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Behavioral and Structural Predictors of Adolescents' Attitudes Towards Voluntary Counseling and Testing (VCT) for HIV in East Java, Indonesia

Jayanti Dian Eka Sari[1]*, Fajrinia Putri Rudiansyah[2], Farah Fadhillah[3], Yeshita Alifia Yuvianti[4], Eny Qurniyawati[5], Suhainizam Bin Muhamad Saliluddin[6], Muthmainnah Muthmainnah[7], Annisa Clara Salsabila[8]

[1]Public Health Study Program, Faculty of Health, Medicine and Life Sciences, Universitas Airlangga Banyuwangi, East Java, Indonesia. Research Group for health and well-being of Women & Children, Public Health Study Program, Faculty of Health, Medicine and Life Sciences, Universitas Airlangga Banyuwangi, East Java, Indonesia
[2]Department of Environmental Health, Faculty of Public Health, Airlangga University, 60115, Surabaya, East Java, Indonesia
[3]Department of Health Policy and Administration, Faculty of Public Health, Airlangga University, 60115, Surabaya, East Java, Indonesia
[4]Department of Environmental Health, Faculty of Public Health, Airlangga University, 60115, Surabaya, East Java, Indonesia
[5]Department of Epidemiology, Faculty of Public Health, Airlangga University, 60115, Surabaya, East Java, Indonesia. Research Group for health and well-being of Women & Children, Public Health Study Program, Faculty of Health, Medicine and Life Sciences, Universitas Airlangga Banyuwangi, East Java, Indonesia
[6]Department of Community Health Faculty of Medicine & Health Sciences University Putra Malaysia, Malaysia
[7]Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia
[8]Department of Health Policy and Administration, Faculty of Public Health, Universitas Airlangga, Indonesia

***Corresponding Author**: **E-mail:** jayantidian@fkm.unair.ac.id

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ABSTRACT

Introduction: HIV remains a significant global public health issue, with East Java, Indonesia, contributing 15–20% of the national HIV cases. Voluntary Counseling and Testing (VCT) is a critical strategy for early detection and prevention, yet its uptake among adolescents is influenced by multifaceted factors. This study aimed to identify the determinants of adolescents' attitudes towards VCT for HIV in East Java.
Methods: An observational analytic cross-sectional study was conducted from July to December 2024, involving 329 adolescents aged 18–24 years selected through random sampling. Data were collected via a validated online questionnaire assessing demographic, socio-economic, knowledge, psychosocial, and institutional factors. Binary logistic regression analysis was employed to determine significant predictors of VCT attitudes.
Results: Nine factors were significantly associated with positive attitudes toward VCT: younger age (OR = 0.81), male gender (OR = 2.34), higher parental income (OR = 1.86), higher HIV-related knowledge (OR = 2.18), better VCT knowledge (OR = 1.72), low-risk sexual activity (OR = 1.95), service availability (OR = 2.48), family support (OR = 1.77), and institutional support (OR = 1.63). Conversely, stigma remained a significant barrier (OR = 0.49).
Conclusion: Addressing stigma, enhancing institutional and family support, and improving access to VCT services are crucial for increasing VCT uptake among adolescents. Targeted interventions, including family-based approaches and comprehensive sexual education, are recommended to foster positive attitudes and reduce HIV transmission in East Java.

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INTRODUCTION

Human Immunodeficiency Virus (HIV) remains a significant global public health issue, affecting millions of people worldwide. An overview of the HIV situation in Indonesia and East Java based on the latest data: The HIV situation in Indonesia (2023–2024) shows a total of 582,447 people diagnosed with HIV since it was first detected in Indonesia in 1987. An upward trend is indicated each year, with approximately 20,000–30,000 new cases reported annually. The primary risk factors for infection include heterosexual contact (around 50%), injection drug use (10%), men who have sex with men (MSM) (30%), and mother-to-child transmission (requiring stronger intervention). Thus, according to national comparisons, East Java accounts for 15–20% of total HIV cases in Indonesia. Surabaya often serves as a focal point for prevention programs by the Ministry of Health and international organizations, such as UNAIDS or WHO (1–3).

Based on the survey conducted, the HIV situation in East Java indicates one of the provinces with a high HIV burden in Indonesia, with a total of over 110,000 HIV cases diagnosed in 2023 (the second highest after the Special Capital Region of Jakarta), where approximately 10,000 new cases were reported in 2023. In East Java, based on regional distribution, the cities of Surabaya, Malang, and Sidoarjo are the areas with the highest number of cases. The key populations are sex workers, men who have sex with men, and female sex workers (FSWs) (4,5).

In East Java, education has been carried out through NGOs such as GAYa Nusantara and the East Java AIDS Community, but there are still challenges, namely limited awareness of HIV testing among the community. In addition, the number of people lost to follow-up remains significant. Despite these challenges, including high social stigma, ARV (antiretroviral) treatment coverage remains at 60-70% of the target, and there is a disparity in access to services between urban and rural areas (6,7).

Voluntary Counseling and Testing (VCT) for HIV is an important strategy in the early detection, prevention, and treatment of HIV/AIDS. However, the uptake of VCT services is influenced by various multifactorial determinants, including demographic factors (such as age and gender), socioeconomic factors (such as parental income and education level), psychological factors (such as perceived stigma and self-efficacy), and institutional factors (such as the availability of services and institutional support). Understanding these determining factors is crucial for increasing VCT participation and reducing HIV transmission. Current efforts include the availability of VCT services at community health centers and hospitals, and an ARV program with a treatment coverage rate of 70%, but there are still challenges related to adherence (8,9)

Prior research identifies multifactorial determinants of VCT attitudes, including demographic (age, gender), socioeconomic (parental income), knowledge-based (VCT/HIV knowledge), behavioral (relationship status, sexual activity), clinical (HIV-related symptoms), structural (service availability), and psychosocial factors (family/institutional support, stigma). These factors align conceptually with established behavioral theories, such as the Health Belief Model (HBM), which emphasizes perceived susceptibility, perceived benefits, perceived barriers, and cues to action as key predictors of health-related behaviors. Likewise, the Theory of Planned Behavior (TPB) suggests that attitudes toward behavior, subjective norms, and perceived behavioral control contribute significantly to intention and action, including VCT uptake. For example, stigma and lack of social support often deter individuals from seeking VCT by increasing perceived barriers, while adequate knowledge and institutional encouragement serve as cues to action, enhancing individuals' intentions to undergo testing (10,11). Incorporating these theoretical perspectives provides a stronger conceptual framework for interpreting the predictors of adolescents' attitudes toward VCT (10,11).

Research by Myers et al. and Akhigbe et al. based on place of residence found that urban residents were more likely to use VCT services than rural residents (12,13). The results of research by Abdalla & Abusalih, Tsegay et al. and Myer et al. on knowledge and awareness of VCT found that a high level of knowledge about VCT significantly increased its use. These results are also supported by awareness and education campaigns about VCT, which are very important. The results of the study by Abdalla & Abusalih also found that perceived risk, i.e., individuals who consider themselves at risk for HIV, are more likely to seek VCT services (13,14).

Research on social and psychological factors, particularly family and institutional support, found that emotional support from family and attachment to parents positively influenced the desire to undergo testing, while institutional support, such as the availability of ART drugs at VCT sites, also encouraged testing. Regarding stigma

and discrimination, research findings indicate that fear of stigma and discrimination remains a significant barrier to VCT utilization. Efforts to reduce stigma through community education and support networks are crucial (15).

Other studies on behavioral factors found that sexual activity, with patients being sexually active and having multiple partners, was negatively associated with the desire to get tested, possibly due to fear of a positive result (16,17). However, those engaged in risky sexual behavior were more likely to use condoms if they knew their HIV status. Previous research on symptoms and health status has found that individuals with symptoms or a history of sexually transmitted infections are more likely to seek VCT (18,19).

The uptake of VCT services is influenced by complex interactions between demographic, socioeconomic, knowledge-based, social, psychological, and behavioral factors (20–22). This study was conducted because, to the best of the researchers' knowledge, there have been few studies examining the influence of age, gender, parental income, knowledge about VCT, relationship status, sexual activity, HIV symptoms, availability of VCT services, family support, institutional support, and HIV stigma on attitudes toward VCT for HIV testing, particularly with a focus on the research location of East Java.

The novelty of this study provides that while previous research has examined VCT uptake among adults or high-risk groups, this study specifically targets adolescents (18–24 years) in East Java, Indonesia, a region contributing 15-20% of national HIV cases. This age group is critical due to increasing HIV incidence yet remains understudied in Indonesia. By examining the interplay between individual-level (e.g., knowledge, stigma) and systemic factors (e.g., service access, institutional policies), this study provides a comprehensive framework for understanding adolescent VCT attitudes in high-burden settings. The results offer empirical insights that help health care providers and policymakers create focused, evidence-based interventions that will increase Indonesian adolescents' participation in VCT. To effectively support HIV prevention efforts, these interventions should take into account both individual-level determinants like knowledge and stigma as well as structural barriers like service availability and institutional support.

METHOD

This study employs a clear and systematic approach to ensure the reliability and validity of the findings. Below are the components of the methodology:

Research Design and Sample

This study uses an observational analytical approach with a cross-sectional design. The purpose of this method and design is to identify factors that influence adolescents' attitudes toward VCT for HIV testing by collecting data at a specific point in time. Attitudes were assessed using a validated questionnaire measuring four dimensions: (1) willingness to undergo VCT, (2) perceived benefits of knowing HIV status, (3) openness to discuss HIV testing with peers/family, and (4) perceived stigma associated with VCT utilization. Responses were recorded on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). A composite attitude score was derived by summing item responses, with higher scores indicating more positive attitudes (Cronbach's $\alpha = 0.78$). The study was conducted from July to December 2024 in East Java, Indonesia.

The study population consisted of adolescents aged 18 to 24 years living in East Java. Using a sample size formula for a population of 3,055,236 (the number of adolescents in East Java according to 2022 data from the Central Statistics Agency), it was calculated that the minimum sample size required was 100 participants with a margin of error of 10%. In this study, we obtained 329 samples using a random sampling method.

$$n = N / (1 + N(e))\text{^}2$$

The inclusion criteria for this study were young adults aged between 18 and 24 years old and residing in East Java. Exclusion criteria were applied to young adults with cognitive impairments that affected their knowledge and those who were unwilling to participate as respondents.

Research Instruments

Data collection was conducted using a questionnaire distributed via Google Forms on social media (WhatsApp). The questionnaire was developed by the research team and contained 108 structured questions. Thirty adolescents with similar characteristics were used to test the validity and reliability of the questionnaire. Reliability analysis confirmed internal consistency across all scales (Cronbach's $\alpha > 0.70$), exceeding the minimum threshold of 0.60 and the calculated r value was greater than the table r value (0.423).

Before filling out the questionnaire, participants were asked to fill out an information consent form as respondents. Demographic information included age, gender, parental income, and education. Independent variables included knowledge about VCT, relationship status, sexual activity, HIV symptoms, availability of VCT services, family support, institutional support, and stigma. The dependent variable measured was attitudes toward VCT for HIV among adolescents.

Analysis

Data analysis used binary logistic regression to examine the influence between independent and dependent variables. The prevalence ratio (PR) with a 95% confidence interval was calculated to measure the level of risk. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

This study obtained ethical approval from the Ethics Committee of the Faculty of Public Health, Airlangga University, with ethical number 151/EA/KEPK/2024. This study complies with research ethics guidelines, including obtaining informed consent from all participants.

RESULTS

Characteristic of Respondents

This study utilized data collected from 329 adolescents in East Java. Table 1 presents the participants' demographic and sociocultural characteristics. The majority of respondents were aged 20–24 years (65.3%) and female (84.8%), with 70.2% having parents who earned at or above the minimum wage. Most participants demonstrated good knowledge of voluntary counseling and testing (VCT) for HIV (56.2%), and nearly all (98.3%) received institutional support from their school or college. However, 58.4% held negative stigmas toward people living with HIV, while 41.6% exhibited positive attitudes. (Table 1).

Table 1. Characteristic of Respondents

Variables	Characteristic	Number	%
Age	18-19 years	114	34.7
	20-24 years	215	65.3
Gender	Male	50	`15.2
	Female	279	84.8
Parents' income	Below the city minimum wage	98	29.8
	At or above the city minimum wage	231	70.2
VCT knowledge	Fair	144	43.8
	Good	185	56.2
Symptoms of HIV	None	273	83.0
	Available	56	17.0
Institutional Support	Less supportive	157	47.7
	Support	172	52.3
Stigma	Negative	192	58.4
	Positive	137	41.6

Variables	Characteristic	Number	%
Attitudes towards VCT for HIV	Negative	12	3.6
	Positive	317	96.4
Relationship Dating status	Dated	206	62.6
	Never Dated	123	37.4
Sexual Activity	Low Risk	139	42.2
	High Risk	190	57.8
Family Support	Supportive	177	53.8
	Less supportive	152	46.2
Availability of service	Bad	278	84.5
	Good	51	15.5

Regarding behavior, 57.8% engaged in high-risk sexual activity, compared to 42.2% who reported low-risk behavior. A majority (62.6%) had dating experience, whereas 37.4% had never dated. Slightly over half (52.3%) perceived strong institutional support, while 47.7% reported weaker support. Family environments were described as supportive by 53.8%, though 46.2% perceived less familial support. Notably, an overwhelming majority (84.5%) rated HIV-related services as "bad," with only 15.5% considering them "good" (Table 1).

The Factors Influence Attitudes toward VCT for HIV

Binary logistic regression analysis was used to identify factors influencing attitudes toward VCT for HIV (positive vs. negative). The model statistically showed significance between the causal variables (age, gender, parental income, knowledge about HIV, knowledge about VCT, dating relationship status, marital status, sexual activity, HIV symptoms, availability of services, family support, institutional support, stigma) and attitudes of VCT for HIV ($\chi^2 = 87.24$, $p < 0.001$). This model indicates that the explanatory variables collectively can predict attitudes toward VCT for HIV effectively. The analysis results show the following binary logistic regression model:

$$\log\left(\frac{P(Y=1)}{1-P(Y=1)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

Description:
P(Y=1): Probability of positive attitudes toward VCT for HIV
β0: Intercept
β1, β2,…, βk: Regression coefficient
X1, X2,…, Xk: predictor variables

In general, the data showed that the binary logistic regression model performs quite well in predicting HIV VCT outcomes, with high statistical significance and moderate classification accuracy.

Table 2. The Results of Binary Logistic Regression

Variable	B	S.E	Wald	Sig.	Exp (B)	95% Cl for Exp (B)
Age	-0.21	0.09	5.47	**0.019***	0.81	0.68 – 0.97
Gender	0.85	0.32	7.12	**0.008***	2.34	1.25 – 4.38
Parental income	0.62	0.25	6.18	**0.013***	1.86	1.14 – 3.03
Knowledge about HIV	0.78	0.28	7.76	**0.005***	2.18	1.26 – 3.78
Knowledge about VCT	0.54	0.23	5.51	**0.019***	1.72	1.09 – 2.70
Status relationship dating	-0.31	0.17	3.32	0.068	0.73	0.52 – 1.03
Low-risk sexual activity	0.67	0.30	4.98	**0.026***	1.95	1.08 – 3.52
High-risk sexual activity	-0.29	0.18	2.60	0.107	0.75	0.53 – 1.06
Symptoms of HIV	0.38	0.20	3.61	0.057	1.46	0.99 – 2.16
Availability of services	0.91	0.31	8.62	**0.003***	2.48	1.35 – 4.56
Family support	0.57	0.24	5.64	**0.018***	1.77	1.10 – 2.84
Institutional support	0.49	0.22	4.96	**0.026***	1.63	1.06 – 2.51
Stigma	-0.72	0.27	7.14	**0.008***	0.49	0.29 – 0.83
Constant	-2.15	1.02	4.45	**0.035***	0.12	

***$p < 0.05$. Bolded values indicate statistically significant variables

Based on the Table 2, there are nine factors that significantly influence attitudes toward VCT for HIV, namely age, gender, parental income, knowledge, marital status, low-risk sexual activity, availability of services, family support, institutional support, and stigma. Additionally, there are three factors that are not significantly associated with attitudes toward VCT for HIV, such as dating relationship status (p=0.068), high-risk sexual activity (p=0.107), and perceived HIV symptoms (p=0.057).

Based on statistical calculations of OR and p-values, the following can be described: age has a significant negative association, meaning that the older the respondent, the less likely they are to have a positive attitude toward VCT for HIV (OR=0.81, p=0.019); gender has a significant association, with males being 2.34 times more likely to have a positive attitude toward VCT for HIV than females (p=0.008); respondents with higher parental income were 1.86 times more likely to have a positive attitude toward VCT for HIV (p=0.013); knowledge about VCT showed a strong positive association with attitudes toward VCT (OR=2.18, p=0.005; OR=1.72, p=0.019); respondents' current relationship status with their partner and certain sexual activities, particularly, were associated with more positive attitudes (OR = 1.52, p = 0.027); service availability was a strongly or highly significant factor associated with attitudes (OR = 2.48, p = 0.003); social support, both from family and institutions, was associated with a higher likelihood of positive attitudes toward VCT (OR=1.77 and 1.63); and stigma was negatively associated with attitudes, where increased stigma was associated with a decrease in positive attitudes toward VCT for HIV (OR=0.49, p=0.008).

DISCUSSION

Adolescence is an important transitional phase characterized by accelerated physical growth, the achievement of independence, and the development of social and behavioral skills that play a crucial role in long-term health and well-being (23). In this context, there are various views among adolescents regarding the implementation of VCT services for HIV. Positive views toward VCT FOR HIV services reflect an individual's willingness to voluntarily undergo VCT FOR HIV, with the belief that these services can provide significant benefits, such as providing health information that supports HIV prevention and management, as well as reducing social stigma associated with HIV. Individuals with positive views will see VCT FOR HIV testing as a responsible action without fear of discrimination from their surroundings (24). Studies show that adolescents who are knowledgeable about HIV are able to communicate about reproductive health conditions, particularly HIV (25). Other studies also show that individuals who are free from stigma after counseling can improve their social relationships with friends and the community through positive family support (26).

The results of this study indicate that positive attitudes toward Voluntary Counseling and Testing (VCT) for HIV are most prevalent among the 20–24 age group, at 97.2%. This finding is consistent with previous studies, which have reported that adolescents tend to have a high awareness of the importance of knowing their HIV status through VCT as an initial step in the early detection and prevention of HIV/AIDS (27). Additionally, individuals from families with incomes above the minimum wage also showed a high proportion of positive attitudes toward VCT, at 97.0%. However, research in China showed contrasting results, where individuals with higher incomes were more reluctant to utilize VCT services, due to the high level of stigma toward people living with HIV/AIDS (PLWHA) in their communities (28). Divergent findings between Indonesia and China may reflect structural disparities: China’s centralized healthcare system faces challenges in safeguarding confidentiality for high-income groups, whereas Indonesia’s NGO-driven initiatives may better mitigate stigma through community engagement.Cultural and structural differences between nations could account for these discrepancies. Higher-income people may find it difficult to access VCT in China due to ongoing stigma in close-knit social groups and a lack of confidentiality in health care. In contrast, despite similar underlying stigma issues, Indonesia may promote greater openness toward VCT services through its growing public health initiatives and more robust community-based interventions, particularly in urban areas.

A comprehensive understanding of HIV/AIDS and the benefits of VCT is crucial to encouraging the adoption of this service, as proper education can reduce the rate of transmission and reduce stigma and discrimination against PLWHA (27). Institutional support is also a significant factor, as evidenced by the fact that 98.3% of adolescents who feel they receive support from the institutions where they study or work show a positive attitude toward VCT. This support includes the provision of information on risk factors and the benefits of VCT, delivered through interpersonal and habit-based approaches (29).

Interestingly, the findings show that despite the negative stigma attached to PLWHA, approximately 97.4% of respondents with such attitudes still demonstrated positive attitudes toward VCT. This is consistent with studies in Nigeria and other places that reveal that the desire to know one's HIV status remains high despite social pressure and stigma. Community-based and workplace interventions have proven effective in increasing VCT participation, especially when combined with approaches that are accessible, quick, and confidential (29).

Most adolescent girls have shown less supportive views toward VCT services. In this era, treatment through VCT services and the promotion of HIV testing globally have become essential health services to meet HIV service needs, not only for women but also for men who play an active role in meeting these service and treatment needs (30).

According to WHO data from 2020, over 30% of new HIV infections worldwide occur among adolescents aged 15 to 21 years (31). Additionally, data from the United Nations indicates that approximately 39 million people worldwide are living with HIV/AIDS, including 37.5 million adults (aged 15 and older) and 1.5 million children (aged 0–14) in 2022 (32). Other data published by the Rwanda Demographic Health Survey in East Africa states that 45% of women aged 15-24 have never been tested for HIV. These data are reinforced by other studies, including one conducted by the Ethiopian Federal Ministry of Health, which states that women are a gender that is highly vulnerable to HIV infection. Generally, individuals do not experience symptoms and are not interested in taking an HIV test because they feel healthy (33).

Although VCT services have been used as an informative health service in preventive efforts, uptake remains low among certain groups, particularly adolescents. A study conducted in Nigeria found that only 17.3% of adolescents wanted to use VCT services for HIV/AIDS, with the remainder citing fear of positive test results, stigma, and discrimination as barriers to using HIV-VCT. Another study conducted in Ethiopia showed that 37.8% of adolescents who used VCT services had peers who also used VCT, wanted to access VCT services in the future, knew someone infected with or deceased from HIV/AIDS, and recognized HIV/AIDS testing as a positive factor supporting the use of VCT services (34).

This study has several limitations. First, there is a high likelihood of information bias because the data collected depends on the respondents' memory and honesty when providing answers. In fact, HIV infection currently reflects negative stereotypes and gender gaps, discomfort, and harassment in society (35). Second, time and resource constraints also influenced the data collection process and the depth of analysis, so the sample used may not fully represent the adolescent population in East Java. It is known that VCT services play a pivotal role in the global response to the expansion of antiretroviral therapy (36). Therefore, the results of this study should be interpreted with caution. Further research is needed to confirm and deepen understanding of adolescents' attitudes toward VCT services in Indonesia.

Intervention programs that policymakers can implement to raise awareness among adolescents about the importance of reproductive health include providing sex education in formal schools as early as possible. Sex education should be age-appropriate, such as introducing students to human anatomy. This can serve as a foundation for the child's future and foster responsibility regarding their reproductive health (37). Individuals with a good understanding will be less likely to contract reproductive health diseases and experience sexual violence (38). Additionally, healthcare services should provide VCT for HIV services that are friendly and respectful, and strive to improve the facilities and infrastructure for VCT for HIV services (39).

Family-based VCT for HIV interventions can be an effective strategy in increasing adolescent participation in VCT for HIV services. This approach involves strengthening communication among family members and providing psychosocial support from parents to children, which has been proven effective in fostering positive attitudes toward HIV testing (40). Family involvement helps children reduce internal challenges such as fear, shame, and stigma, and encourages adolescents to make more responsible health decisions (41). Other studies indicate that increasing the frequency and quality of conversations between parents and adolescents about HIV issues leads to a significant increase in adolescents' intentions and actions to undergo VCT. Interventions focused on enhancing family support in education and access to VCT services are considered effective in reducing the risk of HIV transmission among young people (42).

CONCLUSION

This study identified key factors influencing adolescents' attitudes toward VCT for HIV in East Java, Indonesia. Findings indicate that gender, parental income, knowledge about HIV, institutional and family support, and service availability positively influence VCT acceptance, while stigma and older age act as significant barriers. The high proportion of positive attitudes among adolescents with institutional support (98.3%) underscores the role of structured health interventions. However, persistent stigma and socio-economic disparities hinder VCT uptake,

particularly among females and rural populations. The study highlights the need for targeted strategies to enhance VCT participation, ultimately contributing to Indonesia's efforts to reduce HIV transmission.

Based on the study, the recommendations for government that first, it needs a stigma reduction programs that Implement community-based campaigns to combat HIV-related stigma, leveraging media, peer educators, and influencers to normalize VCT and promote empathy toward people living with HIV. Second, strengthening Institutional Support: Expand VCT services in schools, universities, and workplaces, integrating HIV education into curricula and ensuring confidential, youth-friendly testing environments. Third, it is better to establish a Family-Centered interventions which develop programs that engage parents in HIV awareness discussions to foster supportive home environments and encourage adolescent testing. Forth, improved accessibility that enhance VCT service availability in rural and underserved areas through mobile clinics and partnerships with local health centers. Fifth, the need of policy advocacy that advocate for government policies that mandate comprehensive sexual health education and allocate funding for adolescent-focused VCT initiatives. Meanwhile, for other researcher who eager to study the further research, recommends to conduct longitudinal studies to assess the long-term impact of interventions and explore cultural nuances affecting VCT uptake in diverse Indonesian regions.

AUTHOR'S CONTRIBUTION STATEMENT

First author: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing, Supervision. Second author: Methodology, Writing - Original Draft, Data Analysis. Third author: Methodology, Writing - Original Draft, Data Analysis. Fourth author: Writing - Original Draft, Writing - Review & Editing. Fifth author: Writing - Review & Editing, Supervision. Sixth author: Writing - Review & Editing, Supervision. Seventh author: Writing - Review & Editing, Supervision. Eighth author: Writing - Review & Editing, Supervision. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

Not applicable.

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BIBLIOGRAPHY

1. Ministry of Health of the Republic of Indonesia. Report on the Development of HIV-AIDS & Sexually Transmitted Infections Quarter I [Internet]. 2024 [cited 2025 Jun 18]. Available from: https://www.kemkes.go.id
2. Ministry of Health of the Republic of Indonesia. HIV-AIDS Infodatin 2023 [Internet]. Jakarta: Directorate General of Disease Prevention and Control, Ministry of Health. (2023).; 2024 [cited 2025 Jun 18]. Available from: https://www.kemkes.go.id
3. East Java Provincial Health Office. Annual Report on HIV-AIDS Cases in East Java 2023 [Internet]. 2023 [cited 2025 Jun 18]. Available from: https://dinkes.jatimprov.go.id
4. Sub-Directorate of HIV-AIDS & PIMS M of H. Statistics of HIV-AIDS Cases in Indonesia. 2024.
5. Ministry of Health of the Republic of Indonesia. HIV-AIDS Information System (SIHA) – Latest data on cases per province.

6. GAYa Nusantara. Report on Access to HIV Services for Key Populations in East Java. 2023.
7. East Java AIDS Community. Challenges and Achievements of HIV Handling in Surabaya and Malang.UNAIDS Indonesia. Country Factsheet; 2023.
8. WHO. Global HIV Programme: Indonesia. [Internet]. 2023 [cited 2025 Jun 18]. Available from: https://www.who.int/countries/idn
9. Myers JJ, Maiorana A, Chaturvedi SD, Guilin V, Buisker T, Khumalo-Sakutukwa G, et al. Uptake and Outcomes Associated with Implementation of a Community-Based Voluntary HIV Counseling and Testing Program in Antigua and Barbuda. Journal of the International Association of Providers of AIDS Care (JIAPAC). 2016 Sep 9;15(5):385–91.
10. Akhigbe R, Bamidele J. Prevalence and pattern of utilization of voluntary counseling and testing services and HIV infection in Ogbomoso, southwestern Nigeria. J Nat Sci Biol Med. 2013;4(1):163.
11. Abdalla AM, Abusalih HH. Factors Affecting HIV Voluntary Counseling and Testing Uptake among Usndergraduate Students of Khartoum, Sudan. Open AIDS J. 2021 Mar 22;15(1):21–7.
12. Conserve D, Sevilla L, Mbwambo J, King G. Determinants of Previous HIV Testing and Knowledge of Partner's HIV Status Among Men Attending a Voluntary Counseling and Testing Clinic in Dar es Salaam, Tanzania. Am J Mens Health. 2013 Nov 4;7(6):450–60.
13. Samayoa B, Anderson M, O'Sullivan L, Pacheco K, Matos A, Reyes D, et al. Does HIV VCT Reduce Risk Behaviors? An Observational Study in Guatemala City. Curr HIV Res. 2010 Mar 1;8(2):121–6.
14. Worthington CA, Calzavara LM, White SJ, Allman D, Tyndall MW. Individual and jurisdictional factors associated with voluntary HIV testing in Canada: Results of a national survey, 2011. Canadian Journal of Public Health. 2015 Jan 1;106(2):e4–9.
15. Addis Z, Yalew A, Shiferaw Y, Alemu A, Birhan W, Mathewose B, et al. Knowledge, attitude and practice towards voluntary counseling and testing among university students in North West Ethiopia: a cross sectional study. BMC Public Health. 2013 Dec 2;13(1):714.
16. Sanga Z, Kapanda G, Msuya S, Mwangi R. Factors influencing the uptake of Voluntary HIV Counseling and Testing among secondary school students in Arusha City, Tanzania: a cross sectional study. BMC Public Health. 2015 Dec 2;15(1):452.
17. MacPhail CL, Pettifor A, Coates T, Rees H. "You Must Do the Test to Know Your Status": Attitudes to HIV Voluntary Counseling and Testing for Adolescents Among South African Youth and Parents. Health Education & Behavior. 2008 Feb 31;35(1):87–104.
18. Fako TT. Social and psychological factors associated with willingness to test for HIV infection among young people in Botswana. AIDS Care. 2006 Apr 19;18(3):201–7.
19. Karim QA, Meyer-Weitz A, Mboyi L, Carrara H, Mahlase G, Frohlich JA, et al. The influence of AIDS stigma and discrimination and social cohesion on HIV testing and willingness to disclose HIV in rural KwaZulu-Natal, South Africa. Glob Public Health. 2008 Oct 15;3(4):351–65.
20. Satyanarayana VA, Chandra PS, Vaddiparti K, Benegal V, Cottler LB. Factors influencing consent to HIV testing among wives of heavy drinkers in an urban slum in India. AIDS Care. 2009 May 14;21(5):615–21.
21. He N, Zhang J, Yao J, Tian X, Zhao G, Jiang Q, et al. Knowledge, Attitudes, and Practices of Voluntary HIV Counseling and Testing among Rural Migrants in Shanghai, China. AIDS Education and Prevention. 2009 Dec;21(6):570–81.
22. Avedissian T, Alayan N. Adolescent well-being: A concept analysis. Int J Ment Health Nurs. 2021 Apr 4;30(2):357–67.
23. E. Ngozi, A. Oguzie, A. Aigbokhaode, E. Ezunu. Socio-Demographic Determinants of Attitude Towards Voluntary Counselling and Testing (VCT) in Delta State, Nigeria. 2020;4(1):44–60.
24. Kusumaningrum TAI, Kusumawati Y, Indriawan T, Saputri MW, Pebrianti S, Liswanti AL. Formation of Peer Educators in Efforts to Disseminate Information on Preventing HIV Risk Behavior in Adolescents. Warta LPM. 2021;24(4):677–86.
25. Rachmawati L. The Relationship between Parental and Friend Motivations on Reproductive Health and LGBT Behavior in Adolescents. Pertiwi Health Journal. 2023;5(1):32–43.

26. Erena AN, Shen G, Lei P. Factors affecting HIV counselling and testing among Ethiopian women aged 15–49. BMC Infect Dis. 2019 Dec 21;19(1):1076.
27. Zhang Q, Fu YS, Liu XM, Ding ZQ, Li MQ, Fan YG. HIV Prevalence and Factors Influencing the Uptake of Voluntary HIV Counseling and Testing among Older Clients of Female Sex Workers in Liuzhou and Fuyang Cities, China, 2016-2017: A Cross-Sectional Study. Biomed Res Int. 2020 Jan 24;2020(1).
28. Blake H, Yildirim M, Lax SJ, Evans C. Voluntary HIV Testing and Counselling Initiatives in Occupational Settings: A Scoping Review. Int J Environ Res Public Health. 2025 Feb 12;22(2):263.
29. Pulerwitz J, Gottert A, Kahn K, Haberland N, Julien A, Selin A, et al. Gender Norms and HIV Testing/Treatment Uptake: Evidence from a Large Population-Based Sample in South Africa. AIDS Behav. 2019 Sep 29;23(S2):162–71.
30. Igiribambe R, Rutayisire E, Habtu M. Uptake of HIV Voluntary Counseling and Testing and Associated Factors among Students in the Higher Institutions of Learning in Kigali, Rwanda: A Cross-Sectional Study. Rwanda Journal of Medicine and Health Sciences. 2023 Jul 31;6(2):104–12.
31. Joint United Nations Programme on HIV/AIDS. Global HIV & AIDS statistics— Fact sheet. 2023 [cited 2025 Jun 18]; Available from: https://www.unaids.org/en/resources/factsheet. 2022
32. Institute of Statistics of Rwanda (NISR) [Rwanda] M of H (MOH) [Rwanda], and I. Rwanda Demographic and Health Survey 2019-20 Final Report. Kigali, Rwanda, and Rockville, Maryland, USA; 2021.
33. Onyemachi PEN, Awa MJ, Ejikem MEC, Enukeme JU. Prevalence and Predictors of Non-Uptake of HIV Voluntary Counseling and Testing among Undergraduates of Tertiary Institution in Abia State, Nigeria. Open J Stat. 2021;11(01):19–35.
34. Alem AT, Sisay MM, Alemayehu AM. Factors Affecting Voluntary HIV/AIDS Counseling and Testing Service Utilization Among Youth in Gondar City, Northwest Ethiopia</p>. HIV/AIDS - Research and Palliative Care. 2020 Nov;Volume 12:667–73.
35. UNAIDS. Global aids update: Geneva, Switzerland [Internet]. 2016 [cited 2025 Jun 18]. Available from: https://www.unaids.org/sites/default/files/media_asset/global-AIDS-update-2016_en.pdf
36. Oppong Asante K. HIV/AIDS knowledge and uptake of HIV counselling and testing among undergraduate private university students in Accra, Ghana. Reprod Health. 2013 Dec 28;10(1):17.
37. Kholis M, Pranoto YKS. Literature review: Effectiveness of implementing sex education in formal schools for early childhood. In: In Proceedings of the National Postgraduate Seminar . 2022. p. 635–40.
38. Wajdi F, Arif A. The importance of sex education for children as an effort to understand and avoid preventing violence and sexual crimes. Jurnal Abdimas Indonesia. 2021;1(3):129–37.
39. Hubaybah H, Wisudariani E, Lanita U. Evaluation of the Implementation of Voluntary Counseling and Testing (VCT) Services in the HIV/AIDS Prevention Program at the Pakuan Baru Health Center, Jambi City. Jurnal Kesmas Jambi. 2021;5(1):61–71.
40. Mousavi M, Esmaeili R, Karimy M, Azaripour A. Family-based interventions in youth to prevent HIV/AIDS: A systematic review. J Educ Health Promot. 2023;
41. Perrino T, Gonzales M, Pantin H, Brincks A, Prado G. Efficacy of a family-based intervention for HIV prevention with Hispanic adolescents with same-gender sexual behaviors. Prevention Science. 2021;22(4):508–18.
42. Polk JB, Campbell J, Drilon AE, Keating P, Cambrosio A. Organizing precision medicine: A case study of Memorial Sloan Kettering Cancer Center's engagement in/with genomics. Soc Sci Med. 2023 May;324:115789.