

# HIV knowledge level, social support, and risk perception on attitudes toward HIV testing among heterosexuals in Indonesia

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## Abstract

HIV/AIDS remains a major global health issue, particularly among heterosexual populations. The WHO and UNAIDS aim to end the epidemic by 2030 through the 95-95-95 strategy. In

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Indonesia, 81% of individuals knew their HIV status, 41% were on treatment, and 19% achieved viral suppression as of 2022. HIV testing is vital for identifying those infected. This research examines the relationships between HIV knowledge, social support, and risk perception with attitudes towards HIV testing among heterosexual individuals in Indonesia. Using a descriptive analytical design with a cross-sectional approach, 192 respondents from Bekasi Regional General Hospital, Class 1 Cipinang Prison, Class II A Cipinang Narcotics Prison, and Siloam Mampang Hospital were studied. Multivariate analysis showed that both knowledge ( $p=0.006$ ,  $OR=2.205$ ) and social support ( $p<0.001$ ,  $OR=3.778$ ) significantly influence attitudes towards HIV testing. Higher HIV knowledge and social support increase the likelihood of individuals supporting and participating in HIV testing, highlighting the importance of initiatives to improve both areas to encourage testing.

## Introduction

HIV/AIDS has become a global health challenge, with 39 million people infected by the end of 2022, 1.3 million new infections, and 630,000 deaths related to HIV/AIDS.<sup>1</sup> The highest HIV prevalence is recorded in Africa, Southeast Asia, and the Americas, while the Eastern Mediterranean has the lowest prevalence.<sup>2</sup> Indonesia faces significant challenges in controlling HIV/AIDS, with an increase in cases among women who are partners of key population groups.<sup>3,4</sup> The HIV epidemic has persisted for more than three decades, with the primary mode of transmission being heterosexual risk behaviors.<sup>3</sup> In Indonesia, 68.1% of HIV cases are found in individuals aged 25-49 years.<sup>5</sup>

UNAIDS reports that 540,000 people are living with HIV in Indonesia, with 26,000 deaths due to AIDS.<sup>6</sup> WHO and UNAIDS are committed to ending the HIV/AIDS epidemic by 2030 through the 95-95-95 approach, which aims for 95% of people living with HIV to know their status, 95% to be on ARV treatment, and 95% to achieve viral suppression by 2025.<sup>2</sup> In Indonesia, progress toward the 95-95-95 targets is still lagging, with 81% of individuals aware of their HIV status and 41% receiving ARV treatment.<sup>7</sup> Efforts to increase HIV testing coverage are key to achieving these targets. HIV testing is a critical step in the effort to end the HIV/AIDS epidemic, as earlier testing can reduce transmission and improve treatment outcomes.<sup>8,9</sup> Although HIV testing may generate anxiety and stigma, a positive test result enables timely referral for treatment and prevents further virus transmission, while a negative test result encourages individuals to reduce infection risks.<sup>10,11</sup>

Good knowledge of HIV can reduce concerns about stigma related to HIV testing, as lack of knowledge often leads individuals to avoid testing due to fear of social stigma or emotional consequences.<sup>12</sup> Better knowledge increases risk awareness and moti-

vation to undergo testing.<sup>13</sup> Stigma and discrimination can affect mental health and worsen reluctance to undergo HIV testing.<sup>14</sup> Perceived risk also plays an important role in decision-making for testing, with higher perceived risks increasing motivation to test.<sup>14</sup> Social support, including from family and peer groups, is crucial in reducing stigma and supporting the decision to get tested.<sup>15,16</sup> Knowledge, social support, and risk perception are key factors in enhancing HIV testing and preventing HIV transmission.

## Materials and Methods

This study employed a descriptive analytical method with a cross-sectional design, focusing on heterosexual individuals from two provinces in Indonesia: Special Capital Region of Jakarta Province and West Java. These locations were selected due to their high population density, diverse demographic characteristics, and reported prevalence of HIV cases. Both provinces are considered strategic regions for public health interventions, making them suitable for studying factors influencing HIV testing attitudes. The research was conducted at four locations: Cipinang Class I Penitentiary, Jakarta Class II A Narcotics Prison, Siloam Hospital Mampang South Jakarta, and Bekasi District General Hospital (RSUD). Participants were recruited using a probability sampling technique with simple random sampling, giving all eligible individuals an equal chance to be selected from each study site.

The inclusion criteria for participants are being heterosexual, at least 18 years old, and residing in Special Capital Region of Jakarta Province or West Java, while individuals who identify as bisexual will be excluded from the study. The research will take place from August to October 2024. The sample size was determined using the absolute precision method for population proportion estimation, based on HIV testing data in DKI Jakarta (2022), with a 95% confidence level and 5% margin of error, and an additional 10% added to anticipate non-response.

Data analysis will be conducted using SPSS software, and both proportions and bivariate relationships will be determined using chi-square tests and multivariate analysis. Potential confounders such as age, gender, education level, and marital status were controlled in the multivariate analysis to ensure the independent effect of each variable on attitudes toward HIV testing. The relationship between HIV knowledge, social support, risk perception, and attitudes toward HIV testing will be expressed as odds ratios (risk factors) and calculated using multivariate logistic regression. The data collection of the respondents' demographic characteristics consists of a checklist question using a demographic instrument, which includes age, gender, education, marital status, child ownership, employment status, and the province of residence (Special Capital Region of Jakarta Province and West Java). The instruments used include the Knowledge Questionnaire-18 (HIV-KQ-18), Perceived Social Support in HIV (PSS-HIV), HIV Risk Perception Questionnaire (HRPQ), and HIV-Antibody Testing Attitude Scale (HTAS). In this study, validity and reliability tests were conducted on the questionnaires with 40 respondents from West Java and Jakarta. Non-Indonesian questionnaires were translated by a certified translator and validated by experts. The validity test showed all items were valid, except one item in the HIV testing attitude questionnaire (HTAS), which had an  $r$ -value of 0.314. This item was revised based on expert input. The reliability test showed all questionnaires had a Cronbach's Alpha value above 0.6, indicating they were valid and reliable for use. To minimize bias, enumerators

were trained in standardized data collection procedures, confidentiality, and ethical considerations. The questionnaires were pre-tested to ensure clarity and consistency across study sites.

The data collection for respondents' demographic characteristics involved a checklist question using a demographic instrument, which includes age, gender, education, marital status, child ownership, employment status, and province of residence (Special Capital Region of Jakarta Province and West Java).

## Results

Table 1 shows the characteristics of the respondents. Most were male (60.4%), with the majority having a high school education (47.9%). Most were unmarried (54.7%), and 77.9% had children. Most respondents were employed (81.8%), with 56.7% in the formal sector. Regarding HIV risk, 67.2% were classified as high risk, with 35.9% having one risk factor and 1% having more than three risk factors.

Table 2 shows the frequency distribution of respondents based on HIV knowledge, social support, risk perception, and attitudes toward HIV testing. The average HIV knowledge score was moderate, with a median of 10. Social support also had a moderate score, with a median of 44. The average risk perception was high (57.74), and 72.9% had a positive attitude toward HIV testing.

Table 3 presents the analysis of factors affecting attitudes toward HIV testing. The young adult group showed higher support for HIV testing, but no significant difference was found in the Odds Ratio (OR). Other factors, like gender, education, and employment, did not show significant results, except for HIV risk status, where high-risk individuals were more likely to support HIV testing (OR=0.391,  $p=0.015$ ).

Table 4 presents the candidate selection for the study. Variables with a  $p$ -value  $< 0.25$  were included in the multivariate analysis. These included knowledge, social support, risk perception, age, education, marital status, and HIV high-risk status. Variables with  $p$ -values  $> 0.25$ , like gender and employment, were excluded, though gender was kept for theoretical reasons.

Table 5 presents the final multivariate analysis. It shows that knowledge and social support significantly affect attitudes toward HIV testing. Higher knowledge (OR=2.205) and higher social support (OR=3.778) were associated with more favorable attitudes toward HIV testing. Social support had the strongest influence, with a  $p$ -value  $< 0.001$ .

## Discussion

The analysis results show a significant relationship between knowledge about HIV and attitudes towards HIV testing in heterosexual groups in Indonesia. The  $P$  value of  $<0.001$  indicates that the relationship between knowledge level and attitudes towards HIV testing is statistically significant. The better a person's knowledge about HIV, the more likely they are to have a positive attitude towards HIV testing. Knowledge plays a crucial role in reducing the stigma associated with HIV testing. Individuals with limited understanding of HIV may mistakenly believe that an HIV diagnosis is a death sentence or that they will face severe social stigma if the test results are positive. Concerns about the social and emotional consequences of a positive test result often lead individuals to

**Table 1.** Characteristics of respondents based on age category, gender, education, marital status, child ownership status, employment status, and type of occupation.

Variable	Category	Number	%
Age	Young adulthood (18-39 years)	155	80.7
	Middle adulthood (40+ years)	37	19.3
	Total	192	100
Gender	Male	116	60.4
	Female	76	39.6
	Total	192	100
Education	No Schooling	3	1.6
	Primary School	14	7.3
	Junior High School	24	12.5
	High School	92	47.9
	University or Higher Education	59	30.7
	Total	192	100
Marital status	Single	105	54.7
	Married	59	30.7
	Divorced	28	14.6
	Total	192	100
Child ownership	Has Children	60	77.9
	No Children	17	22.1
	Total	77	100
Employment	Unemployed	35	18.2
	Employed	157	81.8
	Total	192	100
Type of occupation	Formal employment	89	56.7
	Informal employment	68	43.3
	Total	157	100
Belongs to high-risk group for HIV?	Not at risk	63	32.8
	At risk	129	67.2
	Total	192	100
Type of high-risk group	Unprotected sexual intercourse	49	38.0
	Intravenous Drug User (IDU)	5	3.9
	Having more than one sexual partner	14	10.9
	Excessive alcohol and drug use in the context of sexual behavior	18	14.0
	Commercial Sex Worker (CSW)	1	0.8
	Unprotected sexual intercourse and excessive alcohol and drug use in the context of sexual behavior	7	5.4
	Unprotected sexual intercourse and IDU	1	0.8
	Unprotected sexual intercourse and having more than one sexual partner	23	17.8
	Having more than one sexual partner and CSW	3	2.3
	Unprotected sexual intercourse, having more than one sexual partner, and alcohol/drug abuse	7	5.4
	Unprotected sexual intercourse, IDU, and having more than one sexual partner	4	3.1
	Unprotected sexual intercourse, IDU, and having more than one sexual partner, and excessive alcohol/drug use	2	1.6
	Unprotected sexual intercourse, IDU, having more than one sexual partner, and excessive alcohol/drug use	1	0.8
	Unprotected sexual intercourse, IDU, having more than one sexual partner, excessive alcohol/drug use, and CSW	1	0.8
	Total	129	100

**Table 2.** Frequency distribution of respondents based on HIV knowledge, social support, risk perception, and attitudes towards HIV testing

Variable	Median	SD	Min-Maks	CI 95%
HIV Knowledge Level	10.00	3.881	0-16	8.73-9.84
Social Support	44.00	9.668	12-60	40.83-42.47
Variable	Mean	SD	Min-Maks	CI 95%
Risk Perception	57.74	11.105	26-93	56.16-59.33
Variable	Category	Number	Percentage	
Attitudes toward HIV testing	Unfavorable	52	27.1%	
	Favorable	140	72.9%	
	Total	192	100%	

**Table 3.** Analysis of the relationship between potential confounding variables and attitudes towards HIV testing.

Variable	Attitudes Towards HIV Testing				Total		p
	Unfavorable		Favorable		n	%	
	n	%	n	%			
Age							
Young adulthood	38	19.8	113	60.9	155	80.7	0.101
Middle adulthood	14	7.3	23	12.0	37	19.3	
Gender							
Male	33	17.2	83	43.2	116	60.4	0.599
Female	19	9.9	57	29.7	76	39.6	
Education							
Low (primary and secondary)	41	21.4	92	47.9	133	69.3	0.080
High	11	5.7	48	25.0	59	30.7	
Employment status							
Not working	8	4.2	27	14.1	35	18.2	0.534
Working	44	22.9	113	58.9	157	81.8	
Marital Status							
Single	26	13.5	79	41.1	105	54.7	0.426
Married	26	13.5	61	21.8	87	45.3	
Having children							
No	28	14.6	94	49.0	122	63.5	0.089
Yes	24	12.5	46	24.0	70	36.5	
High-Risk Group for HIV?							
Not at Risk	10	5.2	53	27.6	63	32.8	0.015*
At Risk	42	21.9	87	45.3	129	67.2	
Reason for high-risk group							
1 Reason	30	23.3	57	44.2	87	67.4	0.502
>1 Reason	12	9.3	30	23.3.6	34	32.6	

**Table 4.** Candidate selection results.

No	Variable	p	Description
1.	Knowledge	<0.001	Included
2.	Social support	0.003	Included
3.	Risk perception	<0.001	Included
4.	Age	0.043	Included
5.	Gender	0.599*	Included
6.	Education	0.083	Included
7.	Employment status	0.535	Not included
8.	Type of work	0.289	Not included
9.	Marital Status	0.194	Included
10.	Having children	0.091	Included
11.	High-risk group for HIV	0.017	Included
12.	Reason for high-risk group	0.479	Not included

\*Significant if p< 0.25

**Table 5.** Results of the final multivariate modeling.

Variable	B	Wald	p	OR	CI 95%
Knowledge	0.791	7.610	0.006	2.205	(1.257-3.866)
Social support	1.329	12.869	<0.001	3.778	(1.719-8.029)
Constant	-0.559	2.425	0.119	0.572	

avoid HIV testing.<sup>17</sup> Moreover, inadequate knowledge about HIV transmission, early symptoms, and the long-term impact of the disease may result in the perception that testing is unnecessary.<sup>18</sup> This lack of understanding can contribute to the spread of HIV, as individuals may not be aware of the risks they face. Low knowledge about HIV transmission often leads individuals to be unaware of their risk status, ultimately affecting their motivation to get tested.<sup>19</sup> Comprehensive knowledge of HIV, including a correct understanding of transmission and prevention strategies, is critical in preventing HIV transmission.<sup>20</sup> A significant association between HIV knowledge and HIV testing behavior among women has also been reported, with women possessing good HIV knowledge being 3.75 times more likely to undergo testing compared to those with lower knowledge levels.<sup>21</sup> These findings highlight the essential role of knowledge in encouraging HIV testing uptake. Additionally, the analysis demonstrates a significant relationship between risk perception and attitudes towards HIV testing among heterosexual respondents in Indonesia ( $p < 0.001$ ). Higher levels of perceived risk are associated with a more positive attitude towards HIV testing. Risk perception plays a vital role in the acceptance of HIV prevention strategies and is an integral component of the decision-making process for undergoing HIV testing.

Studies have shown that individuals who perceive themselves to be at high risk for HIV are more likely to engage in preventive behaviors, including HIV testing.<sup>14,22</sup> However, a significant gap often exists between risk awareness and action, with many individuals who acknowledge high-risk behaviors still choosing not to undergo testing. For example, although only 3.4% of men and 2.5% of women perceived themselves to be at high risk for HIV, they did not get tested in the past year.<sup>23</sup> Low risk perception remains a major barrier to HIV testing, even among individuals with adequate knowledge about the disease.<sup>23</sup> This phenomenon is frequently driven by misconceptions about risky behaviors or the absence of visible symptoms, leading individuals to underestimate their vulnerability and feel no need for testing.<sup>12</sup> Therefore, increasing awareness of HIV risk behaviors can encourage individuals to undergo testing and better understand their health status. Psychological factors, such as anxiety about potential positive results, also play a role in shaping individual perceptions of HIV risk. Uncertainty about the social and emotional impacts of a positive test result can strengthen risk perception.<sup>24,25</sup> Individuals at high risk, such as drug users or those engaging in unprotected sex with partners of unknown HIV status, are expected to have high-risk perceptions.<sup>26</sup> A deeper understanding of behaviors that increase HIV transmission risk has been associated with a greater likelihood of adopting proactive measures, including voluntary HIV testing.<sup>27</sup>

This study also demonstrated a significant relationship between social support and attitudes towards HIV testing among heterosexual respondents in Indonesia. Individuals with higher levels of social support were more likely to exhibit supportive attitudes towards HIV testing. Conversely, respondents with low social support tended to have negative attitudes. This relationship was statistically significant, with a P value of 0.003. Social support provides emotional, practical, and informational assistance needed to overcome the fear and stigma associated with HIV testing.<sup>15</sup> It can enhance individuals' courage to undergo testing, reduce anxiety, and improve their understanding of the importance of HIV testing.<sup>28,29</sup> Furthermore, higher levels of social support have been associated with increased HIV testing behaviors and intentions. Respondents with greater social support were found to be 1.48 times more likely to have ever undergone HIV testing [ $aOR = 1.48$ ;  $p < 0.001$ ], and 1.22 times more likely to have been tested in the

past six months [ $aOR = 1.22$ ;  $p < 0.01$ ].<sup>30</sup> Additionally, social support was shown to positively influence HIV-related knowledge, further enhancing individuals' intentions to undergo HIV testing.

Social support also plays a critical role in addressing the stigma associated with HIV. Individuals living with HIV often experience stigma, which can significantly affect their decision to undergo testing. Without strong social support, they may fear discrimination and thus avoid seeking testing.<sup>13</sup> Conversely, strong social support encourages individuals to share experiences and seek information, thereby reducing fear and increasing their confidence in maintaining their health. Based on the analysis, it can be concluded that social support plays a significant role in shaping positive attitudes towards HIV testing among heterosexual individuals in Indonesia. Social support not only provides emotional encouragement but also enhances knowledge and reduces stigma, thereby making individuals more likely to undergo HIV testing.

Multivariate analysis revealed that both knowledge and social support significantly influenced attitudes towards HIV testing. Social support had the greatest impact, with an odds ratio (OR) of 3.778, while knowledge had an OR of 2.205. These findings highlight the importance of both knowledge and social support in encouraging HIV testing. Social support, in particular, plays a crucial role in reducing stigma and fear, making it a key factor in promoting HIV testing behavior in Indonesia.

This study was a cross-sectional design, so the findings are limited to two provinces (DKI Jakarta and West Java).

## Conclusions

Social support is the most significant factor compared to other variables influencing an individual's decision to undergo HIV testing. This is because social support provides essential emotional, practical, and informational encouragement in overcoming fear and stigma often associated with HIV testing. Research shows that individuals who receive strong social support are more likely to undergo HIV testing, participate in prevention programs, and access HIV-related healthcare services.

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