

ORIGINAL ARTICLES

Status of vegetarianism and related factors among college students in Hanoi in 2023

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ABSTRACT

Objectives: The study aims to depict the current vegetarianism status among Hanoi students from 18 to 24 years old in 2023 and analyze various factors related to the vegetarianism patterns of Hanoi students in the same year.

Methods: A cross-sectional descriptive research method is used for the study. The survey was conducted from October to November 2023 in Hanoi. Our study described and analyzed data from 327 students aged 18-24, enrolled in colleges/ universities.

Results: Research revealed that 45.3% of the participants were vegetarians, with 15.5% following a vegetarian diet consistently and 84.5% adopting it periodically. The most common vegetarian choices included eggs and/or dairy (65.5%). Additionally, 44.6% opted for vegetarianism based on taste preferences, while 27.0% cited animal protection as a motivation.

Conclusion: Religious individuals were more likely to be vegetarians, with a significant difference of 12.8% compared to non-religious individuals ($p < 0.05$). Moreover, the use of alcoholic beverages was higher among the vegetarian group (70.3%) compared to the non-vegetarian group (57%), showing statistical significance ($p < 0.05$). A significant difference in strenuous physical activity was also observed between the two groups, with 87.2% in the vegetarian group and 75.4% in the non-vegetarian group ($p < 0.05$).

Keywords: *Vegetarianism, Vegetarian diet, Status of nutrition, Students.*

Abbreviations: CED (Chronic energy deficiency), OWOB (Overweight - Obesity), BMI (Body mass index).

INTRODUCTION

Vegetarianism is the dietary practice that involves consuming plant-based ingredients and excludes fresh animal meat. Vegetarians may still include animal-derived products such as honey, eggs, and milk in their diets (1). There are four basic types of vegetarian diets: vegan, ovo-vegetarian (includes

eggs), lacto-vegetarian (includes milk) and lacto-ovo vegetarian (includes both eggs and milk) (2).

According to a survey in 2023, one-quarter of the population in India reported adhering to a vegetarian diet (3). In the United Kingdom, as many as 14% of participants were found to follow a vegetarian diet (4). In Vietnam, a study conducted in 2012 revealed that 14.7%



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of the population follows a vegetarian diet regularly, while 58.9% do occasionally (5).

Vegetarianism is increasingly gaining popularity for various reasons, including health and ethical issues, environmental conservations, and spiritual beliefs (6). A 2017 study from France's NutriNet-Santé project revealed that individuals practicing vegetarianism tend to have higher educational levels, predominantly consisting of women, young adults, and freelancers. The study also indicated that vegetarians generally meet most recommended nutritional requirements, albeit with a notable deficiency in certain nutrients, particularly vitamin B12 (7). Conversely, a 2019 study in Malaysia reported that a significant proportion of vegetarian women failed to meet recommended levels for energy, protein, vitamin B12, calcium, folate, and zinc (8). In Vietnam, a 2021 study similarly highlighted that the majority of daily vegetarian consumers aged 20 and above don't meet recommended daily allowances for energy, essential nutrients, fiber, vitamins, and minerals (9).

According to a study in the United Kingdom, the 20-29 age group has the highest proportion of individuals adopting a vegetarian diet, accounting for 8% (10). Another study in Vietnam revealed that a significant 79.7% of participants aged 20-39 engage in vegetarianism (9). Research conducted on students in the United States indicates a variety of vegetarian eating styles, driven by different reasons and objectives (11). Students, who fall within the age range of 18-25, constitute 23.8% of Vietnam's population (12); exhibit diverse dietary habits and lifestyles.

At present, studies on the status of vegetarianism and related factors have been conducted. However, in Vietnam, the number of studies on this issue is limited, the timing of existing studies is quite dated, and there is a lack of focus on the student population. Hanoi, the capital city of Vietnam, serves as

a political, cultural, and educational hub and stands as one of the two economic centers in the country. It attracts a considerable population of students nationwide, being home to over 130 universities, academies, and colleges (13).

Therefore, we have decided to undertake the study "**Status of vegetarianism and related factors among college students in Hanoi in 2023**" with the following objectives: (1) Describe the current status of vegetarianism among Hanoi students and (2) Analyze various factors related to the vegetarianism patterns among Hanoi college students in 2023.

METHODS

Research Design: The cross-sectional research method.

Research subjects: Students aged 18-24 years old and are studying at colleges/institutes/ universities in Hanoi.

Selection Criteria: Participants who willingly agree to participate in the study and are students aged 18-24 pursuing regular education programs, enrolled in colleges, academies, or universities, and residing in Hanoi.

Exclusion Criteria: The participants have mental problems and are not alert.

Study site and time: Research Period: September 2023 to December 2023 in Hanoi.

Sample size and sampling method

Sample Size Determination: The Estimated formula for 1 ratio :

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

n: Study sample size;

p: Overall vegetarianism rate from Nguyen

Tan Tai's 2020 study is 57.5%,(14) taking $p=0.575$;

α : Level of statistical significance, $\alpha= 0.05$ chosen. In this case, $Z=1.96$;

ε : Relative margin of error between the sample size and the reference population, choosing $\Delta=0.1$;

Substituting into the formula and adding a 5% increment to account for potential non-participation, the calculated study sample size is $n=298$. In practice, 327 samples were collected.

Sample collection method

Step 1: Send the survey to people who may have and/or are following a vegetarian diet.

Step 2: Carry out communication on social networking platforms, attracting research subjects.

Step 3: Proceed to collect data until the number is sufficient

Research variables

Demographics: Year of birth, gender, religion, academic major, monthly living expenses; overall health status: height, weight, health-related issues, regular health check-ups, self-assessment of health.

Vegetarianism Status: Characteristics of Vegetarians: forms of vegetarianism, type of vegetarianism, dining locations, duration of vegetarianism, reasons for choosing a vegetarian diet.

Related factors: Certain characteristics of vegetarian individuals: gender, religion, monthly living expenses, health-related issues. Lifestyle and behavior aspects within the past year: smoking status, alcohol consumption, use of dietary supplements, late-night eating habits, intensity of physical activity, and moderate physical activity status.

Nutritional Status Assessment: Height, weight, BMI.

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

BMI is assessed according to the International Diabetes Institute & Western Pacific Region Office (IDI & WPRO) criteria for Asians (15):

- BMI < 18.5: CED
- BMI 18.5 - 22.9: Normal
- BMI \geq 23: Overweight/Obesity

Data collection

Research Procedure: Subjects meeting the inclusion criteria will participate in the study. The research process includes conducting direct and indirect interviews with a designed set of questions.

Tools: An online survey form is implemented using the REDCap software.

Data analysis: The data collected from the REDCap software are cleaned and analyzed using Stata 17.0 software. Chi-square tests, regression analysis, and correlation analysis are employed to assess differences, investigate associations, and explore correlations.

Ethics approval: The study is an institutional research project of the School of Preventive Medicine and Public Health in 2023. The observational study was approved by the institutional review board under decision number 538/QĐ YHDP dated December 4, 2023, of Hanoi Medical University, and is therefore exempt from ethical review.

RESULTS

In this study, the majority of participants were females, accounting for 75.8% (248 individuals), while males constituted a lower proportion at 24.2% (79 individuals). The

most represented age group was 20 years old, making up 60.55% (198 individuals). Most participants did not affiliate with any religion. The average monthly income of participants was in the range of 1-3 million VND, comprising 51.1%. Regarding regular health check-ups, the majority of participants only sought medical attention when seriously ill (52.6%), followed by those who had never been for a check-up or went annually (19.0%), and lastly, those who went every 6 months (9.5%). In terms of self-rated health status, the majority rated their health as normal or

good, accounting for 60.2% and 27.8%, respectively. The percentage of participants who rated their health as very poor was only 0.3%. The study involves students from 8 different fields. Among them, Health and Medical Sciences make up the largest portion, at 51.7%, followed by business management, which accounts for 25.1%. The rest of the participants are from various academic backgrounds.

Describe the current status of vegetarianism among Hanoi students in 2023

Table 1. Characteristics of Vegetarianism by Gender

Characteristics		Male N (%)	Female N (%)	All N (%)
Vegetarianism status (n=327)	Yes	36 (45.6)	112 (45.2)	148 (45.3)
	No	43 (54.4)	136 (54.8)	179 (54.7)
Forms of Vegetarianism (n=148)	Vegan	6 (16.7)	17 (15.2)	23 (15.5)
	Periodic Vegetarianism	30 (83.3)	95 (84.4)	125 (84.5)
Vegetarian Diet Types (n=148)	Vegan	15 (41.7)	36 (32.1)	51 (34.5)
	Lacto and/or ovo	21 (58.3)	76 (67.9)	97 (65.5)
Duration of Vegetarian Diet Adoption (n=148)	< 3 months	24 (66.7)	71 (63.4)	95 (64.2)
	3-6 months	2 (5.6)	14 (12.5)	16 (10.8)
	> 6 months	10 (27.7)	27 (124.1)	37 (25.0)
Vegetarian Dining Places (n=148)	Homecooking	20 (55.6)	68 (60.7)	88 (59.5)
	Dining out	16 (44.4)	60 (53.6)	76 (51.4)
	Temple/ Pagoda	4 (11.1)	6 (5.4)	10 (6.8)

Table 1 results show an overall vegetarian rate of 45.3% (148 individuals), with the rates for male (45.6%) and female (45.2%) students being nearly equal in both genders. Lacto and/or Ovo vegetarianism is at 65.5%, and strict vegetarianism is at 34.5%.

Participants typically follow a vegetarian diet for less than 3 months (64.2%), with an equal gender distribution in the application of this diet duration. Additionally, participants often choose to follow a vegetarian diet at home (59.5%), at restaurants (51.9%),

and at temples (6.8%). The most common reasons for choosing a vegetarian diet are taste preferences (44.6%), animal protection

(27.0%), health concerns/treatment (25.0%), and weight loss (23.0%).

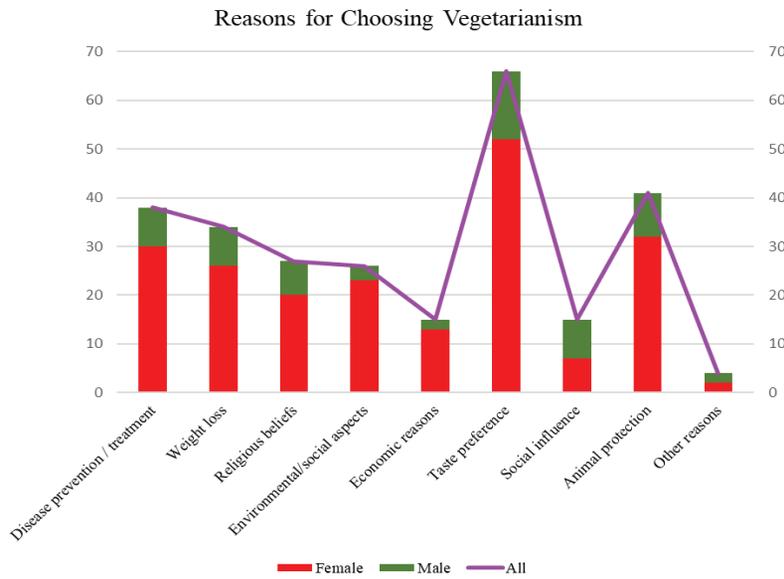


Chart 1. Reasons for Choosing Vegetarianism

Chart 1. Results show popular reasons for choosing vegetarianism among students. The most common reasons for choosing a vegetarian diet are taste preferences 66 subjects (44.6%), animal protection 40 subjects (27.0%), health concerns/treatment

37 subjects (25.0%), and weight loss 34 subjects (23.0%).

Analyze various factors related to the vegetarianism patterns among Hanoi college students in 2023

Table 2. Correlation between Vegetarianism and some relevant characteristics

Attributes (n= 327)		Vegetarian (n= 148) N (%)	Non-vegetarian (n= 179) N (%)	OR (95% CI)	P
Gender	Male	36 (24.3)	43 (24)	0.984 (0.592 - 1.64)	0.95
	Female	112 (75.7)	136 (76)		
Religion	None	19 (12.8)	9 (5)	2.78 (1.22 - 6.35)	0.012*
	Yes	129 (87.2)	170 (95)		
Health Conditions	With health issues	82 (55.4)	88 (49.2)	0.778 (0.503 - 1.2)	0.26
	Without health issues	66 (44.6)	91 (50.8)		

Chi-square test, *:p<0,05

Table 2 reveals a correlation between religious factors and the vegetarian choices of subjects, particularly individuals following a religion are more likely to adopt a vegetarian diet compared to those not following a religion, with $p = 0.012$ (< 0.05) and OR (95% CI) = 2.78 (1.22 - 6.35).

Table 3. The nexus of Vegetarianism and Lifestyle Behaviors

Behaviors	Intensity	Vegetarian (n= 148) N (%)	Non-vegetarian (n= 179) N (%)	OR (95% CI)	P
Smoking	In use	40 (27)	33 (18.4)	0.61 (0.361 - 1.03)	0.06
	Not in use	108 (73)	146 (81.6)		
Alcohol consumption	In use	104 (70.3)	102 (57)	0.56 (0.354 - 0.888)	0.013*
	Not in use	44 (27.7)	77 (43)		
Use of dietary supplements	In use	101 (68.2)	109 (60.9)	0.725 (0.458 - 1.15)	0.17
	Not in use	47 (31.8)	70 (39.1)		
Nighttime eating habits	Yes	127 (85.8)	141 (78.8)	0.614 (0.342 - 1.1)	0.1
	No	21 (14.2)	38 (21.2)		
Intense physical activity	Yes	129 (87.2)	135 (75.4)	0.452 (0.251 - 0.815)	0.007*
	No	19 (12.8)	44 (24.6)		
Moderate physical activity	Yes	143 (96.6)	168 (93.9)	0.534 (0.181 - 1.57)	0.25
	No	5 (3.4)	11 (6.1)		

Chi-square test, *: $p < 0,05$

Table 3 indicates the relationship between alcohol consumption behavior and vigorous physical activity with the vegetarian status, specifically with Odds Ratios (OR) of 0.56 and 0.45, respectively ($p < 0.05$). The study did not find associations between smoking, dietary supplement use, late-night eating and light physical activity with the studied group.

Table 4. Correlation between nutritional status and vegetarians

Subjects	Vegetarian (n=148)	Non-vegetarian (n=179)	OR (95%CI)	P
With OWOB	20(13,5)	22(12,3)	1,12 (0,55 - 2,25)	0,74
Without OWOB	128(86,5)	157(87,7)		
With CED	42(28,4)	49(27,4)	1,05 (0,63 - 1,76)	0,84
Without CED	106(71,6)	130(72,6)		

Chi-square test, *: $p < 0,05$

Table 4 result show the CED group in subjects, whether vegetarian or non-vegetarian, did not exhibit any significant difference. The OWOB group also did not show a correlation with these two categories ($p>0.05$).

DISCUSSION

There were 327 students participating in our study, with an average age of 20 years. The gender distribution was uneven, comprising 24.2% males and 75.8% females. The majority of participants self-assessed their health as normal and good (60.2% and 27.8%), respectively.

The study results indicated that 45.3% of Hanoi students had either tried or were currently following a vegetarian diet, while 54.7% had never adopted such a diet. Among the vegetarians, 34.5% adhered to a strict vegetarian diet, while 65.5% followed a lacto-ovo vegetarian diet, with the majority maintaining this diet for less than three months (95%). Comparatively, a survey in the UK showed that 68% of individuals aged 18-24 reported adhering to a vegetarian or flexitarian diet.(16) This suggests a growing global trend towards vegetarianism, not limited to Vietnam.

Our research has shown that participants who were or had been vegetarians had diverse reasons for their dietary choices. Among 148 participants, 66 subjects (44.6%) choose vegetarianism for taste preferences, while 44 subjects (27.0%) did so for animal protection. Other reasons included health considerations (25.0%), weight loss (23.0%), religious beliefs (18.2%), and ecological and social aspects (17.6%). These results differed from a 2012 survey,(5) 40.7% of individuals choose a vegetarian diet to attain inner peace and tranquility, while 39% opt for vegetarianism to offer prayers for a specific cause. Additionally, 33.1% choose a vegetarian diet

for health protection, and the pursuit of taste accounts for 28.7%, ranking fourth among the reasons for choosing a vegetarian diet. According to a study conducted in Australia in 2021(17) with 470 vegetarian participants, the primary reason for adopting this dietary regimen was animal protection, constituting the highest proportion at 57.9%, followed by environmental concerns at 51.5%. Notably, the preference for vegetarianism based on taste ranked fifth, with only 2.7% of participants selecting this reason. These variations underscore the diversity in reasons for choosing a vegetarian diet across different demographic groups.

Regarding lifestyle, among 148 individuals there are 59.5% of vegetarians preferred cooking at home, 51.4% opted for vegetarian restaurants, and 6.8% chose to eat at temples. Preparing vegetarian meals at home allows individuals to tailor dishes to their personal tastes, providing a sense of comfort and enjoyment when savoring homemade creations. With the growth and expansion of vegetarian restaurants, individuals now have more options for dining out. Currently, some temples organize short-term retreats, offering a chance for young people, including students, to experience a vegetarian diet briefly and potentially make an informed decision to continue following this dietary regimen in the future.

The study analyzed various factors related to the choice of a vegetarian diet among Hanoi students. In terms of religious factors, 67.9% of 28 religious participants were vegetarians, compared to 43.1% of 299 non-religious participants. This correlation is also evident in the research conducted by Nguyen Tan Tai,(14) where a substantial 62.9% of religious individuals choose a vegetarian diet compared to 46.8% of those without religious affiliations. This can be understood because some religions prescribe specific days for

adherents to observe a vegetarian diet. For instance, in Buddhism, there is a ten-day vegetarian schedule; however, depending on conditions and health, individuals may choose to follow a vegetarian diet for 2, 4, or 6 days within the month. Similarly, in Catholicism, followers are obligated to observe a vegetarian diet on Ash Wednesday and Good Friday. (18)

Concerning nutritional status, both vegetarian and non-vegetarian groups showed similar rates of energy deficiency (28.4% and 27.4%, respectively) and protein-energy malnutrition (13.5% and 12.3%, respectively). However, these differences were not statistically significant. A study conducted in Thua Thien Hue (19) reported a prevalence of OWOB (Total Cholesterol and Blood Pressure) at 25.9% in the vegetarian group, while the non-vegetarian group showed a higher prevalence at 28.5%, a significant difference compared to our study. This variance may be attributed to the age group of the subjects in the Thua Thien Hue study, ranging from 45 to 55 years old. Additionally, our study encompasses a more diverse range of vegetarian diets in terms of types and forms, potentially contributing to the observed differences.

The study found a significant difference in alcohol consumption, with 70.3% of vegetarians consuming alcohol compared to 57% of non-vegetarians ($p=0.013$). The study conducted by Nguyen Thi Phuong Anh in 2017 revealed a lower alcohol consumption rate in the vegetarian group compared to non-vegetarians (2.19% and 17.8%).(20) This could be explained by the fact that a majority of participants in our study had a relatively short duration of adopting a vegetarian diet (less than 3 months: 64.2%), indicating that some pre-existing lifestyle habits may still be maintained.

The frequency of vigorous physical activity also differed significantly, with 87.2% of

vegetarians reporting engaging in such activities compared to 75.4% of non-vegetarians ($p=0.007$). Comparing with another study conducted in Germany, Austria, and Switzerland, involving 245 participants in endurance running, 136 individuals opted for a vegetarian or vegan diet.(2) The differences in physical activity levels between the two groups could be attributed to the trend of increased activity accompanying the choice of a healthy diet aimed at improving overall health.

The study did not find a correlation between a vegetarian diet and late-night eating habits. Similarly, there was no association found between the choice to smoke or use dietary supplements and the decision to adopt a vegetarian diet. Currently, both in Vietnam and worldwide, there is a scarcity of research indicating a correlation between the practice of vegetarianism and the mentioned factors.

There are some limitations that can be seen in our study. The small sample size along with the cross-sectional descriptive research method led to a lack of depth in understanding and determining correlations between factors. Moreover, most of the participants in our study have only started a vegetarian diet for less than three months (95%), so they may still be affected by lifestyle and behavior existing before this diet.

Our study provides insights into factors related to vegetarianism among Hanoi students. Further, larger, long-term studies are needed to determine the specific health impacts of vegetarian diets and provide better nutritional guidance for individuals following such diet.

CONCLUSION

In our study, with the dual objectives of describing the prevalence of vegetarianism

and analyzing factors related to the vegetarian practices of students in Hanoi in 2023, the research results revealed a relatively high prevalence of vegetarianism within the student community, in which the rate of a periodic vegetarian diet accounts for the majority. Regarding the motivations for choosing a vegetarian lifestyle, taste preferences and animal welfare were the predominant factors among the participants in our study. Furthermore, to analyze some factors related to vegetarian status, the research results indicate a correlation between alcohol consumption behavior and vigorous physical activity with the vegetarian status. Additionally, religious factors significantly contribute to the research findings, as students following a religion have a higher rate of vegetarianism. Based on these research findings, it is essential to conduct more studies with larger sample sizes to obtain an objective understanding of the vegetarian status and related factors among students. Moreover, the development of a suitable vegetarian diet for students is necessary to ensure optimal health.

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