Sexual health and sexually transmitted diseases knowledge: insights from a large-scale university student survey in Ho Chi Minh City, Vietnam

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Abstract

Background: Sexually transmitted diseases (STDs) are a critical public health issue affecting millions worldwide, with significant repercussions on sexual and reproductive health. This study aims to evaluate the knowledge, attitudes of STDs of university students in Ho Chi Minh City and to identify key socio-demographic factors influencing their awareness. **Method:** A cross-sectional survey was conducted using a structured questionnaire, including the participants' demographic and their knowledge of sexual health (15 items) and STDs (43 items), sexual behavior and attitude toward STD. Differences in STDs knowledge were statistically assessed using Kruskal-Wallis, t-tests and Chi-squared tests. **Results:** The study garnered 19,251 valid responses from students across various academic disciplines and demographic backgrounds. The insights revealed a moderate level of knowledge about sexual health and STDs among the student population. Factors such as gender, field of study, and urban versus rural upbringing significantly influenced knowledge levels. Students majoring in health-related fields and those from urban areas had better understanding, while those who grew up in rural areas or from non-health disciplines demonstrated lower knowledge level. Some misconceptions regarding STDs transmission and prevention remained prevalent, including the belief that condom can completely prevent STDs transmission. **Conclusions:** This study underscores gap in knowledge level and discusses the effect of stigma on perception and behavior. The results provide a foundation for developing targeted interventions aimed at improving STDs awareness and preventative practices among university students in Vietnam. Educational institutions need to play a more active role in providing accurate, accessible, and engaging educational program, as well as creating a supportive environment for open discussions about sexual health.

Keywords: *sexual health education, sexually transmitted diseases, STDs, university student, Vietnam.*

1. INTRODUCTION

Sexually transmitted diseases (STDs) are a significant public health concern affecting sexual and reproductive health, including infertility, complications in newborns, liver diseases, an increased risk of HIV infection, and cancers. A report in 2023 from The World Health Organization (WHO) estimates over one million new STDs cases daily [1], highlighting the ongoing challenge these diseases pose, particularly among younger populations. Numerous studies have identified the inadequate education and awareness regarding STDs as a significant global public health challenge [2]. Despite advancements in medical treatments, the prevalence of misconceptions and stigma surrounding STDs often delay diagnosis and treatment, thereby exacerbating health risks and transmission rates.

Vietnam is a developing country, with around 100,000 new cases of STDs annually [3]. Surveys have highlighted three critical issues in STDs prevention and education in Vietnam. First, the prevalence of STDs among young people has been increasing annually [3,4]. Second, knowledge about the risks, prevention methods, and treatment options for STDs remains low among youth [5,6]. Third, current educational and communication efforts for youth on STDs limited in accessibility and scope [5,7]. University students, in critical stages of personal and sexual development, are particularly vulnerable to the risks associated with inadequate sexual health knowledge [8]. These young patients lack sufficient knowledge about these diseases, which delays medical consultations and inadvertently makes them sources of infection

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within the community [9]. Thus, understanding the level of knowledge among university students is crucial for developing targeted educational interventions and improving public health outcomes.

In Vietnam, there has been several efforts to evaluate knowledge level of teenagers and adolescence. However, these were limited by scale; often focusing only on HIV or evaluating only healthcare students [10-16]. This study aims to evaluate the knowledge and attitudes of university students in Ho Chi Minh City towards STDs, identify key influencing factors, and thereby developing strategies for enhancing awareness and preventive behaviors in students. By accessing data from a large-scale survey of over 19,000 students, this research contributes to the ongoing efforts to improve sexual health education in Vietnam.

2. MATERIALS AND METHODS

The study was approved by the Ethics Review Board of the University of Social Sciences and Humanities, National University of Ho Chi Minh City (ERB No. 18-24, signed July 31, 2024).

2.1. Study design

A cross-sectional survey was conducted among university students in Ho Chi Minh City from September to October 2024. The survey employed a structured questionnaire designed to capture demographic data, knowledge levels, attitudes, and behaviors related to sexual health and STDs.

Participants were recruited from universities within the National University of Ho Chi Minh City network and other higher education institutions in Ho Chi Minh City. The survey was distributed through online platforms (Google Forms). Participation was voluntary and anonymous. Informed consent was implied through survey completion; participants can stop at any point during the survey.

Sampling technique. In this study, we applied convenience sampling method for quantitative survey research to collect data. Several attention questions have been included to ensure data quality in surveys. Samples lacking complete mandatory data or failing to meet eligibility requirements will be removed from the dataset. At first 19,839 surveys were collected. Using criteria, 19,251 (97%) surveys were used for main analysis.

2.2. Questionnaire design

The questionnaire was designed based on previous surveys [17–20]. The questionnaire was pre-tested among 35 students at International University-VNUHCM to check for any inconsistencies and these students were asked not to participate in the final survey.

The questionnaire consisted of four main sections: (1) **Demographics**: Information on age, gender, academic year, and living conditions during adolescence; (2) **Knowledge of** general sexual health knowledge (15 items) (3) knowledge of STDs (43 items), and attitudes, concerns, perceptions about STDs risks; (4) **Behavioral Practices** including sexual activity, contraceptive use, and healthcare-seeking behaviors in case of suspected STDs.

2.3. Data analysis

Survey responses were analyzed using R-4.3.0 statistical software. Data visualization was carried out using ggplot2 [21]. Descriptive statistics were used to summarize demographic data and levels of knowledge, attitudes, and behaviors. Knowledge of general sexual health and STDs was evaluated based on 15 items and 43 items respectively. Each item was given a score of "1" for correct answers and "0" for wrong answers or don't know. and the score for each category and the final score was converted to 100-point scale for analysis.

Inferential analyses, including Kruskal-Wallis, t-tests, and chi-square tests were conducted to examine associations between socio-demographic factors and knowledge levels. P-value < 0.05 were considered statistically significant.

Using median score as the cutoff, the participants who scored above median were considered as having good knowledge; those participants who scored less than or equal to median were considered as having poor knowledge [22].

Fisher exact analysis was employed to examine all items of each attitude and behavior questions, with knowledge level (high vs. low) as the binary dependent variable.

3. RESULTS

3.1. Demographic characteristics of the participants

The survey collected 19,839 responses. After screening and removing invalid entries, 19,251 valid responses were included for further analysis, which comprised of 43.18% (n = 8,312) male and 56.82% (n = 10,939) female participants (Table 1).

Table 1. Summary of respondents' demographics (n = 19,251)

Factors		N (%)
Gender	Male	8,312 (43.18)
	Female	10,939 (56.82)
Academic year	1st year	7,455 (38.73)
	2nd year	5,118 (26.59)
	3rd year	3,175 (16.49)
	4th year	2,822 (14.66)
	> 4th year	681 (3.54)
Field of study	Natural Sciences and Engineering	6,865 (34.73)
	Social Sciences and Humanities	5,583 (29.0)
	Health Sciences	3,655 (18.98)
	Economics and Management	2,012 (10.45)
	Education	1,136 (5.90)
Adolescent household composition (grades 6-12)	Both parents	12,210 (63.43)
	Grandparents	269 (1.40)
	Multigenerational	5,386 (27.98)
	Mother or father only	992 (5.15)
	Other family members or relatives	248 (1.29)
	Alone/with friends	146 (0.76)
Adolescent residential context	Urban	6,897 (35.83)
	Suburb	2,523 (13.11)
	Town (> 15,000 ppl)	2,014 (10.46)
	Small town (< 15,000 ppl)	1,287 (6.69)
	Rural	4,405 (22.88)
	Mixed*	2,125 (11.04)
Sex intercourse	Yes	2,953 (15.34)
	No	16,298 (84.66)
Had STDs	Yes	264 (1.37)
	No	12,949 (67.26)
	Unknown due to lack of medical examination	6,038 (31.37)

* Mixed: when students indicated they had lived in multiple types of arrangement

Most respondents were first- or second-year university students. The majority of students had grown up in urban areas (35.83%) or rural regions (22.88%). Regarding academic disciplines, the respondents were distributed across natural sciences and engineering (34.73%), social sciences and humanities (29.0%), health sciences (18.98%), economics and management (10.45%), and education (5.9%). Participants also reported diverse adolescent settlement contexts. Urban areas were the most common (35.83%), followed by rural settings (22.88%). Suburbs accounted for 13.11%, while 10.46% lived in towns with populations over 15,000. Smaller towns (< 15,000 people) comprised 6.69%, and 11.04% had lived in mixed environments. The adolescent family environment also varied among participants. Most reported living with both parents during grades 6 - 12 (63.43%). A notable proportion were raised in multigenerational households (27.98%), while others lived with a single parent (5.15%), grandparents (1.40%), other relatives (1.29%), or alone/with friends (0.76%). Among respondents, 16,298 (84.66%) had not engaged in sexual activity, while 2,953 (15.34%) reported having done so, with higher rates among older students. Most students (98.63%), regardless

of their sexual activity status, either had no STDs or were unaware of their status.

3.2. Students' knowledge level

The results revealed that students exhibited moderate knowledge and awareness, with median score of 53.33/100 for general sexual health knowledge and 55.81/100 for knowledge of STDs (Figure 1A & 1B). A summary of responses to specific questions across various knowledge domains is provided in Table S1. When asked to self-assess their knowledge on a scale of 1 to 5, students generally rated themselves higher than their scores based on survey responses, indicating overconfidence in their knowledge (Figure 1C).

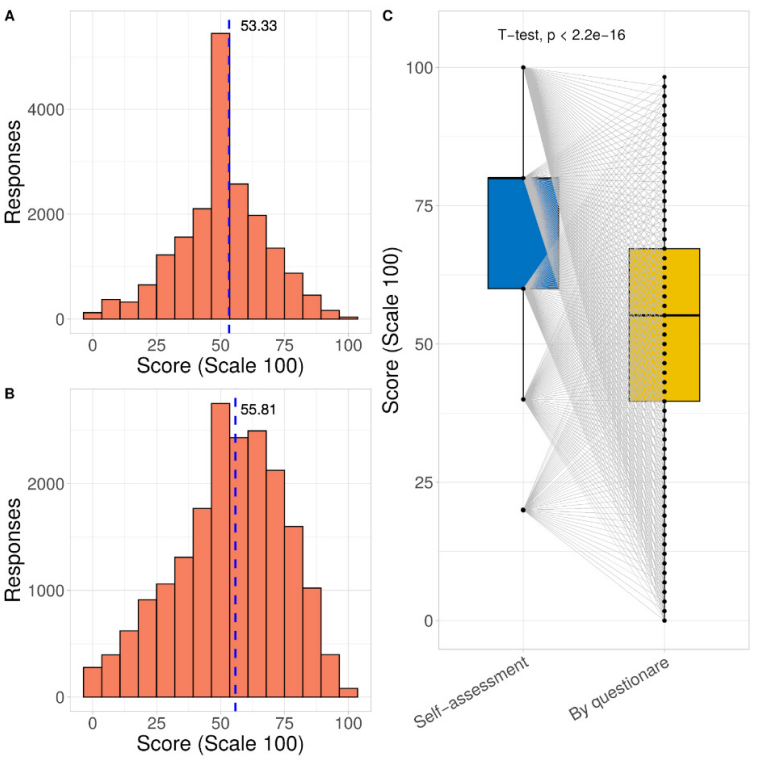

Figure 1. Students' knowledge level of (A) General sexual health (15 items); (B) STDs (43 items); (C) Comparison of students' level of understanding: Self-assessment and Total score ($p < 2.2e^{-16}$).

3.3. Socio-demographic factors associating with knowledge level

Socio-demographic factors that might play a role in determining student knowledge level are analyzed. A data analysis of gender differences in understanding revealed small but statistically significant difference, where female students demonstrated a marginally higher knowledge level in both sexual health and STDs compared to their male counterparts (Table 2). Scores of sexual health knowledge vary across academic years, with a notable increase in students beyond the 4th year (59.33 ± 19.45) and show moderate fluctuations in other academic year. Students in year > 4th also had the highest score in STDs knowledge (69.04 ± 20.16), while 1st-year students scored 54.17, with a drop in 2nd year (50.72), then a steady increase in year 3rd (53.06) and 4th (55.07) (Table 2). Those majoring in health-related fields also demonstrate higher level of knowledge in both sexual health and STDs. Analysis of family characteristics showed that students living with both parents or in multi-generational households had the highest levels of knowledge. In contrast, students living with extended family or relatives demonstrated the lowest levels of understanding (table 2). The sexual health scores are higher in participants from urban areas, mixed environments, and suburban. Rural residents had the lowest sexual health scores. A similar trend appears for STDs scores when students from urban, suburban, and mixed areas had high awareness, while the lowest STD awareness is seen among those from rural areas (table 2).

Table 2. Students' knowledge level according to social-demographic factors (n = 19,251)

Factors		Knowledge of general sexual health	Knowledge of STDs
Biological Sex	Male	49.70 ± 19.55	51.98 ± 22.28
	Female	51.43 ± 18.00	55.05 ± 20.98
	p-value	< 0.001***	< 0.001***
Academic year	1st year	51.36 ± 18.00	54.17 ± 20.48
	2nd year	48.67 ± 18.87	50.72 ± 21.72
	3rd year	50.06 ± 19.14	53.06 ± 22.25
	4th year	51.14 ± 18.83	55.07 ± 22.15
	> 4th year	59.33 ± 19.45	69.04 ± 20.16
	p-value	< .001***	< .001***
Field of study	Education	47.95 ± 18.35	48.66 ± 20.44
	Economics and Management	49.51 ± 17.83	51.02 ± 20.59
	Natural Sciences and Engineering	49.86 ± 19.32	51.69 ± 21.90
	Social Sciences and Humanities	49.14 ± 18.05	51.31 ± 20.56
	Health Sciences/Medicine	56.07 ± 18.11	64.32 ± 20.22
	p-value	< .001***	< .001***
Adolescent household composition (grades 6 - 12)	Both parents	50.60 ± 18.68	53.66 ± 21.65
	Mother or father only	50.33 ± 19.25	52.16 ± 21.70
	Grandparents	49.59 ± 19.17	52.83 ± 20.80
	Other family members or relatives	46.75 ± 18.62	47.67 ± 21.82
	Multigenerational	51.21 ± 18.57	54.55 ± 21.40
	Alone/with friends	49.18 ± 20.28	51.90 ± 23.47
	p-value	.004**	< .001***
Adolescent residential context	Urban	51.55 ± 18.61	55.30 ± 21.40
	Suburb	51.14 ± 18.41	54.87 ± 21.54
	Town (> 15000 ppl)	50.09 ± 19.09	52.39 ± 21.69
	Small town (< 15000 ppl)	50.42 ± 19.20	52.48 ± 21.63
	Rural	49.15 ± 18.68	51.00 ± 21.76
	Mixed	51.22 ± 18.53	54.95 ± 21.27
	p-value	< 0.001***	< 0.001***

Knowledge score is written as mean±SD (***p ≤ 0.001, **p ≤ 0.01, *p ≤ 0.05).

3.4. Behavioral practices related to and attitudes toward sex health and STDs

The survey showed that 77.12% of students (56.99 + 20.14% for Agree and Strongly agree respectively, Table 3) identified that condom using is one of the effective methods to protect against STDs and understand the significant role of condoms in preventing STDs (84.05%, Table 3). Students also correctly estimated the important of using condoms in anal sex or in case both partners having STDs (89%, Table 3). Excellently, almost students agreed that although condoms are efficient but not completely prevent STDs transmission (66.52%, Table 3). Around 87.74% acknowledged the importance of regular STDs testing and professional counseling and 87.35% understand that having multiple partners increases the risk of STDs transmission

(Table 3). However, some misconceptions were noted, including the belief that using condom can completely prevent STDs transmission (33.49%). Alarmingly, 20.18% believed educational organizations should not discuss these topics (Table 3) while 20.03% expressed that they are unconcerned about STDs (Table 3).

Table 3. Students' attitudes and concerns toward Sexual health and STDs (n = 19,251)

Items	Strongly disagree n (%)	Disagree n (%)	Agree n (%)	Strongly agree n (%)
Condoms use				
Condoms help protect us from STDs	1,703 (8.85)	2,700 (14.03)	10,971 (56.99)	3,877 (20.14)
It is not necessary to use condoms during anal sex	10,159 (52.77)	7,075 (36.75)	1,515 (7.87)	502 (2.61)
If both partners have STDs, there is no need to use condoms	11,091 (57.61)	6,042 (31.39)	1,544 (8.02)	574 (2.98)
Condoms play an important role in preventing STDs	1,423 (7.39)	1,647 (8.56)	9,864 (51.24)	6,317 (32.81)
Using condoms can completely prevent the transmission of STDs	3,931 (20.42)	8,874 (46.10)	4,874 (25.32)	1,572 (8.17)
Concerns about STDs				
It is not necessary for academic institutions to discuss issues regarding prevention of STDs	10,933 (56.79)	4,432 (23.02)	2,116 (10.99)	1,770 (9.19)
I am worried about contracting STDs	1,670 (8.67)	2,513 (13.05)	8,512 (44.22)	6,556 (34.06)
I am not too concerned about STD-related issues	7,420 (38.54)	7,975 (41.43)	2,917 (15.15)	939 (4.88)
Perceptions and stereotypes about certain sexual behaviors and STDs transmission				
Having multiple sexual partners plays no role in STDs transmission	11,990 (62.28)	4,826 (25.07)	1,573 (8.17)	862 (4.48)
The need for STD testing, medical examination and treatment				
Premarital STD screening is important	1,352 (7.02)	947 (4.92)	6,023 (31.29)	10,929 (56.77)
Regular STD screening is needed	1,314 (6.83)	1,047 (5.44)	7,906 (41.07)	8,984 (46.67)
If I have symptoms of an STD, I think I should get treatment immediately	1,364 (7.09)	1,091 (5.67)	6,391 (33.2)	10,405 (54.05)
If I find out my partner has symptoms of an STD, I will say nothing and see a doctor myself	7,169 (37.24)	7,363 (38.25)	3,243 (16.85)	1,476 (7.67)

In case of contracting STDs, seeking professional help was the most popular choice (87.25%, table 3). When divided according to knowledge level between above median and under median in both groups (Had STDs, Never exposure to STDs), there is a discrepancy to how students react to getting STDs (Figure 2). Students in both groups with knowledge scores under median tended to not share with anyone and try to handle it themselves, buy medication from a pharmacy or seek advice from a friend. In contrast, students with higher scores in both groups favor professional consultation and medical treatment over self-medication or informal advice. They also tend to be more open to family and partner with their health status regarding STDs (Figure 2).

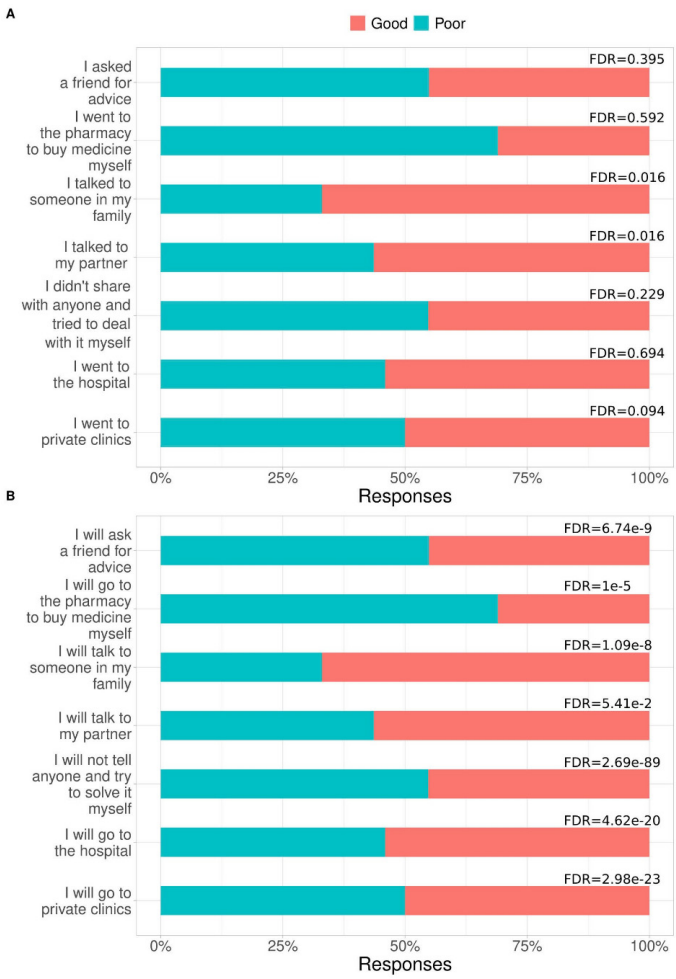

Figure 2. Students's behavior in seeking help and medicine in group A (Had STDs, n=264) and B (Never expose to STDs, n=18,987). "Good" is above median of total score, "Bad" is under median of total score. (FDR = False Discovery Rate, median of total score = 55.17)

4. DISCUSSIONS

This study examines the knowledge level of students in Ho Chi Minh City regarding sexual health and STDs. Students' awareness of sexual health and sexually transmitted diseases (STDs) varies according to socio-demographic factors. On average, their knowledge levels were found to be moderate. This report shows many interesting insights. Female students may be more engaged with or more exposed to sexual health education, potentially due to societal, educational, or health system-related factors. Older students may have had more opportunities to learn or engage with these topics, which reflecting cumulative exposure to health education and life experience. Students in health Sciences scored the highest among other major, that possibly result from including more formal instruction on these topics in health-related academic programs. It underscores the importance of integrating sexual health content into non-health-related curricula. A stable or supportive household structure may contribute to more open communication and better education around health topics, while urban and suburban areas might easily access to resources, healthcare services, and education of sexual health and STDs. That said we need to provide more education programs and information about sexual health and STDs to those students who live alone or with friends or relatives, and those who live in rural areas.

Previous interview-based study on Ho Chi Minh Youth in 2006 found limited sexual knowledge with several misconceptions, due to limited resources, educational program and family education [5]. The current study provides a more positive outlook on student knowledge level, attitude and behavior. In

this study, most students demonstrated a positive attitude and behaviors towards STD-related topics, including protective sex, regular testing and counseling. The difference might come from the different characteristics of the sampled population (working class vs student) and the year of the study. Although the educational effort and state programs are still limited; youth have increasing resources regarding reproductive health, e.g., via internet, NGO programming, and also greater exposure to sexual images and information [23].

On the other hand, the discrepancies between self-assessment and actual test scores (Figure 1) suggest that students often overestimate their understanding regarding STDs. Similarly, there were some misconceptions, namely the perception that using condom offer complete protection against STDs (Table 2). Misconception and overconfidence may cause students to underestimate their vulnerability to STDs or the importance of taking proactive preventive measures. In fact, through a qualitative interview of Vietnamese adolescents, Kaljee et al. found that a combination of stigmatization of sex and perceptions of invulnerability against HIV and other STDs increase risky behavior, thus the risk of contracting STDs [24]. Overconfidence and misconception indicate that such a topic is not often discussed and the students only have surface-level knowledge from daily exposure to social media and friends. And such overconfidence may hinder proactive learning and precautionary behaviors.

Stigma not only influences individual perceptions but also acts as a societal barrier [25], shaping the broader landscape of sexual health education and prevention. The study found that 20.03% of students expressed a lack of concern about STDs, which can be attributed to overconfidence but also the lack of discussion about STDs in normal social settings. The fact that 20.18% of students believe it was not necessary for educational institutions to address these topics, significantly higher than findings in Italy and Malaysia [18,26] highlights the persistence of the perception of sexual health as a stigma and taboo subject that should not be discussed in public. This cultural barrier likely discourages open discussions about STDs and sexual health, both in educational settings and within broader social contexts.

Stigma limits open discussions about sexual health, with sexual partners and within families. In this survey, students are not likely to share with family members or their partner, when or if they got STDs (Figure 2). In fact, lower knowledge individuals were/are less likely to inform their partner and their family and more likely to act alone than higher-scored individuals (Figure 2). However, according to Public Health England, partner notification can reduce infection spread [27], but the fear of judgment might deter individuals from seeking information, seeking professional help, which not only delays treatment but also increases transmission within the community[28]. In fact, students chose more favorable answers in hypothetical scenarios of having STDs (Figure 2B) (seek professional help, talk to others) as compared to when they had STDs (Figure 2A), suggesting that there might be a gap between best practices and how student might act in actuality, because of the stigma surrounding STDs.

A review of qualitative global research on young people aged 15 - 24 reveals that social norms and expectations regarding sexuality can negatively impact communication about sex and young people sexual behavior [29].

The results suggest that misconceptions, overconfidence, and the underlying societal stigma continue to hinder effective STDs education and prevention efforts; and underscore the importance of effective and inclusive of sexual health education, especially in the early stage of adolescence and university. While students relied heavily on the Internet and social media for information, the accuracy and reliability of these sources remain questionable [30]. Therefore, educational institutions must play a more active role in providing accurate, accessible, and engaging education, particularly targeting younger students and those in non-health-related fields. Addressing misconceptions and overcoming the stigma associated with sexual health requires comprehensive, evidence-based education that encourages critical thinking, normalizes discussions about STDs and emphasizes their relevance to overall health and well-being. In addition, creating a supportive environment for open discussions about sexual health in both academic and familial settings is crucial to addressing cultural and systemic barriers and pivotal in improving knowledge and sexual health for young people.

While the large sample size strengthens the generalizability of these findings, self-reported data may introduce biases such as underreporting of sexual activity or STDs because of social desirability biases. The generalizability of these findings is also limited since the study involved only University students in Ho Chi Minh City and thus may not be

representative of those who live in other settings or of other demographics. The study did not consider the different educational programs individual students could have received, which may be an important factor in their knowledge level. Nonetheless, the study reports the current knowledge level of students about STDs and draws attention to important factors impacting knowledge level. These can be utilized to inform future educational programs and awareness campaign strategy. Future studies should explore longitudinal approaches to assess changes in knowledge and behaviors over time, evaluating educational programs' effectiveness. Finally, as this study was conducted by a Convenience sampling method, its findings are primarily applicable to a narrow population. A larger, randomly selected sample encompassing diverse cultural backgrounds is necessary for broader generalizations, and by a large studied population, our results contributed background information to the ongoing discourse in related fields.

5. CONCLUSION

This study provides a comprehensive analysis of knowledge, attitudes, and behaviors regarding sexual health and STDs among university students in Ho Chi Minh City. Stigma not only influences individual perceptions but also affects the broader landscape of sexual health education and prevention. By addressing the identified disparities and barriers, targeted interventions can enhance students' understanding, promote safer behaviors, and ultimately improve public health outcomes. Such efforts can help students make informed decisions to protect themselves, prevent STDs transmission and improve public health.

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Declaration of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Data availability statement

The data that support the findings of this study are provided under reasonable request.

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