purposes.

3. RESULTS

3.1. General Characteristics of Study Subjects

Table 1. General Characteristics of Study Subjects (n=312)

Characteristic		Frequency (n)	Percentage (%)
Age (years) (mean ± SD) 18.9 ± 0.5			
Sex	Male	148	47.4
	Female	164	52.6
Ethnicity	Kinh	286	91.7
	Other	26	8.3

Living situation	Living alone	124	39.7
	Living with friends	123	39.4
	Living with family/relatives	65	20.9
Means of transportation	Walking	38	12.2
	Bicycle	18	5.8
	Motorcycle/electric bicycle	256	82.0
Monthly allowance	≤ 3 million VND	191	61.2
	> 3 million VND	121	38.8
BMI (kg/m^2)	< 18.5	58	18.6
	18.5 – 22.9	209	67.0
	≥ 23	45	14.4
Sleep duration per day	≥ 6 hours	201	64.4
	< 6 hour	111	35.6
Daily internet usage	≥ 4 hour	224	71.8
	< 4 hour	88	28.2
Physical activity	Meeting the requirement	59	18.9
	Not meeting the requirement	253	81.1
Self-assessment of diet	Very unhealthy	23	7.4
	Unhealthy	79	25.3
	Moderate	182	58.3
	Healthy	22	7.1
	Very healthy	6	1.9
Desire to change diet	Very unwilling	18	5.8
	Unwilling	28	9.0
	Neutral	98	31.4
	Willing	104	33.3
	Very willing	64	20.5

The majority of our participants were Kinh ethnicity (91.7%), with males comprising 47.4%. Only 20.9% of the students living with family or relatives. Motorbikes or electric bicycles were the most common modes of transport for students (82.0%). Just 18.9% of students met the physical activity requirements. Obesity or overweight was observed in 14.4% of students. About 71.8% of students used the internet for 4 or more hours per day. Only 1.9% and 7.1% of students rated their daily diet as very healthy and healthy, respectively. Additionally, 33.3% of students expressed a desire to change their current diet.

3.2. Eating behaviors of the subjects

Table 2. Eating behaviors of medical students

Eating behaviors of the subjects		Frequency	Percentage
Eating breakfast	Everyday	85	27.2
	5 - 6 times/week	49	15.7
	3 - 4 times/week	78	25.0
	1 - 2 times/week	68	21.8
	Do not eat	32	10.3

Eating vegetables	Everyday	111	35.6
	5 - 6 times/week	67	21.5
	3 - 4 times/week	85	27.2
	1 - 2 times/week	39	12.5
	Do not eat	10	3.2
Recommended vegetable intake by the National Institute of Nutrition	Meeting the requirement (≥240g/day)	12	3.8
	Not meeting the requirement	300	96.2
Eating fruits	Everyday	37	11.9
	5 - 6 times/week	35	11.2
	3 - 4 times/week	95	30.4
	1 - 2 times/week	122	39.1
	Do not eat	23	7.4
Recommended fruit intake by the National Institute of Nutrition	Meeting the requirement (≥240g/day)	11	3.5
	Not meeting the requirement	301	96.5
Fast food consumption	Everyday	19	6.1
	5 - 6 times/week	22	7.1
	3 - 4 times/week	57	18.3
	1 - 2 times/week	213	68.3
	Do not eat	1	0.2
Soft drink consumption	Everyday	14	4.5
	5 - 6 times/week	14	4.5
	3 - 4 times/week	38	12.2
	1 - 2 times/week	131	42.0
	Do not eat	115	36.8
Milk/dairy product consumption	Everyday	66	21.2
	5 - 6 times/week	40	12.8
	3 - 4 times/week	90	28.8
	1 - 2 times/week	83	26.6
	Do not eat	33	10.6
Having meals on time	Frequently	140	44.9
	Occasionally	134	42.9
	Rarely	34	10.9
	Never	4	1.3
Adding fish sauce/soy sauce/ salt to food at the dining table	Frequently	178	57.1
	Occasionally	85	27.2
	Rarely	35	11.2
	Never	14	4.5

We found that 27.2% of students ate breakfast every day. Only 3.8% and 3.5% of students met the recommended intake of vegetables and fruits, respectively. Additionally, 6.1% of students consumed fast food daily, and 4.5% drank soft drinks daily. Meanwhile, 21.2% of students consumed milk and dairy products daily. Regular meal timing was practiced by 44.9% of students, and 57.1% frequently added fish sauce, soy sauce, or salt to their food.

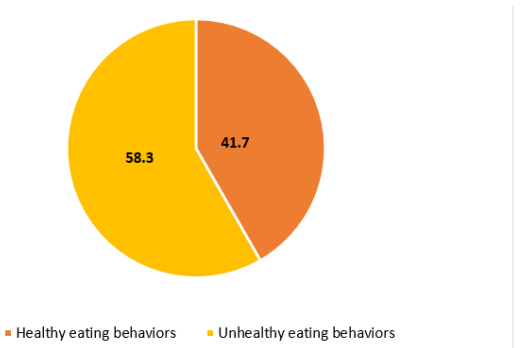


Figure 1. Eating behaviors of medical students

41.7% of students were assessed to have healthy eating behaviors, while 58.3% of students had unhealthy eating behaviors.

3.3 Multivariate logistic regression model identifying variables related to eating behavior of medical students

Table 3. Multivariate logistic regression model identifying variables related to eating behavior of medical students

Factors		OR	95% CI	P
Sex	Female	1		
	Male	2.66	1.57 - 4.50	**<0.001**
Living situation	Living with family/relatives	1		
	Renting with friends	0.66	0.36 - 1.19	0.174
	Renting alone	1.25	0.63 - 2.48	0.514
Monthly allowance	> 3 million VND	1		
	≤ 3 million VND	1.93	1.12 - 3.30	**0.018**
BMI (kg/m^2)	18,5 - 22,9	1		
	<18,5	0.32	0.15 - 0.67	0.002
	≥ 23	0.75	0.89 - 1.42	0.754
Physical activity	Meeting the requirement	1		
	Not meeting the requirement	2.96	1.52 - 5.78	**0.001**
Daily sleep duration	< 6 hours	1		
	≥ 6 hours	2.03	1.17 - 3.54	**0.012**
Daily Internet usage	≥ 4 hours	1		
	< 4 hours	1.94	1.11 - 3.41	**0.020**
Desire to change diet	Yes	1		
	No	2.16	1.30 - 3.60	**0.003**

Sex, monthly allowance, physical activity, sleep duration, internet usage duration, and the desire to change diet were found to be associated with eating behaviors. Specifically, male students were more likely to exhibit healthy eating behaviors compared to female students (odds ratio (OR)=2.66, 95% confidence interval (CI)=1.57 - 4.50). Additionally, students with monthly allowance less than 3 million VND and don't meet the requirement of physical activity were more likely to have healthy eating behaviours compared to the others, ORs were 1.93 (1.12 - 3.30) and 2.96 (1.52 - 5.78), respectively. Furthermore, healthier eating behaviors were observed among students who slept more than six hours per day, used the internet for less than four hours daily, and did not wish to change their diet.

4. DISCUSSION

4.1. Eating behavior of medical students

We found that 58.3% of students exhibited unhealthy eating behaviors. A previous study in Ho Chi Minh City reported that 30% of students had eating behavior disorders [19]. Additionnaly, our study found that 44.9% of students regularly ate meals on time, and 27.2% had breakfast daily. This is higher than a study in Hai Phong, where only 21.6% of preventive medicine students at Hai Phong Medical University had breakfast daily [20]. Since consuming breakfast is associated with better average academic scores, students should be encouraged not to skip breakfast [5].

High consumption of vegetables and fruits may reduce mortality from all causes [21]. According to the National Institute of Nutrition's recommendations, the daily intake should be 240-320 grams of vegetables and 240 grams of fruit. In our study, only 3.8% of students met the recommended intake for vegetables, and 3.5% met the recommended intake for fruits [17]. Similarly, a previous study in Ho Chi Minh City showed that the fiber intake in students was lower than the recommendations of the National Institute of Nutrition [22]. Less vegetable and fruit consumption were also found in other study [7]. Additionally, 99.8% of our students consumed fast food, which was higher than those reported in Hanoi [8] and the United States [23]. One possible explanation for this is that medical students, who spend significant time on theoretical and clinical studies, may opt for fast food as a time-saving convenience. In our study, 21.2% of students consumed milk and dairy products daily, which was higher than the result at a Spanish university [7]. Our study also showed that 4.5% of students consumed soft drinks daily, which was lower compared to a previous study in China, where the proportion of soft drink consumption among international students was 63%. A high rate of soft drink consumption was also found in other studies [8, 24]. Additionally, 57.1% of our students often added fish sauce/soy sauce/salt to their food. A study in China also showed an increasing sodium intake among students [25].

4.2. Factors associated with eating behavior

Sex, monthly allowance, physical activity, sleep duration, internet usage duration, and the desire to change diet were observed to be associated with eating behaviors in our study.

Male students were 2.66 times more likely to have healthy eating behaviors compared to female students. This finding contrasts with a study in Turkey, which reported that female students adhered to healthier diets better than male students [26]. Differences in eating behaviors between males and females may stem from their motivations and food preferences. Males tend to choose foods they enjoy and believe will support their growth, while females often prioritize maintaining a slim figure and aesthetic appeal, which influences their dietary habits [27]. Additionally, a previous study found that cognitive eating (e.g., emotional eating) was present in females but not in males. This suggests that hormonal differences may influence eating behaviors through the gut-brain axis, playing a role in intentional eating driven by cognitive factors rather than hunger [27].

Furthermore, students with a monthly allowance of 3 million VND or less were more likely to exhibit healthy eating behaviors than those with an allowance exceeding 3 million VND. Students with limited budgets tend to choose home-cooked meals over dining out, which often involves foods high in calories, fat, and sugar. As a result, they demonstrate healthier eating behaviors compared to others. Additionally, students who met the recommended levels of physical activity tended to exhibit healthier eating behaviors compared to those who did not. This result aligns with a study in Brazil, which observed that a high proportion of students who met WHO physical activity recommendations also had healthy eating habits [28]. Regular physical activity can impact both current and future health, thus, schools should promote sports activities to enhance students' physical fitness.

Students who sleep ≥ 6 hours/day were 2.03 times more likely to have healthy eating behaviors compared to other students. Students who used the Internet for < 4 hours/day seemed to exhibit healthy eating behaviors compared to the other. Our study is consistent with a previous study in Poland, which highlighted that Internet usage influences students' eating behaviors, particularly in relation to academic issues [29]. Additionally, a high proportion of healthy eating behaviors was observed in students who were not willing to change their diet. This can be explained by the fact that students who recognize their unhealthy eating behaviors may be more motivated to change their diet, whereas those who believe their eating habits are already healthy may see no need to alter their current diet.

Our study is one of the few conducted to explore eating behaviors and their associated factors among

medical students. However, we did not account for medical student-specific factors such as training programs or knowledge of a healthy diet. Therefore, further research incorporating these variables is needed to draw more effective conclusions.

5. CONCLUSION AND RECOMMENDATIONS

Our study found that a significant proportion of medical students (58.3%) exhibited unhealthy eating behaviors. Factors influencing these behaviors include sex, monthly allowance, physical activity, sleep duration, Internet usage, and the desire to change their diet. Thus, it is essential to emphasize the importance of getting more than six hours of sleep and reducing internet use among students, while also providing education on healthy diets to encourage positive changes in eating habits. Additionally, students should be encouraged to increase their physical activity to help maintain a healthy body.

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