

SOCIAL ENVIRONMENT, PSYCHOSOCIAL FACTORS, AND HIV TESTING BEHAVIOR AMONG MEN WHO HAVE SEX WITH MEN IN PAREPARE CITY, INDONESIA: A CROSS-SECTIONAL STUDY

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ARTICLE INFO

Article history

Submitted: 2026-02-14

Revised: 2026-08-13

Accepted: 2026-08-25

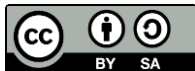
Keywords:

Access to health services;
men having sex with men;
social environment; HIV
testing; stigma

Kata Kunci:

Akses layanan kesehatan;
lelaki seks lelaki,
lingkungan sosial; tes HIV;
stigma

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ABSTRACT

HIV testing behavior among men who have sex with men (MSM) is an important component of HIV prevention and control strategies because early detection enables individuals to receive timely diagnosis and access to treatment services. This study aimed to analyze factors associated with HIV testing behavior among MSM in Parepare City. A quantitative analytical study with a *cross-sectional* design was conducted among 316 respondents. The study population consisted of MSM aged ≥ 18 years residing in Parepare City, with an estimated population of approximately 1,500 individuals. The sample was determined using the Slovin formula and selected through *non-probability purposive sampling*. The research instrument met the required validity criteria, with correlation coefficients ranging from 0.480 to 0.760, exceeding the critical r value of 0.444, and reliability criteria with a Cronbach's alpha value of $[\alpha \text{ value}]$, indicating that the instrument was suitable for use. Data were analyzed using binary logistic regression. The results showed that age, stigma toward health services, HIV knowledge, and social environment were significantly associated with HIV testing behavior ($p < 0.05$). HIV knowledge was the most dominant factor in increasing the likelihood of HIV testing. In contrast, education, access to health services, *self-efficacy*, and sex were not significantly associated with HIV testing behavior after controlling for other variables. These findings indicate that knowledge, psychosocial factors, and the social environment play important roles in HIV testing behavior among MSM in Parepare City.

ABSTRAK

Perilaku tes HIV pada Lelaki Seks Lelaki (LSL) merupakan komponen penting dalam strategi pencegahan dan pengendalian HIV karena deteksi dini memungkinkan individu memperoleh diagnosis dan akses terhadap layanan pengobatan secara tepat waktu. Penelitian ini bertujuan menganalisis faktor-faktor yang berhubungan dengan perilaku tes HIV pada LSL di Kota Parepare. Penelitian menggunakan desain kuantitatif analitik dengan pendekatan *cross-sectional* terhadap 316 responden. Populasi penelitian terdiri atas LSL berusia ≥ 18 tahun yang berdomisili di Kota Parepare, dengan estimasi populasi sekitar 1.500 orang. Sampel ditentukan menggunakan formula Slovin dan dipilih dengan teknik *non-probability purposive sampling*. Instrumen penelitian telah memenuhi kriteria validitas dengan koefisien korelasi 0,480–0,760, lebih besar dari r tabel 0,444, serta reliabilitas dengan nilai Cronbach's Alpha sebesar $[\text{nilai } \alpha]$, sehingga dinyatakan layak digunakan. Analisis dilakukan menggunakan regresi logistik biner. Hasil menunjukkan bahwa umur, stigma layanan kesehatan, pengetahuan tentang HIV, dan lingkungan sosial berhubungan signifikan dengan perilaku tes HIV ($p < 0,05$). Pengetahuan tentang HIV merupakan faktor paling dominan dalam meningkatkan peluang melakukan tes HIV. Sebaliknya, pendidikan, akses layanan kesehatan, *self-efficacy*, dan jenis kelamin tidak menunjukkan hubungan yang signifikan setelah dikontrol bersama variabel lainnya. Temuan ini menunjukkan bahwa faktor pengetahuan, psikososial, dan lingkungan sosial memiliki peran penting dalam perilaku tes HIV pada LSL di Kota Parepare.

INTRODUCTION

Human Immunodeficiency Virus (HIV) continues to be one of the most complicated and long-lasting global public health problems, especially for key population groups that are more likely to be affected. Even though there have been significant improvements in antiretroviral therapy, biomedical prevention, and global policy commitments such as the UNAIDS 95–95–95 targets, the HIV epidemic remains difficult to control because of gaps in early diagnosis. HIV testing is widely acknowledged as a crucial initial step in the HIV care continuum, facilitating prompt treatment initiation, decreasing morbidity and mortality, and averting further transmission at both individual and population levels (UNAIDS, 2025). Nonetheless, global and regional reports consistently demonstrate that a significant percentage of individuals at elevated risk of HIV infection remain unaware of their serological status. This undiagnosed group keeps hidden chains of transmission going in communities, making current prevention and treatment strategies less effective. Thus, enhancing HIV testing coverage is a fundamental component in global efforts to eradicate HIV (K. Li et al., 2024).

Men having sex with men (MSM) are known around the world as one of the groups most affected by HIV in many different epidemiological settings (Abrantes et al., 2024). The elevated risk of HIV transmission within this demographic is attributable not only to biological susceptibility but also significantly shaped by social, cultural, and structural factors. Persistent stigma, discrimination, and the criminalization of same-sex behavior in numerous areas hinder MSM's access to equitable and inclusive health services, including HIV testing (Vashisht et al., 2023). These social barriers often mix with internalized stigma, fear of telling someone, and low trust in the health care system, which makes people act in complicated ways when they need health care. Although numerous studies indicate that MSM generally exhibit good or even high levels of HIV knowledge, this awareness does not consistently translate into regular HIV testing behavior (Topping, 2022). Psychosocial factors, including perceived social support, anticipated stigma, and perceptions of the ramifications of a positive diagnosis, substantially affect the willingness to undergo HIV testing, highlighting the importance of the social environment in shaping individual decision-making (Mokgatle & Madiba, 2023).

Increasing empirical evidence is showing how important this issue is in low- and middle-income countries like Indonesia. HIV/AIDS is still a big problem, especially in developing countries, with 1.3 million new cases every year. Groups that are at risk should get the most help first (Tayebwa et al., 2025). Recent cohort and surveillance studies show that the HIV rate among MSM and transgender women is very high, with some estimates in urban areas going over 20%. There has also been a recent rise in incidence rates in these groups, which means that transmission is still happening and prevention efforts are not reaching enough people.

Structural obstacles, social exclusion, and dispersed community involvement still limit how well these interventions work. Consequently, the elevated HIV prevalence among MSM in Indonesia is attributable to both systemic inadequacies in addressing the social determinants of HIV testing and prevention, as well as individual risk behaviors (Yenny et al., 2025). In the last ten years, new approaches to HIV testing have emerged because traditional methods were not working well enough. These include HIVST, community-based testing, and distribution models based on social networks. These strategies aim to reduce psychological and structural barriers by enhancing privacy, convenience, and autonomy for individuals (M. Li & Li, 2023). Data from modeling studies, meta-analyses, and systematic reviews show that HIVST is very effective at reaching people who have never been tested before and increasing awareness of HIV status at the population level (Dessie & Zewotir, 2024).

Even though HIVST has a lot of potential, MSM still do not use it in all situations. Without a supportive social environment that promotes trust, acceptance, and the idea that HIV testing is normal, the effects of HIVST are likely to remain small. This shows that new technology alone is not enough (Katirayi et al., 2023). The social environment has a big impact on health behaviors, such as the willingness to get tested for HIV. Peer norms, social support networks, community cohesion, and the presence of MSM-friendly organizations all play a role in how people view risk, safety, and privacy (Dirawan et al., 2025). Positive interactions with healthcare professionals and support from peer networks can bolster trust in healthcare services and alleviate fears related to HIV testing (Nugroho et al., 2020). On the other hand, MSM are less likely to get tested for HIV because they have been discriminated against, excluded from social groups, and stigmatized in both healthcare settings and the community at large. A social environment that normalizes HIV testing and frames it as a collective

responsibility, rather than an individual moral dilemma, can generate positive social pressure, enhance the perceived advantages of testing, and ultimately foster a willingness to ascertain one's HIV status (Watson et al., 2025).

Even though more people are starting to realize how important social context is, there are still big gaps in research. First, a lot of research sees the social environment as a single, undifferentiated construct, without separating out specific aspects like peer pressure, community social capital, online social networks, and trust in institutions (Nursinah et al., 2023). Second, empirical evidence from developing countries, especially in Southeast Asia, is still quite limited when compared to studies conducted in high-income nations. Third, people often assume psychosocial factors that affect how the social environment affects HIV testing behavior, like self-efficacy, perceived stigma, and outcome expectations, without enough empirical testing.

To fill this gap, we need a theoretical approach that can take into account the fact that social influences happen on many levels. The socio-ecological model is a helpful way to think about how people's actions are affected by their relationships with others, their communities, and the structures around them (Nugroho et al., 2020). Social Cognitive Theory and the Health Belief Model explain more about how the social environment affects self-efficacy, perceived vulnerability, perceived benefits, and perceived barriers, all of which affect health-related decision-making (X. Zhang & Warner, 2023). In addition to these viewpoints, social capital theory stresses how trust, norms, and social networks can help people work together and adopt healthy habits. By merging these frameworks, this study conceptualizes the social environment as a structural determinant affecting HIV testing willingness, both directly and indirectly through psychosocial mediators, while also acknowledging the moderating influence of innovations such as HIV self-testing and online social networks (Veenstra, 2025). Consequently, this study seeks to examine the influence of the social environment on the willingness of MSM to undergo HIV testing, aspiring that the results will aid in theoretical advancement and serve as an empirical foundation for more socially responsive HIV prevention policies and community-based interventions (Adedimeji et al., 2019).

METHOD

Type of Research

This research utilized a quantitative methodology featuring an observational analytical framework and cross-sectional techniques. This method was selected to examine the correlation between the social environment and the willingness to undergo HIV testing among Men Who Have Sex with Men at a single measurement point. Moreover, this study utilized an explanatory research framework to elucidate the mechanisms by which the social environment affects HIV testing willingness through psychosocial variables, including self-efficacy and perceived stigma. Subsequent analysis, encompassing mediation and moderation analyses, was employed to investigate the direct and indirect pathways of influence among the study variables.

Place and Time of Research

The research took place in a large Indonesian city with a large MSM population, HIV testing centers, and active MSM-based communities. The site was chosen because there were many MSM living with HIV and community groups that facilitated research access. Data collection took place from June to September 2025, beginning with the preparation of instruments and the recruitment of respondents, and culminating in data collection and verification.

Population and Sample

The study population comprised all Men Who Have Sex with Men residing in the city of Parepare, aged 18 years or older, totaling approximately 1,500 individuals. The Slovin formula was used to select 316 people for the study sample. A non-probability sampling technique was employed due to the MSM population being regarded as a concealed demographic. MSM who consented to participate voluntarily and had previously undergone HIV testing were selected. The minimum sample size calculation for multivariate analysis was used to determine the sample size based on the number of independent variables and mediators that were studied.

Ethical Considerations

This study adhered to ethical principles for research involving human participants, including respect for autonomy, confidentiality, privacy, beneficence, and risk minimization. Before participation, each respondent was provided with information regarding the study objectives, data collection procedures, potential benefits and risks, and their right to refuse or withdraw from the study at any time without consequences. Participation was voluntary and undertaken only after respondents provided informed consent. Given the sensitive nature of the MSM population, respondents' personal identities were not recorded in the research instruments or reported in any publication. All data were coded, securely stored, and used solely for research purposes. Data collection procedures were conducted in a manner that protected respondents' privacy and minimized the potential for discomfort, stigma, or discrimination arising from participation in the study. The study was conducted following approval from the authorized research ethics committee.

Data Collection

After checking to ensure that all data from the questionnaires were complete, the data were coded, entered, and corrected. The analysis of the data was conducted in steps, starting with descriptive analysis that examined the characteristics of the respondents and the distribution of the research variables. Next, bivariate analysis was used to examine the initial associations between variables. Logistic regression or linear regression was used for multivariate analysis, depending on the type of dependent variable.

The validity analysis showed that all variables demonstrated significant associations with HIV testing behavior. The calculated correlation coefficients ranged from 0.480 to 0.760, exceeding the critical r value of 0.444 at the 5% significance level. All variables also showed statistically significant p -values ($p < 0.05$), indicating that the variables were significantly associated with HIV testing behavior. The strongest association was observed for social environment ($r = 0.760$; $p < 0.001$), followed by self-efficacy ($r = 0.710$; $p < 0.001$) and knowledge ($r = 0.660$; $p = 0.002$).

Data Analysis and Processing

Grouping involved calculating the total score of each component of the research variables and the mean value. Typically, a score less than the mean was categorized as good; contrastingly, a score greater than or equal to the mean was categorized as poor. The dataset was thereafter analyzed using frequency distribution, chi-square, and logistic regression.

We conducted a mediation analysis to assess how psychosocial variables acted as mediators. Mediation analysis was employed to assess the influence of factors such as online social networking usage and access to confidential HIV testing. The analysis was conducted using statistical software. The research findings were presented through interpretive narratives, tables, and graphs. All of these formats emphasized the real meaning of the results rather than just their statistical significance.

RESULT

Table 1. Distribution of Respondents by Educational Level

Level of education	Frequency	Percentage (%)
No school	15	4.7
Elementary school (SD)	10	3.2
Junior High School (SMP)	23	7.3
Senior High School (SMA)	255	80.7
Higher Education Institutions (HEIs)	13	4.1
Total	316	100.0

The distribution of respondents based on education level showed considerable variation. Most respondents had a senior high school education (255; 80.7%), indicating that the study population was predominantly characterized by a secondary educational background.

Table 2 based on age group shows that most respondents were 21–30 years old, namely 132 people (41.8%), followed by the 31–40 year age group with 108 respondents (34.2%), while the lowest proportion was in the <20 year age group, namely 28 people (8.9%).

Table 2. Age Groups

Age Group	Frequency	Percentage (%)
≤20 years	28	8.9
21-30 years old	132	41.8
31-40 years	108	34.2
> 40 years	48	15.2
Total	316	100.0

The multivariate logistic regression analysis in Table 3 was conducted to identify factors associated with HIV testing behavior among Men Who Have Sex with Men. The analysis showed that age, stigma related to health services, knowledge, and social environment were significantly associated with HIV testing behavior ($p < 0.05$).

Table 3. Description of Research Variables

Variable	Category	n	%
Access to Healthcare Services	Difficult	133	42.1
	Easy	183	57.9
Healthcare Stigma	Low	112	35.4
	High	204	64.6
HIV Testing Behavior	Yes	151	47.8
	No	165	52.2
Knowledge	Low	149	47.2
	High	167	52.8
Self-Efficacy	Low	7	2.2
	High	309	97.8
Social Environment	Good	109	34.5
	Poor	207	65.5

Respondents in certain age groups were 63.1% less likely to have tested for HIV than the reference group (OR = 0.369; 95% CI: 0.228–0.595; $p < 0.001$). This indicates that this age group was 63.1% less likely to have tested for HIV. Health care stigma was significantly associated with HIV testing behavior (OR = 3.381; 95% CI: 1.420–8.050; $p = 0.006$). Respondents with a specific stigma category were 3.38 times more likely to undergo HIV testing than the reference group.

Respondents with high HIV knowledge had substantially higher odds of HIV testing than those with low knowledge (OR = 32.858; 95% CI: 14.135–76.385; $p < 0.001$). However, the magnitude of this association should be interpreted cautiously because the cross-sectional design does not establish temporal directionality.

Social environment was significantly associated with HIV testing behavior among Men Who Have Sex with Men (OR = 0.093; 95% CI: 0.038–0.226; $p < 0.001$). Respondents in certain social environment categories had a 90.7% lower chance of undergoing HIV testing compared to the reference group.

Meanwhile, the variables of education, access to health services, and self-efficacy did not show a significant relationship after being controlled for together in the multivariate model.

**Table 4. Multivariate Analysis
Variables in the Equation**

	Variables	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for EXP(B)	
								Lower	Upper
Step 1 ^a	Age	-1.027	.250	16.909	1	.000	.358	.220	.584
	Stigma	1.210	.456	7.032	1	.008	3.354	1.371	8.202
	Knowledge	3.566	.484	54.357	1	.000	35.388	13.712	91.327
	Socio-social Environment	-2.424	.464	27.310	1	.000	.089	.036	.220
	Education	.243	.244	.994	1	.319	1.275	.791	2.056
	Access	-.025	.461	.003	1	.957	.975	.395	2.407
	Self-efficacy	-.103	1.047	.010	1	.921	.902	.116	7.022
	Constant	-1,291	2.406	.288	1	.592	.275		
Step 2 ^a	Age	-1.026	.249	16.945	1	.000	.358	.220	.584
	Stigma	1,204	.444	7.370	1	.007	3.334	1.398	7.954
	Knowledge	3.556	.441	65.012	1	.000	35.012	14.752	83.099
	Social Environment	-2.423	.463	27.350	1	.000	.089	.036	.220
	Education	.243	.244	.991	1	.319	1.275	.790	2.056
	Self-efficacy	-.110	1.040	.011	1	.916	.896	.117	6.876
	Constant	-1.293	2.406	.289	1	.591	.274		
Step 3 ^a	Age	-1,027	.249	16.970	1	.000	.358	.220	.584
	Stigma	1.205	.443	7.400	1	.007	3.338	1.401	7.957
	Knowledge	3.553	.440	65.206	1	.000	34.913	14.739	82.698
	Social Environment	-2.427	.462	27.657	1	.000	.088	.036	.218
	Education	.243	.244	.989	1	.320	1.275	.790	2.057
	Constant	-1,497	1.440	1.081	1	.298	.224		
Step 4 ^a	Age	-.998	.244	16.724	1	.000	.369	.228	.595
	Stigma	1.218	.443	7.572	1	.006	3.381	1.420	8.050
	Knowledge	3.492	.430	65.832	1	.000	32.858	14.135	76.385
	Social Environment	-2.380	.455	27.358	1	.000	.093	.038	.226
	Constant	-.670	1.164	.332	1	.565	.512		

a. Variable(s) entered on step 1: Age, Stigma, knowledge, social environment, education, access, self-efficacy.

DISCUSSION

Age

Age represents an important socio-demographic factor that may shape HIV testing behavior through differences in health-related experiences, risk perceptions, access to information, and engagement with healthcare services. In this study, age was significantly associated with HIV testing behavior among men who have sex with men (MSM). Respondents in the identified age category had lower odds of undergoing HIV testing than those in the reference group (OR = 0.369; 95% CI: 0.228–0.595; $p < 0.001$). This finding suggests that age-related differences in HIV testing behavior may reflect differences in how MSM perceive HIV risk and interact with health information and healthcare services rather than age itself functioning as a direct determinant.

From the perspective of the Health Belief Model, age may influence key cognitive components of health behavior, particularly perceived susceptibility, perceived severity, perceived benefits, and perceived barriers to HIV testing. Younger MSM may perceive themselves as less vulnerable to HIV or may have less experience with healthcare services, while older individuals may have accumulated greater exposure to health information and healthcare systems. These differences may influence the extent to which individuals recognize the importance of regular HIV testing and respond to perceived HIV risk (Jumu, 2024).

This interpretation is consistent with previous research indicating that younger MSM may encounter barriers to HIV testing related to low perceived risk, fear of stigma, and limited engagement with healthcare services. (Mustanski et al., 2021), for example, reported that young MSM may delay HIV testing despite experiencing HIV-related risk, partly because of perceptions of low vulnerability and concerns about stigma. Similarly, (C. Hong et al., 2022) found differences in HIV testing patterns across age groups, with older MSM being more likely to engage with HIV testing services, potentially reflecting greater experience with healthcare systems and increased awareness of HIV-related risks.

However, the association between age and HIV testing should not be interpreted independently of other social and psychosocial factors. Age may function as a proxy for accumulated experiences, including exposure to HIV information, previous healthcare encounters, social support, disclosure experiences, and experiences of stigma or discrimination. In this context, the observed association may partly reflect differences in these underlying factors rather than a direct effect of chronological age. This interpretation is particularly relevant because the present study also identified knowledge, healthcare stigma, and social environment as significant factors associated with HIV testing behavior.

This interpretation is also consistent with previous evidence regarding HIV vulnerability and testing among younger populations. In the Indonesian context, surveillance studies among key populations indicate that the burden of HIV infection remains relatively high among young people, particularly those aged 20–29 years. However, younger populations may still face barriers to HIV testing, including limited HIV knowledge, low perceived risk, and fear of receiving a positive test result (Lin et al., 2022). This suggests that although younger MSM may be epidemiologically vulnerable to HIV infection, their vulnerability does not necessarily translate into a higher likelihood of HIV testing. The difference may be related to variations in risk perception, access to health information, stigma, and previous experience with healthcare services.

Education

Formal education is commonly considered an important social determinant of health behavior because individuals with higher educational attainment tend to have better health literacy, greater access to health information, and stronger skills in evaluating health-related risks. However, in this study, education was not significantly associated with HIV testing behavior after controlling for knowledge, healthcare stigma, and social environment. This finding suggests that the influence of formal education may become less apparent when more proximal psychosocial and social factors are considered simultaneously. A study by (Tetteh et al., 2021) in the *Journal of Biosocial Science* similarly found that the association between education and HIV testing became non-significant after controlling for knowledge and access to healthcare services.

One possible explanation for this finding is that the effect of education may operate indirectly through HIV-related knowledge. Formal education can provide individuals with greater opportunities to obtain health information and develop health literacy; however, when knowledge is included in the regression model, the direct contribution of education to HIV testing behavior may no longer be statistically significant. This interpretation is consistent with the *Knowledge-Attitude-Practice* framework, which positions knowledge as an important pathway through which structural and individual characteristics may influence health behavior. Fotso et al., (2020) similarly demonstrated that knowledge can function as an important mechanism linking structural factors to preventive behaviors among sexual minority populations. Thus, education may contribute to HIV testing indirectly by improving health literacy rather than functioning as an independent determinant.

Furthermore, education is often used as a proxy for socioeconomic status (SES) and broader social opportunities. The effect of education on health behavior may become more evident in settings where substantial inequalities exist in access to information, healthcare services, and social resources.

Conversely, when access to HIV-related information and testing services is relatively available across educational groups, differences in formal education may no longer represent a strong determinant of testing behavior. In the Indonesian context, [Fauk et al., \(2021\)](#) found that education level was not a strong predictor of HIV testing behavior among MSM after accounting for stigma and access to key-population-friendly healthcare services. This finding suggests that factors more directly related to the testing experience, particularly stigma, service accessibility, and the social environment, may be more influential than formal educational attainment.

The non-significant association between education and HIV testing in the present study should therefore not be interpreted as indicating that education has no relevance to HIV prevention. Rather, the finding indicates that formal education alone may be insufficient to explain HIV testing behavior among MSM. The effect of education may be embedded within other mechanisms, particularly HIV-related knowledge, stigma, access to appropriate services, and the social environment.

Knowledge

Knowledge about HIV, including modes of transmission, the benefits of HIV testing, and access to treatment, emerged as a strong predictor of HIV testing behavior in this study. The magnitude of the association indicates that HIV-related knowledge may play an important role in shaping decisions to undergo testing among MSM. However, the strength of this association should be interpreted cautiously, particularly because the cross-sectional design does not establish temporal directionality. Individuals who have undergone HIV testing may have received pre- or post-test counseling and additional HIV-related information, which could subsequently increase their knowledge. Thus, the relationship between knowledge and HIV testing may be bidirectional rather than reflecting a simple causal pathway from knowledge to testing.

Within the framework of health behavior theory, particularly the Health Belief Model and the Knowledge-Attitude-Practice (KAP) framework, knowledge represents an important foundation for health-related decision-making. Individuals who understand HIV transmission, the consequences of infection, and the benefits of early detection may develop greater perceived susceptibility and perceived benefits of testing. In this context, knowledge can help individuals recognize personal vulnerability and understand the practical value of early diagnosis. [Mahardani et al., \(2022\)](#) reported that HIV knowledge among students at Manado 4 High School was significantly associated with perceptions related to HIV status, supporting the importance of knowledge in shaping HIV-related perceptions.

Previous empirical research has also demonstrated a positive relationship between HIV literacy and testing uptake. [Qin et al., \(2023\)](#) reported that MSM with higher levels of HIV knowledge were almost twice as likely to undergo regular HIV testing than those with lower levels of knowledge. This evidence supports the present finding that knowledge is an important factor associated with HIV testing behavior. Nevertheless, the variation in knowledge levels observed in the present study suggests that not all members of the local MSM population may have equal access to accurate HIV information. Some individuals may still be exposed to misconceptions regarding HIV transmission, testing procedures, confidentiality, or the consequences of a positive diagnosis. Consequently, the availability of HIV testing services alone may not be sufficient to increase utilization when individuals lack the information required to perceive testing as necessary and beneficial.

Knowledge may also influence HIV testing through psychosocial mechanisms. Adequate understanding of testing procedures, confidentiality, treatment availability, and the benefits of early diagnosis may reduce uncertainty and psychological barriers associated with testing. Furthermore, greater knowledge may strengthen an individual's confidence in navigating healthcare services. [Zhao et al., \(2022\)](#) found that self-efficacy mediated the relationship between health education and HIV prevention behaviors, suggesting that knowledge or health education may influence health behavior partly through psychosocial pathways. This finding is particularly relevant to the present study because it indicates that the effect of knowledge may not operate independently but may interact with self-efficacy and other psychosocial factors.

The findings also have implications for community-based HIV prevention among MSM. Community-based educational interventions, culturally appropriate health communication, peer education, and the integration of online and offline approaches may provide opportunities to improve HIV literacy while reducing barriers to testing. [\(P. Hong et al., 2021\)](#) demonstrated that a peer-led

educational approach among MSM significantly improved both HIV knowledge and HIV testing rates. In the context of MSM communities, educational interventions should therefore provide accurate and accessible information while ensuring that communication is stigma-free and culturally appropriate. Peer educators may be particularly valuable because information delivered through trusted community networks may be more acceptable than information delivered exclusively through formal healthcare institutions.

From a practical perspective, the strong association between knowledge and HIV testing suggests that HIV education should not be treated as a stand-alone information intervention. Educational activities need to be connected directly with accessible, confidential, and non-discriminatory testing services so that increased awareness can be translated into actual testing behavior. Evaluation should also assess whether improvements in knowledge are accompanied by changes in testing uptake rather than relying solely on changes in knowledge scores. This integrated approach may help reduce the gap between knowing about HIV testing and actually undertaking HIV testing.

Stigma

Healthcare-related stigma is an important structural and interpersonal barrier to HIV testing among key populations, including men who have sex with men (MSM). In this study, healthcare stigma was significantly associated with HIV testing behavior, indicating that perceptions and experiences of stigma within healthcare settings may influence decisions to seek HIV testing. Importantly, the stigma identified in this study should not be interpreted solely as an individual attitude of healthcare workers. It may also reflect limited exposure of healthcare personnel to HIV programs, inadequate understanding of the specific needs of key populations, and the broader organizational culture within health facilities. Thus, stigma should be understood as a multidimensional phenomenon that can emerge from interactions between healthcare providers, institutional practices, and the social environment surrounding MSM.

Conceptually, healthcare stigma operates at both interpersonal and institutional levels. At the interpersonal level, judgmental, insensitive, or discriminatory attitudes from healthcare providers toward sexual orientation or sexual behavior may reduce patients' perceived safety and willingness to disclose relevant information. At the institutional level, inadequate confidentiality protection, unfriendly administrative procedures, and the absence of clearly implemented non-discrimination policies may undermine trust in healthcare services. Yiğit et al., (2025) reported that perceived discrimination in healthcare facilities was significantly associated with a lower likelihood of HIV testing among MSM, supporting the importance of healthcare experiences in shaping testing behavior.

The findings are also consistent with (C. Zhang & Liu, 2022), who found that stigma experienced by MSM in healthcare settings was associated with lower dissemination and utilization of HIV-related services, including routine HIV testing and PrEP. In Indonesia, (Fauk et al., 2021) reported that experiences of discrimination from healthcare workers could lead some respondents to delay HIV testing despite awareness of their risk of HIV infection. These findings suggest that stigma does not merely generate negative psychological experiences but can translate into concrete behavioral consequences by discouraging engagement with healthcare services.

The influence of stigma may also extend beyond direct experiences with healthcare providers. In social and cultural environments where same-sex sexual behavior is negatively perceived, MSM may anticipate judgment, rejection, or disclosure of their sexual behavior when accessing HIV services. Such anticipated stigma may reinforce internalized stigma and reduce confidence in seeking healthcare. Consequently, stigma may operate through several interconnected mechanisms, including reduced perceived safety, diminished trust in healthcare providers, lower self-efficacy in accessing services, and reluctance to disclose sexual or HIV-related information. These mechanisms may explain why the availability of HIV testing services does not necessarily translate into higher testing uptake.

The findings also indicate the importance of considering the cultural and social environment surrounding MSM. Where prevailing social norms are less accepting of same-sex behavior, stigma may be reinforced not only within healthcare facilities but also through family, peer, community, and social networks. Conversely, supportive peer networks and community-based organizations may provide a protective environment that normalizes HIV testing and reduces fear of discrimination. Therefore,

healthcare stigma should be addressed not only through provider-level interventions but also through broader community-based approaches that strengthen social acceptance, confidentiality, and trust.

Interventions to reduce stigma in healthcare settings have shown promising potential. Sensitization and capacity-building programs for healthcare workers, implementation of non-discrimination policies, confidentiality safeguards, and the development of key-population-friendly services can help create safer healthcare environments. An implementation study in Indonesia by (Sitorus et al., 2024) found that a community-based service approach combined with peer educator support increased trust in healthcare services and HIV testing uptake. This suggests that involving trusted community members may be an effective strategy for bridging the gap between MSM communities and formal healthcare institutions.

The findings indicate that healthcare-related stigma was a significant determinant of HIV testing behavior among MSM. However, this stigma should also be understood within the broader cultural and lifestyle context of the respondents. Cultural norms, social values, and prevailing perceptions regarding same-sex sexual behavior may influence how MSM perceive HIV, sexual health services, and disclosure of their sexual behavior to healthcare providers. In environments where such behaviors are socially stigmatized or considered inconsistent with prevailing cultural and moral norms, respondents may experience fear of judgment, discrimination, or social rejection, which can reduce trust in healthcare services and discourage HIV testing. Conversely, supportive peer networks, greater community acceptance, and non-judgmental healthcare environments may reduce perceived stigma and encourage testing. Therefore, interventions to address healthcare stigma should not be limited to healthcare facilities and policy-level measures but should also consider the cultural and social environment in which MSM live, including community norms, peer support, and prevailing attitudes toward HIV testing and sexual health.

Self-Efficacy

Self-efficacy is an important construct in health behavior theories, particularly Bandura's Social Cognitive Theory, because it reflects an individual's confidence in their ability to perform a particular behavior, including accessing and completing HIV testing. However, in the present study, self-efficacy was not significantly associated with HIV testing behavior after controlling for knowledge, healthcare stigma, social environment, and other variables in the multivariate model. This finding suggests that although self-efficacy is theoretically relevant, its independent contribution to HIV testing behavior may be limited when broader social and structural factors are considered simultaneously.

One possible explanation is that self-efficacy may operate through indirect rather than direct pathways. Individuals may have sufficient confidence in their ability to obtain an HIV test, but this confidence may not translate into actual testing when they encounter stigma, concerns about confidentiality, unsupportive social environments, or other barriers within healthcare settings. In other words, having the confidence to perform a behavior does not necessarily mean that the individual has a supportive environment in which that behavior can be carried out. This may explain why self-efficacy lost its statistical significance after knowledge, stigma, and social environment were included in the multivariate model.

The finding may also be interpreted within the social context of MSM communities. In a collectivist cultural context such as Indonesia, interpersonal relationships, peer norms, and social support may influence health-related decisions alongside individual psychological characteristics. A study by (Leluțiu-Weinberger et al., 2020) showed that community support was more consistently associated with HIV testing than individual self-efficacy among MSM in several Asian countries. This finding suggests that individual confidence may be strengthened or constrained by the social environment in which MSM make decisions about HIV testing. Thus, self-efficacy should not necessarily be interpreted as an isolated individual characteristic but as a psychological capacity that interacts with social support and community norms.

The non-significant finding is also important because it differs from the theoretical expectation that greater self-efficacy should directly facilitate health behavior. Rather than indicating that self-efficacy is irrelevant, the result may suggest that its effect is conditional on the presence of enabling social and structural conditions. For example, an MSM individual may feel confident about undergoing HIV testing but may still avoid testing if they fear being recognized by community members, anticipate

discrimination from healthcare workers, or doubt the confidentiality of the service. Therefore, self-efficacy may be more relevant when the external barriers to testing are sufficiently low.

Although self-efficacy was not a significant independent predictor in the final model, it remains potentially valuable as an intervention target. Strategies such as skill-building workshops, role-playing, communication training, and service simulations may strengthen individuals' confidence in communicating with healthcare providers, requesting HIV testing, and managing anticipated stigma. However, these individual-level interventions should be implemented alongside efforts to reduce healthcare stigma and strengthen supportive social environments. Increasing individual capability without addressing structural and social barriers may have limited effects on actual testing behavior.

The findings suggest that HIV testing behavior among MSM in Parepare may be better understood through a multilevel perspective, in which individual psychological capacity interacts with knowledge, social support, healthcare stigma, and the broader social environment. The non-significant direct effect of self-efficacy does not exclude its theoretical importance; rather, it raises the possibility that self-efficacy may function as an indirect or conditional mechanism in the relationship between social and psychosocial factors and HIV testing behavior. This possibility should be examined in future research using mediation or moderation analysis rather than being inferred solely from the current multivariate model.

Social Environment

The social environment, including peer support, group norms, and community connectedness, represents an important interpersonal and community-level determinant of health behavior. In this study, the social environment was significantly associated with HIV testing behavior among MSM. This finding indicates that the social context in which MSM interact may either facilitate or constrain decisions to undergo HIV testing. Rather than functioning merely as a background characteristic, the social environment may influence access to information, perceptions of HIV risk, emotional support, and confidence in using healthcare services.

Within the framework of Social Ecological Theory, the social environment operates primarily at the interpersonal and community levels and provides a link between individual characteristics and broader structural conditions. Peer support can provide information about the importance of HIV testing, emotional encouragement, and practical assistance, such as accompanying individuals to healthcare facilities or helping them obtain self-test kits. (Aytur et al., 2021) emphasized the importance of social and interpersonal contexts in shaping health-related behaviors. Similarly, (Zhao et al., 2022) reported that MSM with supportive social networks were more likely to engage in HIV testing than those experiencing social isolation. These findings support the interpretation that testing decisions are influenced not only by individual knowledge or motivation but also by the social resources available to individuals.

The social environment can operate in both supportive and restrictive directions. Supportive peer networks and community organizations may increase feelings of safety, acceptance, and confidence in accessing HIV services, whereas negative group norms, stigma, or fear of social judgment may discourage testing. This dual role can be understood through injunctive norms, which refer to what individuals perceive their social group considers acceptable or appropriate, and descriptive norms, which refer to behaviors that individuals observe being commonly practiced by others. When HIV testing becomes normalized within a community, individuals may perceive testing as an ordinary and socially acceptable health behavior rather than as an indication of risky or stigmatized sexual behavior. (Zhao et al., 2022) demonstrated that interventions targeting group norms could increase HIV testing intentions and behavior among MSM through changes in perceived social norms.

The social environment may also function as an informal information and service-delivery pathway. Within MSM communities, peer networks can disseminate information about HIV testing locations, testing procedures, confidentiality, and available prevention services more rapidly than formal health communication channels. Community-based approaches involving peer educators and peer navigators may therefore reduce the psychological and practical barriers associated with facility-based testing. This mechanism is particularly relevant when individuals have concerns about stigma or lack confidence in approaching conventional healthcare facilities.

However, the effect of the social environment should be interpreted within the local context. The social dynamics of MSM communities in Parepare may differ according to the degree of identity disclosure, strength of peer networks, availability of community-based organizations, and the use of online platforms as spaces for social interaction and information exchange. More socially closed networks may require approaches emphasizing confidentiality, trust, and individualized peer engagement. Conversely, more connected networks may provide opportunities for community leaders and peer groups to promote positive testing norms and mobilize members toward HIV prevention services.

The findings also suggest that community gatekeepers and peer leaders may have an important role in strengthening HIV testing behavior. Changes in social norms are unlikely to occur immediately; they require repeated communication, collective learning, and consistent reinforcement of positive messages within social networks. Therefore, community-based HIV programs should not only measure changes in testing uptake but also consider changes in perceived social norms, peer support, community connectedness, and trust in healthcare services.

Importantly, the significant association observed in this study does not by itself establish that the social environment directly causes HIV testing behavior. The relationship may involve other psychosocial mechanisms, including knowledge, self-efficacy, perceived stigma, and risk perception. The social environment may also interact with these factors. For example, strong community support may be particularly valuable for individuals with limited HIV knowledge because peers can provide information and encouragement that compensate, at least partially, for gaps in formal health information. However, this potential moderating or mediating mechanism cannot be established from the current cross-sectional analysis and should therefore be tested in future analytical models.

Access to health services

The results of this study indicate that access to health services was not significantly associated with HIV testing behavior among MSM. This finding may appear inconsistent with previous evidence identifying access to healthcare as an important factor in HIV service utilization. However, the result may indicate that physical accessibility to HIV testing facilities is not the only dimension of access that is relevant to testing decisions. When services are geographically available, other factors, including perceived safety, confidentiality, stigma, quality of interaction with healthcare providers, and the acceptability of services, may be more closely associated with HIV testing behavior.

This interpretation is supported by (Vashisht et al., 2023), who identified several barriers and facilitators affecting the utilization of HIV testing services among MSM, indicating that access involves more than the physical availability of healthcare facilities. Concerns regarding the testing process, social stigma, confidentiality, and experiences within healthcare services may affect the willingness of MSM to utilize available testing services. Thus, the absence of a significant association between access and HIV testing in the present study should not be interpreted as meaning that healthcare access is unimportant, but rather that the dimension of access measured in this study may not capture the full complexity of healthcare accessibility experienced by MSM.

The Indonesian context further supports this interpretation. (Fauk et al., 2021) documented experiences of HIV stigma and discrimination among healthcare providers in Yogyakarta and Belu, Indonesia. Such experiences may shape how key populations perceive the safety and acceptability of healthcare services. Similarly, (Nugroho et al., 2020), examining client perspectives on HIV prevention outreach targeting Indonesian MSM and transwomen, highlighted the importance of community-oriented approaches in facilitating engagement with HIV prevention services. These findings suggest that geographical proximity to a healthcare facility does not necessarily correspond to effective access when individuals experience concerns related to stigma, confidentiality, trust, or the social acceptability of services.

Another explanation is that access may have been measured mainly by distance or ease of reaching healthcare facilities, without considering factors such as travel time, transportation costs, waiting time, operating hours, confidentiality, provider competence, and MSM-friendly services. Thus, the non-significant finding may reflect limitations in the access indicators used. More comprehensive measures could provide a better understanding of the relationship between healthcare access and HIV testing behavior.

The findings should also be interpreted in relation to the significant association between healthcare stigma and HIV testing behavior. Physical access to healthcare does not necessarily mean that MSM individuals feel safe or comfortable using testing services. Concerns about discrimination, confidentiality, and negative interactions may discourage testing, whereas confidential, respectful, and supportive services may be perceived as accessible despite greater physical distance.

Community-based approaches may therefore complement conventional facility-based services. (Sitorus et al., 2024) demonstrated that educational counseling for HIV testing was associated with increased coverage of voluntary HIV testing among MSM. Together with the findings of Nugroho et al., (2020), this suggests that community engagement and approaches that reduce psychological and social barriers may be important components of HIV testing services.

Importantly, because this study employed a cross-sectional design, the findings should be interpreted as associations rather than causal relationships. The study cannot establish that limited healthcare access causes lower HIV testing behavior, nor can it conclude that increasing physical access will necessarily increase HIV testing. The appropriate interpretation is that access to health services was not significantly associated with HIV testing behavior after controlling for other variables in the multivariate analysis

CONCLUSION AND SUGGESTION

Conclusion

This study found that age, healthcare-related stigma, HIV knowledge, and social environment were significantly associated with HIV testing behavior among MSM in Parepare City. HIV knowledge showed the strongest association, followed by social environment, highlighting the importance of HIV literacy, peer support, and social context in promoting HIV testing. In contrast, education, access to healthcare services, and self-efficacy were not significantly associated with HIV testing behavior after multivariate adjustment. Given the cross-sectional design, these findings indicate associations rather than causal relationships.

Suggestion

1. HIV prevention programs should strengthen community-based HIV education and peer education while ensuring confidential, respectful, and stigma-free HIV testing services for MSM.
2. Healthcare facilities and policymakers should strengthen confidentiality, non-discrimination, and stigma-reduction policies in HIV services and support community-based testing approaches.
3. Further studies should use longitudinal designs and examine whether HIV knowledge, healthcare-related stigma, and social environment mediate or moderate HIV testing behavior.

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