THE KNOWLEDGE OF RESPIRATORY INFECTIOUS DISEASE PREVENTION AMONG MEDICAL STUDENTS AT THE VIETNAM UNIVERSITY OF TRADITIONAL MEDICINE IN 2025

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ABSTRACT

Objective: To assess the knowledge of respiratory infection prevention among medical students at the Vietnam University of Traditional Medicine in 2025.

Subjects and Methods: A descriptive cross-sectional study was conducted on 908 medical students from the 3rd to 6th academic years between May and October 2025 using a structured questionnaire. Data were collected and analyzed using Excel and SPSS version 22.0. Statistical significance was set at $p < 0.05$.

Results: Among 908 students, the mean knowledge score on respiratory infection prevention increased progressively across academic years: Medical students, Year 3 (MS3) 8.95 ± 1.37, MS4 9.03 ± 1.10, MS5 9.45 ± 1.17, and MS6 9.98 ± 1.19. There was a difference in the mean knowledge scores between General Medicine students (9.44 ± 1.32) and Traditional Medicine students (9.16 ± 1.22); however, this difference was not statistically significant ($p > 0.05$).

Conclusion: Medical students demonstrated fairly good to good levels of knowledge regarding respiratory infection prevention, which improved progressively with academic year.

Keywords: Students, respiratory infections, knowledge.

1. INTRODUCTION

Currently, respiratory diseases remain one of the most common and concerning public health issues worldwide. According to 2021 statistics, approximately 12.8 billion new cases and 177 million prevalent cases of upper respiratory tract infections were recorded globally, resulting in over 19,600 deaths and 5.68 million disability-adjusted life years (DALYs) [1]. In Vietnam, upper respiratory diseases such as the common cold, influenza, acute sinusitis, and acute otitis media account for a large proportion of acute illnesses, with two distinct influenza seasons each year depending on regional climatic characteristics [2]. Statistics from six northern and north-central provinces during 2017–2021 showed that the number of hospital admissions due to upper respiratory infections ranged from 6,899 to 19,762 cases per year [3].

Medical students - a group frequently studying and practicing in healthcare environments - are at high risk of exposure to respiratory pathogens, particularly in the context of seasonal influenza, COVID-19, and other emerging infectious diseases that continue to pose potential risks. Assessing students' knowledge during their training period provides an overall perspective, helping to equip them with accurate knowledge and attitudes toward respiratory infection prevention. This is particularly important not only to protect themselves but also to reduce transmission risks within communities and healthcare facilities.

2. SUBJECTS AND METHODS

2.1. Study design

Descriptive cross-sectional study

2.2. Study setting and period

The study was conducted at the Vietnam University of Traditional Medicine from May to October 2025.

2.3. Study subjects

- Inclusion criteria:

+ Medical students from third - to sixth - year practicing at hospitals during the 2024-2025 academic year.

+ Agreed to participate in the study.

- Exclusion criteria:

+ Students with underlying respiratory diseases.

+ Students who declined to participate.

2.4. Sample size and sampling method

The sample size was calculated using the formula:

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

Where: n: minimum required sample size

+ Z = 1.96 (with 95% confidence interval)

+ α = 5% significance level

+ p = estimated proportion of students with correct knowledge (p = 0.5)

+ d = desired precision (0.05)

+ dE = design effect = 2

The calculated minimum sample size was 768 students. In practice, the study collected data from 908 students.

2.5. Evaluation criteria

Data were collected using a pre-designed, self-administered questionnaire. Results were evaluated according to the Bloom cut-off scale to classify levels of knowledge among participants [4].

- Knowledge assessment (0–12 points): Each question was scored on a scale of 0–12, and results were classified as follows:

+ Good: ≥ 80% (≥ 9.6 points)

+ Fair: 60% ≤ correct knowledge < 80% (7.2 ≤ total score < 9.6 points)

+ Average: < 60% (< 7.2 points)

2.6. Data processing method

Data were entered and analyzed using biomedical statistical algorithms in SPSS version 20.0. The non-parametric Mann–Whitney U test was used to compare between the two majors, and the Kruskal–Wallis test was applied to compare among academic years. A p-value of < 0.05 was considered statistically significant. Results were presented as X̄±SD.

2.7. Ethical considerations

The study was approved by the Proposal Evaluation Committee and the Ethics Committee of the Vietnam University of Traditional Medicine. All procedures complied with fundamental principles of research ethics.

3. RESULTS

3.1. Characteristics of study participants

Table 1. Characteristics of study participants

Characteristics		
Content	Number (n)	Percentage (%)
Gender		
Male	278	30,6
Female	630	69,4
Total	908	100
Major		
General Medicine	521	57,4
Traditional Medicine	387	42,6
Total	908	100
Academic year		
Medical students, Year 3 (MS3)	258	28,4
Medical students, Year 4 (MS4)	211	23,2
Medical students, Year 5 (MS5)	236	26
Medical students, Year 6 (MS6)	203	22,4
Total	908	100

Among the 908 participants, 69.4% were female (630 students) and 30.6% were male (278 students). Medical students accounted for 57.4% (521 students), and traditional medicine students 42.6% (387 students). Distribution by academic year was relatively balanced: MS3 (28.4%), MS4 (23.2%), MS5 (26%), and MS6 (22.4%).

3.2. History of respiratory disease and vaccination among students

Table 2. History of respiratory disease and vaccination among students

Content			Number (n)	Percentage (%)
History of respiratory disease	No		286	31,5
	Yes		622	68,5
	Including:	Influenza (seasonal virus)	476	38,7
		Acute nasopharyngitis	305	24,9
		COVID- 19	185	15,1
		Acute bronchitis	133	10,8

Content			Number (n)	Percentage (%)
History of respiratory disease	Including:	Pneumonia	85	6,9
		Allergic rhinitis	21	1,7
		Pulmonary tuberculosis	8	0,6
History of vaccination against respiratory diseases		Never vaccinated	72	7,93
		Vaccinated	836	92,07
	Including:	Tuberculosis (BCG)	831	99,4
		COVID-19	804	96,17
		Influenza A/B	445	53,23

Out of 908 students, 68.5% (622) reported having had a respiratory illness, while 31.5% (286) had not. The most common conditions were influenza (38.7%), acute nasopharyngitis (24.9%), COVID-19 (15.1%), and acute bronchitis (10.8%). Less frequent illnesses included pneumonia (6.9%), allergic rhinitis (1.7%), chronic bronchitis (1,3%) and tuberculosis (0.6%). Regarding vaccination, 92.1% of students had received at least one respiratory-related vaccine - most commonly BCG (99.4%), COVID-19 (96.2%), and influenza A/B (53.2%).

3.3. Students' knowledge level on respiratory disease prevention by academic year

Table 3. General knowledge level of respiratory diseases by academic year

Content	Academic Year		MS3		MS4		MS5		MS6	
	Level		≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%
General knowledge about respiratory diseases	Common respiratory diseases	Percentage	22.1%	29.5%	17.1%	24.2%	17.4%	46.6%	27.1%	30.5%
		Mean Score	7,06 ± 3,84		7,55 ± 2,59		8,31 ± 2,39		8,53 ± 2,49	
	Main transmission routes	Percentage	60.5%	18.2%	42.2%	51.2%	47%	46.6%	63.5%	31.5%
		Mean Score	8,81 ± 4,65		9,40 ± 2,47		9,71 ± 2,36		10,33 ± 2,41	
	Preventive measures	Percentage	58.1%	16.3%	49.8%	20.4%	62.3%	14.8%	64.5%	28.6%
		Mean Score	9,12 ± 3,80		8,80 ± 3,49		9,54 ± 3,42		10,29 ± 2,54	
Mean knowledge score			8,95 ± 1,37		9,03 ± 1,10		9,45 ± 1,17		9,98 ± 1,19	

The results indicated that students' general knowledge of respiratory diseases increased progressively by academic year. Knowledge regarding main transmission routes and preventive measures reached Fair to Good levels, with mean scores ranging from 8.81 ± 4.65 to 10.33 ± 2.41 and from 9.12 ± 3.80 to 10.29 ± 2.54, respectively.

Overall, mean knowledge scores increased by year level: MS3 (8.95 ± 1.37), MS4 (9.03 ± 1.10), MS5 (9.45 ± 1.17), and MS6 (9.98 ± 1.19).

Table 4. Knowledge level of respiratory disease prevention by academic year

Content	Academic Year		MS3		MS4		MS5		MS6	
	Level		≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%
Knowledge about masks	Preventive effectiveness	Percentage	80,2%	0%	80,1%	0%	85,2%	0%	87,7%	0%
		Mean Score	9,58 ± 4,82		9,61 ± 4,80		10,22 ± 4,27		10,52 ± 3,95	
	Proper wearing method	Percentage	75,2%	0%	74,9%	0%	68,6%	0%	74,4%	0%
		Mean Score	10,21 ± 3,35		10,21 ± 3,32		9,81 ± 3,47		10,40 ± 2,79	
	Standards for qualified masks	Percentage	28,7%	38,4%	28,9%	46,9%	36,4%	37,7%	48,8%	32,5%
		Mean Score	7,60 ± 3,54		8,08 ± 3,15		8,32 ± 3,34		9,08 ± 3,33	

Content	Academic Year		MS3		MS4		MS5		MS6	
	Level		≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%	≥ 80%	60-80%
Knowledge about hand hygiene	Timing of hand hygiene	Percentage	60.9%	26.4%	56.9%	21,3%	53.8%	23.3%	59,1%	22,7%
		Mean Score	10,31 ± 2,49		9,94 ± 2,69		9,78 ± 2,79		10,12 ± 2,60	
	Hand hygiene procedure	Percentage	67.4%	0%	74.9%	0%	78.4%	0%	77.8%	0%
		Mean Score	8,09 ± 5,63		8,99 ± 5,22		9,41 ± 4,95		9,34 ± 5,00	
Knowledge about vaccines	Diseases preventable by vaccines	Percentage	53.5%	43.4%	40.3%	58.8%	60.2%	37.7%	60.1%	24.6%
		Mean Score	9,95 ± 2,45		9,57 ± 2,04		10,29 ± 2,27		9,77 ± 3,03	
	Influenza A/B booster vaccination interval	Percentage	76%	0%	72.5%	0%	71.2%	0%	73.4%	0%
		Mean Score	9,12 ± 5,14		8,70 ± 5,37		8,54 ± 5,45		8,81 ± 5,32	

Knowledge about mask usage achieved Good levels for correct-wearing technique (9.81 ± 3.47 to 10.40 ± 2.79), whereas understanding of mask quality standards remained at Fair levels (7.60 ± 3.54 to 7,60 ± 3,54).

Knowledge of hand hygiene reached Good levels in recognizing appropriate times for handwashing, though procedural knowledge remained at Fair levels.

Knowledge of vaccines was generally Good regarding vaccine-preventable diseases, with mean scores ranging from 9.57 ± 2.04 to 10.29 ± 2.27.

3.4. Students' knowledge level by academic major

Table 5. General knowledge level of respiratory diseases by academic major

Content	Mean Score		p
	General Medicine	Traditional Medicine	
General knowledge about respiratory diseases			
Common respiratory diseases	7,85 ± 2,84	7,79 ± 3,19	> 0,05
Main transmission routes	9,59 ± 3,08	9,41 ± 3,48	> 0,05
Preventive measures	9,45 ± 3,34	9,37 ± 3,52	> 0,05
Mean knowledge score	9,44 ± 1,32	9,16 ± 1,22	> 0,05

The mean knowledge scores of students from the General Medicine and Traditional Medicine programs showed some differences; however, these differences were not statistically significant (p > 0.05). Overall, the general level of knowledge about respiratory diseases among students in both programs was rated as Fair.

Overall, the mean knowledge score of General Medicine students (9.44 ± 1.32) was higher than that of Traditional Medicine students (9.16 ± 1.22); however, this difference was not statistically significant (p > 0.05).

Table 6. Knowledge level of respiratory disease prevention by academic major

Content	Mean Score		p
	General Medicine	Traditional Medicine	
Knowledge about masks			
Preventive effectiveness	9,97 ± 4,50	9,94 ± 4,53	> 0,05
Proper wearing method	10,17 ± 3,12	10,11 ± 3,45	> 0,05
Standards for qualified masks	8,25 ± 3,38	8,18 ± 3,41	> 0,05
Knowledge about hand hygiene			
Timing of hand hygiene	10,05 ± 2,66	10,02 ± 2,64	> 0,05
Hand hygiene procedure	8,96 ± 5,22	8,88 ± 5,27	> 0,05
Knowledge about vaccines			
Diseases preventable by vaccines	9,93 ± 2,53	9,88 ± 2,40	> 0,05
Influenza A/B booster vaccination interval	8,75 ± 5,34	8,85 ± 5,29	> 0,05

Regarding knowledge related to mask use and hand hygiene, students achieved Fair to Good levels, in which understanding of mask-related content and

proper-wearing techniques reached Good levels. The mean scores for these aspects were 10.17 ± 3.12 in General Medicine and 10.11 ± 3.45 in Traditional Medicine (p > 0.05).

For the topic of vaccines and influenza A/B booster vaccination intervals, students from both programs demonstrated Fair levels of knowledge, with mean scores of 8.75 ± 5.34 in General Medicine and 8.85 ± 5.29 in Traditional Medicine (p > 0.05).

4. DISCUSSION

The results reflect typical epidemiological characteristics of respiratory illnesses among young adults studying and living in crowded environments. Among 908 students, 622 (68.5%) had experienced at least one respiratory illness, totaling 1,229 reported episodes. Seasonal influenza accounted for the highest proportion (38.7%), followed by acute nasopharyngitis (24.9%) and acute bronchitis (10.8%). The rapid transmissibility, frequent antigenic variation, and early viral shedding of influenza facilitate its spread in enclosed environments such as classrooms, dormitories, and hospitals-settings where medical students frequently interact [5]. University dormitories have repeatedly been identified as influenza transmission hotspots due to high interpersonal contact density [6]. The 15.1% COVID-19 rate reflects the lingering impact of the 2020–2021 pandemic.

Regarding vaccination, 836 participants (92.07%) had received at least one type of vaccine against respiratory diseases, while 72 students (7.93%) had never been vaccinated. Among those who had been vaccinated, the BCG vaccine accounted for 99.4%, the COVID-19 vaccine reached 96.17%, and the influenza A/B vaccine was only 53.23%. This rate accurately reflects the context in Vietnam: BCG is a mandatory vaccine under the Expanded Program on Immunization; COVID-19 vaccination was widely implemented during 2021–2022; whereas influenza vaccination is only recommended seasonally, depending on cost and individual awareness. These results are consistent with the study by Le Ngoc Cua et al. (2022) among health science students, which recorded the rate of acceptance or having received at least one dose of the COVID-19 vaccine at approximately 93.6% [7], higher than the findings of Pham Le An (2021) with a rate of 77%–88%. However, this difference may be due to the earlier data collection period, before the nationwide vaccination campaigns (2021–2022) reached their peak [8].

The general knowledge of students about respiratory infectious diseases reached a fairly good to good level, showing an upward trend by academic year, particularly among Year 5-Year 6 students. Topics such as the main routes of transmission and preventive measures achieved good levels, reflecting the accumulation of knowledge and clinical experience. Knowledge regarding the use of medical masks was generally good; students were well aware of proper wearing techniques and preventive effects, but still limited in understanding the maximum duration of use and the criteria for standard masks, similar to trends reported in some surveys on respiratory disease prevention practices among Vietnamese medical students [9]. Knowledge about hand hygiene also remained at a fairly good to good level, in which "moments for hand hygiene" were better understood than the "hand hygiene procedure," consistent with WHO's observation that compliance with hand hygiene decreases in the absence of regular supervision. Regarding vaccines for respiratory diseases, students clearly understood the role of immunization but showed limitations in remembering the annual influenza booster schedule-a phenomenon also common among medical students and young healthcare workers worldwide. The findings are consistent with those of Nguyen Thi Hai Ha et al. (2023), which also indicated a trend of knowledge accumulation by academic year, particularly in infection control knowledge [10]. Between General Medicine and Traditional Medicine students, the mean knowledge scores were both at a fairly good to good level, with no statistically significant difference (p>0.05), indicating comparable training effectiveness. Overall, it is necessary to strengthen preclinical training, reinforce practical knowledge about infection control, and regularly update the educational content on vaccination and hand hygiene in accordance with guidelines.

Awareness of respiratory prevention was Fair overall, improving by academic year. Awareness regarding lab coat use and maintenance was limited in MS3 but improved to Fair in MS4-MS6. Mask use awareness was Good, particularly regarding hygiene and frequency. Awareness of hand hygiene was also Good regarding frequency, though understanding of disinfectant versus soap use varied. Awareness of exposure risks and safe practices was higher among MS5-MS6 students. Mean awareness scores ranged from 3.3 to 4.4, indicating a generally Fair foundation that still requires targeted interventions to elevate all cohorts to Good levels. Suggested measures include reinforcing pre-clinical infection control protocols, scenario-based training, and post-clinical assessments that convert awareness (3.9-4.0) into sustained compliance upon graduation.

Regarding the relationship between infection control training and knowledge level, the results showed that students who had received training had a higher mean knowledge score compared to those who had not (9.37 ± 1.37 vs. 8.14 ± 1.79), indicating a positive association between training and understanding. These findings suggest that infection control training sessions should be organized before clinical practice and periodically reinforced to help students consolidate their knowledge and develop correct practice habits in the hospital setting.

5. CONCLUSION

From the survey of 908 students across MS3-MS6:

- There were 630 female students (69.4%) and 278 male students (30.6%). General Medicine students accounted for 57.4% (521), and Traditional Medicine students 42.6% (387). The proportion of students who had experienced respiratory disease was 68.5%, with specific rates of influenza (38.7%), nasopharyngitis (24.9%), and COVID-19 (15.1%). Moreover, 92.07% had received at least one respiratory vaccine (influenza, tuberculosis, or COVID-19).

- Knowledge: Mean overall knowledge scores increased with academic year. MS3: 8.95 ± 1.37 (Fair), MS4: 9.03 ± 1.10 (Fair), MS5: 9.45 ± 1.17 (Fair), MS6: 9.98 ± 1.19 (Good). Between majors, General Medicine students (9.44 ± 1.32) and Traditional Medicine students (9.16 ± 1.22) both achieved Fair levels, with no statistically significant difference (p > 0.05).

- Awareness: Mean awareness scores also increased with academic year. All cohorts achieved Fair levels: MS3 (3.49 ± 0.38), MS4 (3.60 ± 0.33), MS5 (3.68 ± 0.34), and MS6 (3.94 ± 0.32).

REFERENCES

[1] Institute for Health Metrics and Evaluation (IHME). Upper respiratory infections — Level 3 cause. 2021.

[2] Le TT, Pham TH, et al. Circulation of influenza B lineages in northern Viet Nam, 2007–2014. Western Pacific Surveillance and Response Journal. 2015;6(4):17-23.

[3] Pham TBD, Mai TMP, et al. Thuc trang benh ho hap tren tai 6 benh vien khu vuc giap vinh Bac Bo tu nam 2017–2021. Tap chi Nghien cuu Y hoc. 2022;159(11):204-211.

[4] Feleke BT, Shibeshi W, Gizachew M, Ayano G. Knowledge, attitude and preventive practice towards COVID-19 and associated factors among outpatient service visitors at Debre Markos comprehensive specialized hospital, Northwest Ethiopia. BMC Public Health. 2021;21(1):439.

[5] Centers for Disease Control and Prevention (US). Chapter 6: Influenza. In: Manual for the Surveillance of Vaccine-Preventable Diseases [Internet]. Atlanta (GA): CDC; 2017 Nov 10 [cited 2025 Oct 19].

[6] Zivich PN, Eisenberg MC, et al. Transmission of viral pathogens in a social network of university students: the eX-FLU study. Epidemiol Infect. 2020;148:e267.

[7] Cua NL, Nguyen UTT, Do DTH. Predictors of COVID-19 vaccine acceptability among health professions students in Vietnam. BMC Public Health. 2022;22:854.

[8] Pham LA, Nguyen HN, Nguyen DD, Vo LY, Huynh G. The intention to get a COVID-19 vaccine among the students of health science in Vietnam. Hum Vaccin Immunother. 2021;17(12):4823–8.

[9] Khanh Thi Lien, N., Dinh Luyen, L., & Ngoc Thuy Tien, Doan. (2022). Thuc trang ve phong chong dich benh viem duong ho hap cap Covid-19 cua sinh vien truong Dai hoc Y Ha Noi nam 2020. Tap Chi Y hoc Viet Nam, 513(1).

[10] Nguyen Thi Hai Ha, Le Kien Ngai, Tran Quynh Anh, Vu Kim Quy, Do Minh Thuy. Kien thuc ve kiem soat nhiem khuan co ban cua sinh vien, hoc vien thuc hanh tai Benh vien Nhi Trung uong nam 2022. Tap chi Nhi khoa. 2023;16(3).