



Exposure to prevention information, sexual health, and experience of discrimination: HIV exploration among high-risk populations in Vietnam

[Exposición a información sobre prevención, salud sexual y experiencia de discriminación: Exploración del VIH entre poblaciones de alto riesgo en Vietnam]

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Abstract

Context: HIV/AIDS has been a major public health concern worldwide, yet research on high-risk populations in Vietnam has paid little attention to prevention information, sexual behaviors, and discrimination.

Aims: To investigate the above-mentioned groups' exposure to prevention information, sexual health, and experiences of discrimination.

Methods: The cross-sectional paper-based survey focusing on HIV-related risk behaviors, testing, and access to health services was administered to participants recruited through two-stage sampling in southern Vietnam. The questionnaire consisted of four sections, including sociodemographic characteristics, sexual behaviors, access to preventive information, and discrimination experience.

Results: Among the 173 participants, approximately 60% identified as lesbian/gay/bisexual/transgender, with 51.4% reporting they had a potential risk of HIV acquisition and 85% engaging in high-risk sexual behaviors. Television was the most popular source of information on HIV prevention. The most common unsafe behavior among respondents was non-condom use during sex (72% in males and 25% in females), followed by drug use (41% in males and 7.4% in females). Significant disparities were identified in STI diagnosis, treatment, and HIV testing rates among sociodemographic groups (such as orientation, education, occupation, monthly income, and financial vulnerability). Discrimination experiences were also associated with different sociodemographic characteristics (such as men who have sex with men orientation, occupation, and engagement in high-risk sexual behaviors).

Conclusions: Policymakers can allocate financial resources and support evidence-based interventions to address the HIV epidemic among high-risk populations in Vietnam, including educational campaigns on television, healthcare provider training programs, and stigma reduction efforts.

Keywords: HIV; sexual and gender minorities; social discrimination; unsafe sex; Vietnam.

Resumen

Contexto: El VIH/SIDA ha sido uno de los principales problemas de salud pública en todo el mundo; sin embargo, la investigación sobre poblaciones de alto riesgo en Vietnam ha prestado poca atención a la información sobre prevención, los comportamientos sexuales y la discriminación.

Objetivos: Investigar la exposición de los grupos mencionados a la información sobre prevención, salud sexual y experiencias de discriminación.

Métodos: La encuesta transversal en papel, centrada en los comportamientos de riesgo relacionados con el VIH, las pruebas y el acceso a los servicios sanitarios, se administró a participantes reclutados mediante un muestreo en dos etapas en el sur de Vietnam. El cuestionario constaba de cuatro secciones, que incluían características sociodemográficas, comportamientos sexuales, acceso a información preventiva y experiencias de discriminación.

Resultados: De los 173 participantes, aproximadamente el 60% se identificó como lesbiana/gay/bisexual/transexual, el 51,4% declaró tener un riesgo potencial de contraer el VIH y el 85% tenía comportamientos sexuales de alto riesgo. La televisión fue la fuente más popular de información sobre la prevención del VIH. El comportamiento de riesgo más común entre los encuestados fue el uso de preservativos durante las relaciones sexuales (72% en hombres y 25% en mujeres), seguido del consumo de drogas (41% en hombres y 7,4% en mujeres). Se identificaron disparidades significativas en el diagnóstico de ITS, el tratamiento y las tasas de pruebas del VIH entre grupos sociodemográficos (como orientación, educación, ocupación, ingresos mensuales y vulnerabilidad económica). Las experiencias de discriminación también se asociaron a diferentes características sociodemográficas (como la orientación de hombres que tienen relaciones sexuales con hombres, la ocupación y la participación en conductas sexuales de alto riesgo).

Conclusiones: Los responsables políticos pueden asignar recursos financieros y apoyar intervenciones basadas en la evidencia para hacer frente a la epidemia de VIH entre las poblaciones de alto riesgo en Vietnam, incluyendo campañas educativas en televisión, programas de formación de proveedores de atención sanitaria y esfuerzos de reducción del estigma.

Palabras Clave: discriminación social; minorías sexuales y de género; relaciones sexuales de riesgo; Vietnam; VIH.

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Abbreviations: ART: anti-retroviral therapy; GBD: Global Burden of Diseases, Injuries, and Risk Factors Study; HIV: human immunodeficiency virus; HSB: high-risk sexual behaviors; LGBT: lesbian/gay/bisexual/transgender; MSM: men who have sex with men; PrEP: pre-exposure prophylaxis; SES: socioeconomic status; STI: sexually transmitted infections; WSW: women who have sex with women.

INTRODUCTION

Infection from the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) have been major public health concerns worldwide (Pandey and Galvani, 2019). Since the beginning of the epidemic in the 1980s, an estimated 74.9 million people have been infected with HIV, and 32 million have died from AIDS-related illnesses. At the end of 2018, 37.9 million people were living with the virus, among whom 95.5% were aged 15 years or older (UNAIDS, 2019). According to statistics from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD), HIV mortality decreased by 51%, from a peak of 1.95 million in 2006 to 0.95 million in 2017. The annual incidence gradually decreased by only 39%, from a peak of 3.16 million in 1999 to 1.94 million at the end of 2017 (Global Health Observatory, 2020). Reducing mortality and incidence and increasing access to anti-retroviral therapy (ART) resulted in a rise in the number of people living with HIV globally from 8.74 million in 1990 to 36.82 million in 2017 (Global Health Observatory, 2020).

Around 0.8% of adults aged 15 to 49 years live with HIV worldwide (WHO, 2018), but the highest prevalence occurs in the 20- to 29-year-old group. Specifically, 20- to 24-year-old women and 25- to 29-year-old men constituted only 3.8% and 4.2% of the global population in 2017, respectively, but they accounted for 10.3% and 9.3% of new infections that year, respectively (Pandey and Galvani, 2019). The considerable risks of HIV infection among young adults are related to transactional sex, drug use, transgender sexuality, and men who have sex with men (MSM) (Pandey and Galvani, 2019). Despite high-risk individuals being responsible for approximately 45% of the adult incidence related to the condition, they receive a disproportionately small amount of funded resources - only 2% - to reduce transmission among this population (Pandey and Galvani, 2019). The imbalance between the burden borne by these groups and the healthcare funding allocated to them calls for strengthening education programs that improve their knowledge, attitudes, and safe HIV/AIDS-related behaviors.

Vietnam had an estimated 19,100 new HIV infections at the end of 2017, accounting for 20.6% of the incidence in Southeast Asia and 0.98% of the global total (Frank et al., 2019). AIDS-related cumulative deaths reached 11,400, the second highest among Southeast Asian countries after Thailand (Frank et al., 2019).

Presently, the fundamental approaches to control HIV infection are providing community-based education and scaling up preventive awareness among citizens worldwide. Within high-risk groups, namely, female sex workers, MSM, and drug users, the daily use of pre-exposure prophylaxis (PrEP) has effectively prevented HIV infection. The combination of tenofovir (200 mg) and emtricitabine (300 mg), when taken daily, reduces the risk of acquiring HIV from sex by about 99% and from drug injection by at least 74%. The problems are that PrEP protection efficacy varies across trials (Nel et al., 2016; Van der Straten et al., 2012), and different PrEP delivery systems provide less protection to younger women (Marrazzo et al., 2013). Additionally, both oral and topical PrEP preparations provide higher protection against anal than vaginal transmission; that is, MSM populations have found these products to be more effective than females (Cottrell et al., 2016; Fonner et al., 2016; Grant et al., 2010; Marrazzo et al., 2015). In cases of contraindication or inconsistent PrEP treatment, condom use is encouraged to prevent not only HIV infection but also other sexually transmitted diseases (Gilead, 2004).

Discrimination against the high-risk population with HIV is an unfortunate phenomenon that persists in many societies. This discrimination specifically targets individuals at a higher risk of acquiring HIV, such as men who have sex with men, sex workers, transgender individuals, and people with unsafe sexual behavior (Beyrer et al., 2011). Despite significant advancements in understanding HIV transmission and prevention, this population continues to face unfair treatment and stigmatization. Such discrimination can take various forms, including social exclusion, negative stereotypes, limited access to healthcare services, and diminished employment or housing opportunities (Beyrer et al., 2011). This unjust treatment infringes upon the rights and dignity of the high-risk population and undermines efforts to prevent the spread of HIV and HIV treatment effectively. Stigmatization and discrimination against individuals living with HIV can create barriers to healthcare services, including access to anti-retroviral therapy (ART) and other medications. Pharmaceutical science plays a crucial role in developing effective and affordable treatments for HIV, but if discrimination prevents people from accessing these treatments, the full benefits cannot be realized.

Vietnam has demonstrated insufficient attention to prevention, sexual behaviors, and discrimination within the scope of HIV/AIDS research among high-risk populations. A more comprehensive understand-

ing of these factors has the potential to enhance the efficacy of programs aimed at mitigating the impact of this disease, particularly among high-risk cohorts. As such, the current study seeks to investigate these groups' access to prevention information, sexual health, and exposure to discriminatory practices.

MATERIAL AND METHODS

Study design, participants, and sampling

This cross-sectional study using a paper-based survey to assess HIV-related risk behaviors, testing, and access to health services among target populations in Southern Vietnam in January 2023. High-risk populations include people being at increased risk of acquiring HIV infection if what they are doing, or what they might do if placed in a facilitating situation, is associated with a high risk of HIV transmission. Those population groups included MSM, women who have sex with women (WSW), and other high-risk behavior (in the last six months) such as having sex without a condom, participating in group sex or with multiple partners, sharing sex toys, and using stimulants. These communities were chosen on the basis of their HIV notification rates and population sizes. People aged 18 years and older who were born in the target provinces were eligible to participate in the study. Given that numerous people reside in southern Vietnam and this region has the largest population of individuals from culturally and linguistically diverse backgrounds, Ho Chi Minh City was selected as the focal point of survey implementation.

Sample size was determined using the formula [1].

$$n = \frac{z_{1-\alpha/2}^2 P(1-p)}{d^2} \quad [1]$$

Where $P = 0.1$ is the estimated proportion of the population engaging in high-risk behaviors, and $Z = 1.96$ because $\alpha = 0.05$, and $d = 0.05$, which is absolute precision required.

Applying the formula, the sample size was 139 without non-response rate. Two-stage sampling was conducted. Cluster sampling was performed to choose prospective participants from three provinces/cities, and convenience sampling was carried out to collect data from participants in each province/city. Individuals were approached along major boulevards, nearby parks, markets, and coffee shops on a regular basis. Prospects were invited on a voluntary basis if they met the inclusion criteria: being of Vietnamese nationality, aged 18 years old or above, being able to communicate in Vietnamese, and having lived in the selected study areas for at least one year upon the initiation of the study. People who had mental health problems or were unable to give an interview because of morbidity conditions (e.g., disability,

hearing loss, paralysis, and comatose state) were excluded.

Ethical considerations

This study's protocols were approved by the Hanoi University of Public Health (No. 445/2022/YTCC-HD3). The research complied with ethical standards by obtaining informed consent, ensuring respondent autonomy, and guaranteeing anonymity and confidentiality. Explanations provided to the respondents included information regarding the voluntary nature and safety of participation in the study. The participants were informed of their right to refuse participation or withdraw from the survey at any time without consequences. No details that could point to the participants' identities were reflected on the questionnaires, and only research team members were authorized to collect information on the participants.

Instrument

The questionnaire was developed based on a review of the relevant literature (Fay et al., 2011; Starace et al., 2006; Wagenaar et al., 2012). It was examined for content validity by three experts in behavioral science and public health using the Index of Item-objective Congruence (IOC) as the quality criterion. The questionnaire was revised as suggested by the experts. These questions were tested for internal consistency reliability in 30 participants with characteristics comparable to the prospective sample. Cronbach's alpha coefficient was used as the quality criterion for internal consistency reliability. They favorably assessed the clarity, construction, and relevance of the instrument. The pilot study participants satisfied the inclusion criteria of the main research, but they were excluded from the latter.

With the assessment of the pilot participants as a basis, several adjustments were made. The final questionnaire was composed in English and then translated into Vietnamese. The translation was done by a translator who was a native Vietnamese speaker and was also granted an English certification. The final version included a brief overview of the background and purpose of the study, an assurance regarding the confidentiality of responses, and an informed consent form. The final version of the questionnaire consisted of five sections which are sociodemographic characteristics (11 questions); the sexual behaviors of the high-risk participants (6 questions); access to preventive information (2 questions); sexual health (6 questions), and experience of discrimination (3 questions).

Ten research assistants were trained by the researcher. They approached respondents to introduce themselves and provide information about study's

objectives, process, and voluntary and anonymous nature. The written informed consent was obtained before the interview. Research assistants read the questions and wrote the answers for the participants. The interview took about 30 minutes for each participant.

The variable list comprised twelve variables for sociodemographic characteristics (age, gender, sexual orientation, residency, education level, marital status, occupation, monthly income, financial vulnerability, self-evaluated risk of getting HIV, information source of HIV vaccine, high-risk population), nine variables related the sexual behaviors; two variables for access to preventive information; six variables about sexual health and three variables about the experience of discrimination. All variables were categorized as nominal variables, except for age as a continuous variable.

Data analysis

The Statistical Package for the Social Sciences (IBM SPSS Statistic 20.0, SPSS Inc., Chicago, IL, USA) was performed to analyze the data. The demographic characteristics of the respondents were subjected to statistical analysis to summarize the data (frequency and percentages). For continuous variables, mean and standard deviation (SD) were used if a given variable was normally distributed, or median and interquartile range were adopted for skewed distribution. Normal distribution was tested using Kolmogorov-Smirnov test, skewness, and kurtosis. The sexual behaviors of the high-risk participants and their access to preventive information were described as frequencies and percentages. A chi-square test was performed to determine the association of selected sociodemographic variables with sexual health and experience of discrimination. The 95% confidence intervals of each mediational path were obtained.

RESULTS

Of the 173 participants, two-thirds were male, and approximately 60% identified as lesbian/gay/ bisexual/transgender (LGBT) (Table 1). The average age of the participants was nearly 30 years (SD = 8.14 years). Most of them lived in urban areas (74%) and obtained a higher education degree (63.6%). The proportions of single and religious individuals were 64.2% and 58.4%, respectively. A total of 67% of the participants evaluated themselves as having moderate financial vulnerability. Over half of them (51.4%) assumed that they had a potential risk of HIV acquisition, and 85% engaged in high-risk sexual behaviors (HSB), including sex without a condom, sex with multiple partners, sex toy sharing, and/or sex-related drug injection.

Additionally, 48 men and 51 women engaged in homosexual activities.

Among the 51 MSM respondents, 100% engaged in oral sex, and 45 respondents received anal sex (Fig. 1). Of the 48 WSW, up to 47 experienced vaginal sex, and one person reported giving oral sex. In both genders, non-condom use during sex was the most frequent unsafe sexual behavior, followed by drug utilization. When the respondents were asked if they had ever received information about preventing HIV infection from a man/woman, similar results from the two questions were obtained (Fig. 2). Television was the most popular source of information, followed by healthcare practitioners and the internet. Family/acquaintances, schools, and posters were the least frequently consulted sources of information.

Table 2 depicts the disparity in sexual health between the sociodemographic groups. When the participants were asked whether they had ever been diagnosed with sexually transmitted infections (STI), 38 participants (23%) responded "yes". A significant overall difference in STI diagnosis was found among the orientation, education, occupation, self-evaluated risk of HIV infection, and WSW groups ($p < 0.05$). In terms of receiving treatment for STI (37 out of 173 participants had ever been treated), a significant difference was found between groups of varying genders, education levels, occupations, and levels of risk of HIV acquisition ($p < 0.05$). Gender, orientation, education, occupation, monthly income, financial vulnerability, self-evaluated risk of HIV infection, and WSW were associated with the receipt of a recommendation for HIV testing ($p < 0.05$). In this sample, the ratio of individuals who had been tested for HIV infection to those who had not was 108:63. A difference in HIV testing was found between groups of different genders, orientations, residences, education levels, and occupations ($p < 0.01$). A discrepancy in diagnosis and non-diagnosis of HIV or AIDS between groups of different genders, orientations, residences, occupations, education levels, monthly incomes, and financial vulnerability ($p < 0.05$). Of the sample, 48 people were currently being treated for HIV infection. HIV treatment was related to gender, orientation, residence, occupation, education, financial vulnerability, self-evaluated risk of HIV infection, and WSW orientation.

Table 3 shows the association between sociodemographic characteristics and the experience of discrimination among the groups. Seven participants were afraid to seek healthcare services, three participants were denied such services, and 13 were blackmailed. Moreover, the rate of subjects who were afraid to seek healthcare services was associated with financial vulnerability and MSM orientation ($p < 0.05$). The occupa-

tion was the only aspect that affected the denial of healthcare services on the basis of sexuality ($p < 0.05$). The incidence of blackmail was associated with gen-

der, orientation, residence, education, MSM orientation, and engagement in HSB ($p < 0.05$).

Table 1. Sociodemographic characteristics of the respondents (N = 173).

Characteristic	N (%)	Characteristic	N (%)
Age		Marital status	
Mean (SD)	29.9 (8.1)	Single/Widowed/Divorced	111 (64.2)
Median (Q1 - Q3)	27 (23 - 36)	Married/Co-habituated	62 (35.8)
Min - Max	18 - 64	Religion	
Gender		Religious	101 (58.4)
Male	115 (66.5)	Irreligious	72 (41.6)
Female	58 (33.5)	Monthly income (million VND)	
Orientation		<4.5	59 (34.1)
Heterosexual	73 (42.2)	4.5 - 10.5	50 (28.9)
Lesbian/Gay/Bisexual/Transgender (LGBT)	100 (57.8)	≥10.5	64 (37.0)
Residency		Financial vulnerability	
Urban	128 (74.0)	Low	25 (14.5)
Rural	45 (26.0)	Medium	116 (67.0)
Education		High	32 (18.5)
High school and lower	63 (36.4)	Self-evaluated risk of HIV infection	
University and post-graduate	110 (63.6)	No risk	84 (48.6)
Occupation		High-risk population	
Blue collar	44 (25.4)	Risk	89 (51.4)
White collar	77 (44.5)	Women who have sex with women (WSW)	48 (27.7)
Students/Housewife/Retired/Unemployed	52 (30.1)	Men who have sex with men (MSM)	51 (29.5)
		High-risk sexual behavior (HSB)	147 (85.0)

SD: Standard deviation; Q: quartile; VND: Vietnam Dong; HIV: human immunodeficiency virus. 1 United States dollar = 23,700 VND (Source: Vietnamese Ministry of Finance - exchange rate for foreign currencies in January 2023).

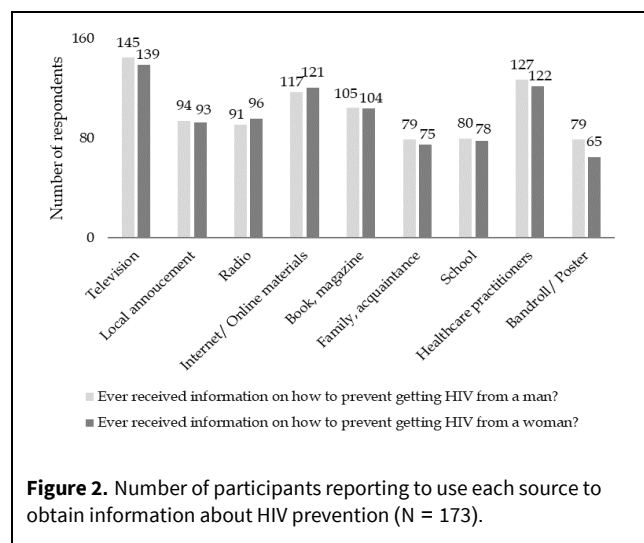
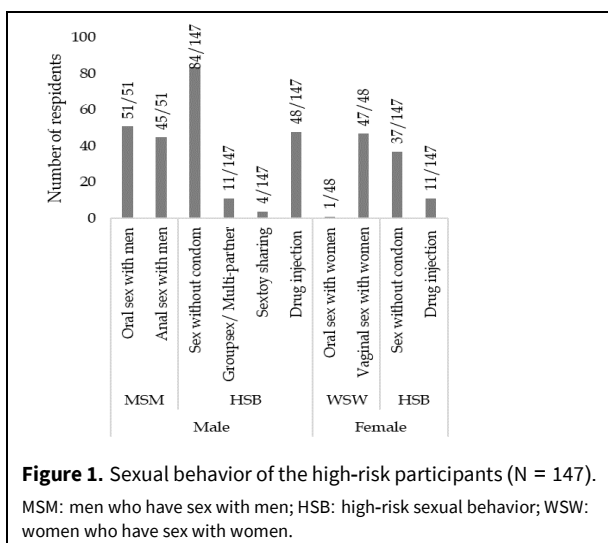


Table 2. Association between selected sociodemographic variables and sexual health.

Variable	Diagnosed with an STI			Was treated for an STI			Received recommendation to test for HIV		
	Yes (n = 38)	No (n = 135)	χ^2 (P-value)	Yes (n = 37)	No (n = 136)	χ^2 (P-value)	Yes (n = 78)	No (n = 95)	χ^2 (P-value)
Gender									
Male	31	84	4.985	30	85	4.506	62	53	10.793
Female	7	51	(0.180)	7	51	(0.024)	16	42	(<0.001)
Orientation									
Heterosexual	27	73	3.505	25	75	1.84	65	35	37.956
LGBT	11	62	(0.044)	12	61	(0.121)	13	60	(<0.001)
Residency									
Urban	23	105	4.586	23	105	3.42	48	80	11.44
Rural	15	30	(0.290)	14	31	(0.053)	30	15	(<0.001)
Education									
High school and lower	24	39	15.039	24	39	16.451	56	7	76.782
University and post-graduate	14	96	(<0.001)	13	97	(<0.001)	22	88	(<0.001)
Occupation									
Blue collar	18	26	12.355	17	27	10.443	40	4	52.895
White collar	12	65	(0.002)	12	65	(0.005)	18	59	(0.001)
Students/Housewife/Retired/Unemployed	8	44		8	44		20	32	
Marital status									
Single/Widowed/Divorced	24	87	0.021	23	88	0.082	53	58	0.886
Married/Co-habitated	14	48	(0.514)	14	48	(0.459)	25	37	(0.217)
Religion									
Religious	22	79	0.005	21	80	0.051	45	56	0.028
Irreligious	16	56	(0.544)	16	56	(0.482)	33	39	(0.495)

Table 2. Association between selected sociodemographic variables and sexual health (continued...)

Variable	Diagnosed with an STI			Was treated for an STI			Received recommendation to test for HIV			
	Yes (n = 38)	No (n = 135)	χ^2 (P-value)	Yes (n = 37)	No (n = 136)	χ^2 (P-value)	Yes (n = 78)	No (n = 95)	χ^2 (P-value)	
Monthly income (million VND)										
<4.5		10	49	3.894	10	49	3.311	29	30	12.007
4.5 - 10.5		25	65	(0.143)	24	66	(0.191)	46	44	(0.002)
≥10.5		3	21		3	21		3	21	
Financial vulnerability										
Low		3	22	1.768	2	23	3.191	15	10	6.065
Medium		28	88	(0.413)	28	88	(0.203)	54	62	(0.048)
High		7	25		7	25		9	23	
Self-evaluated risk of HIV infection										
No risk		6	78	20.929	7	77	16.549	21	63	26.609
Risk		32	57	(<0.001)	30	59	(<0.001)	57	32	(<0.001)
WSW										
Yes		5	43	5.169	6	42	3.121	15	33	5.137
No		33	92	(0.016)	31	94	(0.056)	63	62	(0.017)
MSM										
Yes		13	38	0.524	12	39	0.197	26	25	1.015
No		25	97	(0.297)	25	97	(0.399)	52	70	(0.200)
HSB										
Yes		35	112	1.941	34	113	1.765	69	78	1.355
No		3	23	(0.125)	3	23	(0.141)	9	17	(0.171)

1 United States dollar = 23,700 VND (Source: Vietnamese Ministry of Finance - exchange rate for foreign currencies in January 2023). SD: Standard deviation; Q: quartile; LGBT: Lesbian/gay/bisexual/transgender; WSW: Women who have sex with women; MSM: Men who have sex with men; HSB: High-risk sexual behavior; STI: Sexually transmitted infections.

Table 2. Association between selected sociodemographic variables and sexual health (continued...)

Variable	Underwent HIV screening			Diagnosed with HIV or AIDS			Currently being treated for HIV		
	Yes (n = 108)	No (n = 65)	χ^2 (P-value)	Yes (n = 49)	No (n = 124)	χ^2 (P-value)	Yes (n = 48)	No (n = 125)	χ^2 (P-value)
Gender									
Male	85	30	19.291	42	73	11.356	41	74	10.696
Female	23	35	(<0.001)	7	51	(<0.001)	7	51	(0.001)
Orientation									
Heterosexual	80	20	31.198	39	61	13.306	38	62	12.43
LGBT	28	45	(<0.001)	10	63	(<0.001)	10	63	(<0.001)
Residency									
Urban	74	54	4.469	26	102	15.557	25	103	16.563
Rural	34	11	(0.025)	23	22	(<0.001)	23	22	(<0.001)
Education									
High school and lower	58	5	37.101	44	19	84.126	44	19	87.581
University and post-graduate	50	60	(<0.001)	5	105	(<0.001)	4	106	(<0.001)
Occupation									
Blue collar	42	2	28.229	33	11	64.357	32	12	60.601
White collar	37	40	(<0.001)	7	70	(<0.001)	7	70	(<0.001)
Students/Housewife/Retired/Unemployed	29	23		9	43		9	43	
Marital status									
Single/Widowed/Divorced	72	39	0.784	34	77	0.812	33	78	0.608
Married/Co-habituated	36	26	(0.235)	15	47	(0.235)	15	47	(0.275)
Religion									
Religious	62	39	0.112	26	75	0.796	26	75	0.486
Irreligious	46	26	(0.431)	23	49	(0.235)	22	50	(0.299)

Table 2. Association between selected sociodemographic variables and sexual health (continued...)

Variable	Underwent HIV screening			Diagnosed with HIV or AIDS			Currently being treated for HIV		
	Yes (n = 108)	No (n = 65)	χ^2 (P-value)	Yes (n = 49)	No (n = 124)	χ^2 (P-value)	Yes (n = 48)	No (n = 125)	χ^2 (P-value)
Monthly income (million VND)									
<4.5	36	23	3.966	15	44	7.287	14	45	5.272
4.5 - 10.5	61	29	(0.138)	32	58	(0.026)	31	59	(0.072)
≥10.5	11	13		2	22		3	21	
Financial vulnerability									
Low	19	6	2.558	5	20	6.967	4	21	8.057
Medium	71	45	(0.278)	40	76	(0.031)	40	76	(0.018)
High	18	14		4	28		4	28	
Self-evaluated risk of HIV infection									
No risk	37	47	23.517	2	82	54.13	2	82	52.401
Risk	71	18	(<0.001)	47	42	(<0.001)	46	43	(<0.001)
WSW									
Yes	22	26	7.799	7	41	6.178	7	41	5.741
No	86	39	(0.005)	42	83	(0.009)	41	84	(0.011)
MSM									
Yes	38	13	4.501	14	37	0.027	13	38	0.184
No	70	52	(0.024)	35	87	(0.513)	35	87	(0.409)
HSB									
Yes	94	53	0.961	45	102	2.523	44	103	2.332
No	14	12	(0.222)	4	22	(0.084)	4	22	(0.095)

1 United States dollar = 23,700 VND (Source: Vietnamese Ministry of Finance - exchange rate for foreign currencies in January 2023). SD: Standard deviation; Q: quartile; LGBT: Lesbian/gay/bisexual/transgender; WSW: Women who have sex with women; MSM: Men who have sex with men; HSB: High-risk sexual behavior; STI: Sexually transmitted infections.

Table 3. Differences in experiences of discrimination.

Variable	Felt afraid to seek healthcare services			Was denied for healthcare services based on sexuality			Was blackmailed because of sexuality		
	Yes (n = 7)	No (n = 166)	χ^2 (P-value)	Yes (n = 3)	No (n = 170)	χ^2 (P-value)	Yes (n = 13)	No (n = 160)	χ^2 (P-value)
Gender									
Male	7	108	3.679	3	112	1.54	12	103	4.209
Female	-	58	(0.054)	-	58	(0.291)	1	57	(0.032)
Orientation									
Heterosexual	5	95	0.555	2	98	0.098	12	88	6.861
LGBT	2	71	(0.370)	1	72	(0.617)	1	72	(0.007)
Residency									
Urban	6	122	0.521	3	125	1.073	13	115	4.942
Rural	1	44	(0.416)	-	45	(0.403)	-	45	(0.017)
Education									
High school and lower	1	62	1.543	-	63	1.749	1	62	5.009
University and post-graduate	6	104	(0.205)	3	107	(0.254)	12	98	(0.020)
Occupation									
Blue collar	1	43	0.623	-	44	7.104	1	43	2.96
White collar	4	73	(0.732)	-	77	(0.029)	6	71	(0.228)
Students/Housewife/Retired/Unemployed	2	50		3	49		6	46	
Marital status									
Single/Widowed/Divorced	6	105	1.474	2	109	0.008	11	100	2.557
Married/Co-habituated	1	61	(0.214)	1	61	(0.708)	2	60	(0.093)
Religion									
Religious	4	97	0.005	2	99	0.086	9	92	0.681
Irreligious	3	69	(0.618)	1	71	(0.625)	4	68	(0.302)

Table 3. Differences in experiences of discrimination (continued...)

Variable	Felt afraid to seek healthcare services			Was denied for healthcare services based on sexuality			Was blackmailed because of sexuality		
	Yes (n = 7)	No (n = 166)	χ^2 (P-value)	Yes (n = 3)	No (n = 170)	χ^2 (P-value)	Yes (n = 13)	No (n = 160)	χ^2 (P-value)
Monthly income (million VND)									
<4.5	1	58	1.369	-	59	2.815	5	54	0.194
4.5 - 10.5	5	85	(0.504)	3	87	(0.245)	6	84	(0.907)
≥10.5	1	23		-	24		2	22	
Financial vulnerability									
Low	-	25	7.581	-	25	4.788	1	24	1.653
Medium	3	113	(0.023)	1	115	(0.091)	8	108	(0.438)
High	4	28		2	30		4	28	
Self-evaluated risk of HIV infection									
No risk	3	81	0.095	2	82	0.401	7	77	0.158
Risk	4	85	(0.532)	1	88	(0.478)	6	83	(0.456)
WSW									
Yes	-	48	2.801	-	48	1.172	1	47	2.82
No	7	118	(0.098)	3	122	(0.375)	12	113	(0.079)
MSM									
Yes	5	46	6.175	2	49	2.031	10	41	15.219
No	2	120	(0.024)	1	121	(0.208)	3	119	(0.001)
HSB									
Yes	5	142	1.048	2	145	0.801	7	140	10.663
No	2	24	(0.283)	1	25	(0.388)	6	20	(0.005)

1 United States dollar = 23,700 VND (Source: Vietnamese Ministry of Finance - exchange rate for foreign currencies in January 2023). SD: Standard deviation; Q: quartile; LGBT: Lesbian/gay/bisexual/transgender; WSW: Women who have sex with women; MSM: Men who have sex with men; HSB: High-risk sexual behavior; STI: Sexually transmitted infections.

DISCUSSION

In this study, over half of the participants (51.4%) perceived themselves as being at risk of HIV infection. This figure was higher than the figure reported in research on older adults in South Africa, where 28.8% of 435 respondents held the aforementioned perception (Nyirenda et al., 2022). The current study showed that non-condom use was the most frequent unsafe sexual behavior in both males and females, followed by drug use. This pattern is similar to that found in another study, which reported that 97% of the participants never used condoms or dental dams for protection during oral sex. They may choose not to use condoms for various reasons, such as personal preference, allergies, or the desire for alternative contraceptive options. Pharmaceutical science offers several alternatives to condom use, such as hormonal contraception and intrauterine devices, which can provide effective contraception while addressing individual preferences and needs. It's important to note that while these alternative methods can be highly effective at preventing pregnancy, they may not offer the same level of protection against STIs as condoms do. Condoms provide a physical barrier that helps reduce the risk of STI transmission, which is not present in most other methods. Additionally, nearly all the individuals (97%) in this work, within the last 12 months, reported using one or more substances prior to or during anal intercourse (Diesterheft et al., 2016). As previously stated, the most popular media type that helped the respondents access preventive information about HIV/AIDS was television, followed by healthcare practitioners and the internet. By contrast, a study in Vietnam's border regions by Hoang et al. discovered that health workers are the most common source of HIV/AIDS information (88.6%), followed by mass media (63.0%) and announcements issued over loudspeakers in localities (52.3%) (Hoang et al., 2019). The variety of information sources about HIV/AIDS could be explained by the differences in the study population and therefore their living conditions. Given that television is a more expensive education channel compared to other information sources. Therefore, this finding suggested that the government should put more effort into using the internet channel to gain more coverage of HIV/AIDS information.

This study revealed that gender, orientation, residence, occupation, education level, monthly income, and financial vulnerability were associated with HIV/AIDS diagnosis. Previous studies suggested that personal socioeconomic status (SES) could influence susceptibility to HIV/AIDS infection and AIDS development (Chin and Gillies, 2007; Michelo et al., 2006; Shelton et al., 2005). It is critical to understand

the relationship between educational attainment and the likelihood of HIV infection (Ogunmola et al., 2014). Certain studies indicated that educational attainment is negatively related (Glynn et al., 2004; Gupta and Mahy, 2003), positively related (in eastern and southern Africa) (Bloom et al., 2002; Glynn et al., 2001; Hargreaves and Glynn, 2002; Swai et al., 2006), or unrelated (in Tanzania and other African countries) to HIV infection (Johnson and Way, 2006; Quigley et al., 1997). In school, students can be educated about HIV infection (Igulot and Magadi, 2018), which helps young individuals escape from many social evils, such as drug abuse and sex work, thereby reducing the possibility of transmission from HIV-infected people (Walque, 2004; Zuilkowski and Jukes, 2012). Individuals with high educational attainment are expected to be provided with knowledge that enhances their capacity to reduce vulnerability (Bradley et al., 2007; Durevall and Lindskog, 2012). Previous studies in Zambia and Tanzania revealed an inverse association between schooling and the incidence of HIV infection (Hargreaves and Howe, 2010; Msisha et al., 2008). Notably, the absence of a connection between educational achievement and HIV infection may present challenges to interaction with the provision of health information to prevent epidemic transmission. Other studies showed that HIV infection often exerts a negative impact on SES by limiting an individual's ability to work. Among men, the unemployed have a high probability of being infected with HIV (Msisha et al., 2008). According to one study, the unemployment rate among people living with HIV/AIDS ranges from 45% to 65% (Dray-Spira et al., 2008). Furthermore, people who earn high incomes frequently have lifestyles associated with having multiple sexual partners (Igulot and Magadi, 2018). About half of the women with affluent lifestyles reported having sexual partners that cover two to four lifetimes (Msisha et al., 2008). Similarly, evidence regarding survival in many African countries, including Tanzania, indicated that women and men frequently have multiple concurrent sexual relationships, among which the majority are long-term (Halperin and Epstein, 2004). This is considered a significant mitigating factor in the rapid dissemination of HIV in Africa (Halperin and Epstein, 2004). Low-income individuals may be unable to access HIV-related services, resulting in increased transmission (Fotso and Kuate-Defo, 2005). Low income may predispose a person to accept a risky situation to satisfy their basic needs. This gives rise to the idea that sexual exposure offers several financial benefits: sex is traded for property, food, narcotics, housing, and protection (Ogunmola et al., 2014; Riley et al., 2007).

The findings showed that less than 10% of the sample perceived healthcare discrimination. Gender, orientation, residence, education, occupation, MSM orientation, engagement in HSB, and financial vulnerability were associated with the experience of discrimination. In a study of black MSM in the southeastern United States, a high proportion (31.2%) have experienced sexual orientation-based healthcare-related discrimination. The results also revealed that age is related to perceived healthcare-related discrimination, implying that perceptions of healthcare-related discrimination increase with age (Maksut et al., 2018). Social discrimination can influence the attitudes and behavior of healthcare professionals and researchers within the pharmaceutical industry. Biases and prejudices may affect the quality of care and research conducted. It is important for pharmaceutical scientists to be aware of their own biases and strive for unbiased research and equitable healthcare delivery.

While the findings of this study provide valuable insights into the relationship between exposure to prevention information, sexual health, and experience of discrimination among high-risk populations in Vietnam with regards to HIV, there are several potential limitations that should be considered. First, the study's focus on high-risk populations in Vietnam may limit the generalizability of the findings to other populations or contexts. Second, the reliance on self-reported data may introduce bias or inaccuracies in the results. Third, the cross-sectional design of the study limits the ability to establish causality or determine the direction of the observed relationships between the variables. These limitations should be taken into account when interpreting the results and suggest opportunities for future research.

Longitudinal studies could be conducted to establish the causal relationships between exposure to prevention information, sexual health, and experience of discrimination and their impact on HIV knowledge and behavior. Using more comprehensive and reliable measures to assess exposure to prevention information, sexual health, and experience of discrimination would provide a more nuanced understanding of these constructs and their relationship with HIV. Investigating other high-risk populations beyond the sample in Vietnam, such as men who have sex with men or sex workers, would help to identify potential differences or similarities in their experiences and inform targeted prevention strategies. Finally, evaluation of the effectiveness of HIV prevention interventions that address exposure to prevention information, sexual health, and experience of discrimination could provide valuable information on their po-

tential impact and inform evidence-based interventions in high-risk populations.

The findings of this study have important implications for policymakers who are tasked with addressing the HIV epidemic among high-risk populations in Vietnam. Financial support and resource allocations could be directed towards developing and implementing evidence-based interventions that address exposure to prevention information, sexual health, and the experience of discrimination among high-risk populations. This could include investing in educational campaigns to increase access to information and resources on HIV prevention and sexual health, as well as in training programs for healthcare providers to improve the quality of HIV-related care and services. Furthermore, they could work to reduce stigma and discrimination against high-risk populations, which may help to improve their access to healthcare services and reduce their risk of HIV infection. These actions could help to reduce the burden of HIV among high-risk populations in Vietnam and improve the overall health outcomes in these communities.

CONCLUSION

Non-condom use during sex was the most popular unsafe behavior, followed by drug utilization. Gender, orientation, education, occupation, residence, and self-evaluated risk of HIV infection were linked to sexual health. Policymakers can allocate financial resources and support evidence-based interventions to address the HIV epidemic among high-risk populations in Vietnam, including educational campaigns about HIV prevention on communication media, healthcare provider training programs, and stigma reduction efforts.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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Contribution	Tram NTH	Somying P	Sermsiri S	Luerat A
Concepts or ideas	x	x	x	x
Design	x	x	x	x
Definition of intellectual content	x			x
Literature search	x	x	x	x
Experimental studies	x			x
Data acquisition	x			x
Data analysis	x			x
Statistical analysis	x			x
Manuscript preparation	x			x
Manuscript editing	x	x	x	x
Manuscript review	x	x	x	x

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