



Knowledge, Attitudes, and HIV/AIDS Preventive Behaviors Among Tattooed Papuan Adolescents in Eastern Indonesia: A Cross-Sectional Study of Cultural Risk Factors

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A B S T R A C T

HIV/AIDS remains a significant global health challenge, with a 2.3% prevalence in Papua and an estimated 12,050 cases in West Papua by 2024. The prevalent practice of tattooing among Papuan adolescents potentially increases the risk of HIV transmission. This study aimed to analyze the levels of knowledge, attitudes, and preventive behaviours regarding HIV/AIDS among tattooed Papuan ethnic secondary school students in Sorong City. A cross-sectional study was conducted in March 2024 at a secondary school in Sorong City. The sample comprised 150 Papuan ethnic students in Years XI-XII, aged 15-18 years, with tattoo history, selected through purposive sampling. Data were collected using validated questionnaires (Cronbach's alpha >0.7) measuring knowledge (10 items), attitudes (12 items), and preventive behaviours (8 items). Analyses employed descriptive statistics and chi-square tests using SPSS version 25.0. The study received ethical approval (approval number DM.03.05/8/138/2024, dated 17 January 2024). Many respondents (53.3%) demonstrated moderate knowledge levels, 43.3% exhibited neutral attitudes, and 46.7% showed adequate preventive behaviours. Significant positive correlations were found between knowledge and attitudes ($r=0.65$; $p<0.01$) and preventive behaviours ($r=0.72$; $p<0.01$). Sociodemographic analysis revealed a predominance of respondents aged 17-18 years (46.7%) from middle-income backgrounds. The findings indicate the necessity for culturally sensitive educational interventions to enhance knowledge and promote positive attitudes towards HIV/AIDS prevention among tattooed Papuan ethnic adolescents.

INTRODUCTION

HIV/AIDS remains one of the most significant global health challenges, profoundly impacting individuals, families, and communities. According to recent reports, in 2023, approximately 1.4 million children under the age of 15 years were living with HIV worldwide. In Indonesia, attention to HIV cases among children has become increasingly urgent, with an additional 700–1,000 children infected annually. The prevalence of HIV in Papua is 2.3%, with an estimated 12,050 people living with HIV (PLHIV) in West Papua Province by 2024. Within this context, research on the knowledge, attitudes, and behaviours regarding HIV/AIDS prevention among Papuan adolescents in Sorong City is highly relevant (Hardisman, 2009; Jocelyn et al., 2024; NIH's Office of AIDS Research, 2024; Nyoko & Hara, 2020; Romantir et al., 2024a; Solihin et al., 2023; UNICEF, 2024; United Nations in Indonesia, 2023).

Adolescents are a vulnerable group to HIV/AIDS infections. Data indicate that by 2022, approximately 1,929 adolescents aged 15–24 years were infected with HIV in Indonesia (Ministry of Health, 2022). In Sorong City, although only 12 positive HIV cases were reported in early 2024, it is essential to understand the factors influencing adolescents' knowledge and attitudes toward HIV/AIDS prevention.

Tattoos, a prevalent form of self-expression among Papuan adolescents, may contribute to risk behaviours associated with HIV transmission. Tattoos often hold profound cultural significance for Papuan communities and may shape their perceptions of health and infection risks (CDC, 2024; Cohen, 2021; Dzinamarira & Moyo, 2024; Hasnia et al., 2024; Karagözoğlu & İlhan, 2024; Karman et al., 2024; Khairunisa et al., 2024; Khan et al., 2024; Koch et al., 2005; Naully & Romlah, 2018; Perkins et al., 1997; Permatasari et al., 2025; Ratnawati, Setiawan, et al., 2024a; Sulistina et al., 2024).

Although several studies have been conducted on HIV/AIDS prevention in Indonesia, gaps remain in the understanding of how knowledge and attitudes among Papuan adolescents relate to prevention practices. Most previous studies have focused on the general population or high-risk groups, such as commercial sex workers and injection drug users (Jocelyn et al., 2024; K et al., 2024; Mela et al., 2024; Mudazkir & Puspitasari, 2024; Ramdan & Setiadi, 2024; Ratnawati, Setiawan, et al., 2024a; Ribeiro Banze et al., 2024; Romantir et al., 2024a; Sundareshan et al., 2024; Tao et al., 2024; Wulandari et al., 2024). This study aimed to address this gap by exploring the knowledge, attitudes, and behaviours surrounding HIV/AIDS prevention among high school students of Papuan ethnicity in Sorong City.

The primary objective of this research was to identify the level of students' knowledge about HIV/AIDS and their attitudes and behaviours toward its prevention. The research questions included: What do students know about HIV/AIDS? What are their attitudes toward preventing infection? How do they behave when implementing preventive measures? This study also hypothesised a positive relationship between knowledge about HIV/AIDS and attitudes and behaviours regarding prevention among adolescents.

Utilising a quantitative approach with a survey design, this research collected data from high school students of Papuan ethnicity through structured questionnaires. This methodology was selected because of its ability to provide statistically measurable data on students' knowledge and attitudes. Key variables to be analysed included the level of knowledge about HIV/AIDS, attitudes toward infection prevention, and actual behaviours in implementing preventive measures.

This study not only contributes to the academic understanding of the factors influencing HIV/AIDS prevention among Papuan adolescents but also offers practical implications for developing more effective health education programs. It is anticipated that these findings will provide new insights for policymakers and healthcare practitioners in designing appropriate interventions to enhance awareness and preventive actions among adolescents.

METHOD

Study Design

This study used a cross-sectional design to investigate the knowledge, attitudes, and preventive behaviours towards HIV/AIDS among high school students of Papuan ethnicity in Sorong City with a history of tattoos. The independent variables were knowledge and attitudes toward HIV/AIDS, while the dependent variable was HIV/AIDS preventive behaviour.

Participants and Setting

The target population consisted of high school students of Papuan ethnicity in Sorong City, specifically those in Grades XI and XII. The inclusion criteria were students aged 15–18 years who had a history of tattoos and were willing to participate in the study. Exclusion criteria comprised Students lacking fundamental knowledge of HIV/AIDS or those with medical conditions that could potentially influence study outcomes were excluded. The sample size was determined using Slovin's formula to calculate the required sample size with a 95% confidence level and 5% margin of error. A sample size of 150 students was selected based on an approximate population of 500 students in Sorong City. Purposive sampling was employed, wherein participants were selected based on specific criteria. The study was conducted at a single centre, a high school located in Sorong City, West Papua. This site was chosen because of the high prevalence of HIV infection in the area and the presence of a Papuan community with rich tattooing traditions. Informed consent procedures involved elucidating the study's purpose to the participants and obtaining written consent from them and their parents or guardians, as required.

Intervention

This study did not involve direct interventions because its primary focus was on data collection regarding knowledge, attitudes, and preventive behaviours toward HIV/AIDS. Data collection was conducted in one session over two weeks in March 2024. Each session lasted 60 minutes, during which the participants completed the questionnaires. Data collection protocols adhered to established standard operating procedures (SOPs) to ensure consistency in gathering information. The data collectors underwent training before the study to provide a comprehensive understanding of the instruments and data collection procedures.

Data Collection

The research instrument consisted of a questionnaire specifically designed to measure knowledge, attitudes, and preventive behaviours toward HIV/AIDS. The questionnaire consisted of the following questions:

1. Knowledge of HIV/AIDS: 10 multiple-choice questions.
2. Attitudes toward HIV/AIDS Prevention: 12 statements using a Likert scale (1–5).
3. Preventive behaviour: Eight questions about respondents' concrete actions.

Instrument validity was assessed using exploratory factor analysis (EFA), and reliability was evaluated using Cronbach's alpha, with values above 0.7 indicating good internal consistency. Data collection was conducted by a team of trained researchers who adhered to standardised procedures to ensure data quality and integrity. All data were stored securely in a restricted-access system to safeguard participant confidentiality.

Data Analysis

Data analysis was conducted using SPSS software version 25.0. Primary analyses encompassed descriptive statistics to characterise the demographic profiles of respondents and their levels of knowledge, attitudes, and preventive behaviours regarding HIV/AIDS. Inferential analysis, specifically the chi-square test, was employed to determine the relationships between the independent and dependent variables. Missing data was addressed through imputation techniques, which are necessary to maintain dataset integrity. Sensitivity analyses were also performed to evaluate the impact of missing data on study outcomes.

Ethical Considerations

This study was approved by the Health Research Ethics Committee of the Sorong Health Polytechnic (approval number DM.03.05/8/138/2024, dated 17 January 2024). All participants were provided with comprehensive information regarding the study's purpose and rights before giving informed consent. Data confidentiality was strictly maintained by anonymising the respondents' identities when the results were published. Risks to participants were minimised through stringent risk management procedures, including training data collectors to manage sensitive situations related to HIV/AIDS. Participants were not offered financial compensation; however, they were provided with information about HIV/AIDS-related health services as a form of support.

RESULT

Characteristics of Respondents

This study involved 150 high school students of Papuan ethnicity in Sorong City with a history of tattoos. The respondents' characteristics are summarized based on age, gender, and socioeconomic status.

Table 1 Demographic Characteristics of Respondents

Characteristic	(n)	(%)
Age		
15–16 years	50	33.3
17–18 years	70	46.7
>18 years	30	20.0
Gender		
Male	80	53.3
Female	70	46.7

Economic Status		
Low	60	40.0
Middle	70	46.7
High	20	13.3

The table presents the demographic distribution of respondents across three main categories: age, gender, and economic status. The findings reveal that most respondents are aged 17–18 years, comprising 46.7% of the sample. Male respondents slightly outnumber females at 53.3%. Regarding socioeconomic status, the middle-income category dominates, representing 46.7% of the respondents. These results offer valuable demographic context for interpreting subsequent analyses.

Students' Knowledge of HIV/AIDS

A questionnaire with 10 multiple-choice questions was used to evaluate the students' knowledge level. The results are summarized in the following table:

Table 2 Knowledge Levels about HIV/AIDS

Knowledge Level	Frequency (n)	Percentage (%)
Low	40	26.7
Moderate	80	53.3
High	30	20.0

Note: Knowledge levels were categorised based on questionnaire scores.

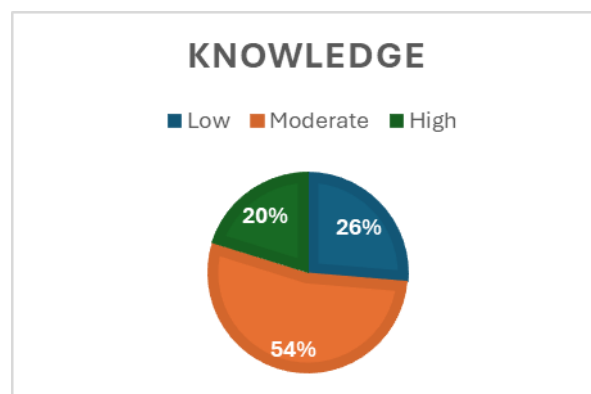


Figure 1 Distribution of Knowledge Levels about HIV/AIDS

The table illustrates the respondents' level of knowledge about HIV/AIDS. The majority (53.3%) exhibit a moderate level of expertise, indicating a foundational understanding of the topic. However, 26.7% demonstrate low knowledge levels, emphasizing the need for targeted educational initiatives to bridge this gap and promote awareness.

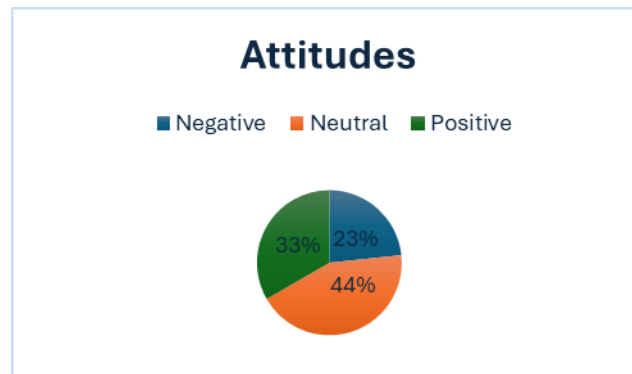
Attitudes toward HIV/AIDS Prevention

Respondents' attitudes toward HIV/AIDS prevention were assessed using a Likert scale. The findings are presented below:

Table 3 Respondents' Attitudes toward HIV/AIDS Prevention

Attitude	(n)	(%)
Negative	35	23.3
Neutral	65	43.3
Positive	50	33.3

Note: Attitude scores were grouped into three categories based on data analysis.

**Figure 2 Attitudes toward HIV/AIDS Prevention**

The table highlights the respondents' attitudes toward HIV/AIDS prevention. Positive attitudes were observed in 33.3% of respondents, reflecting supportive perspectives on preventive measures. However, 23.3% displayed negative attitudes, suggesting challenges in fostering awareness and encouraging proactive prevention efforts.

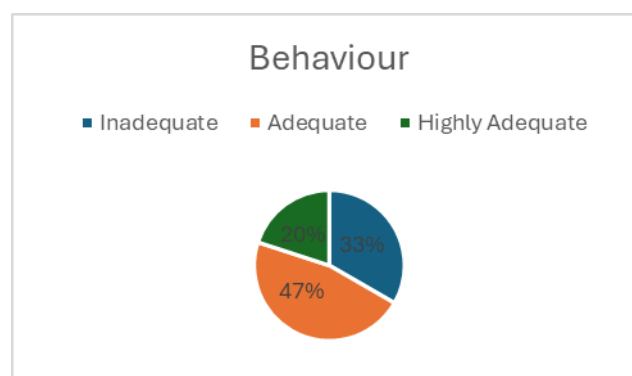
Preventive Behaviours toward HIV/AIDS

Preventive behaviours were assessed based on three main dimensions: condom use, avoidance of risky activities, and peer education. The results are summarized below:

Table 4 Preventive Behaviours toward HIV/AIDS

Behaviour Level	(n)	(%)
Inadequate	50	33.3
Adequate	70	46.7
Highly Adequate	30	20.0

Note: Behaviour levels were categorised based on a specially designed questionnaire scale.

**Figure 3 Preventive Behaviours toward HIV/AIDS**

The table examines respondents' preventive behaviours toward HIV/AIDS. Nearly half (46.7%) display adequate behaviours, indicating some awareness and action. However, 33.3% exhibit inadequate behaviours, highlighting the need for targeted interventions to improve practices and mitigate risks.

Relationship between Knowledge, Attitudes, and Preventive Behaviours

Statistical analysis revealed significant relationships between knowledge levels and both attitudes and preventive behaviours toward HIV/AIDS.

Table 5 Relationships among Knowledge, Attitudes, and Preventive Behaviours

Variable	Correlation Coefficient (r)	p-value
Knowledge vs Attitude	0.65	<0.01
Knowledge vs Behaviour	0.72	<0.01

Note: Pearson correlation analysis was used to measure relationships among variables.

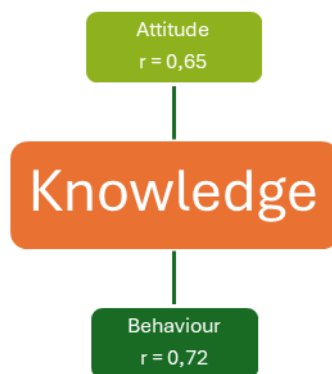


Figure 4 Relationships between Knowledge and Preventive Behaviours

The analysis indicates significant positive correlations between knowledge and both attitudes ($r = 0.65$; $p < 0.01$) and preventive behaviours ($r = 0.72$; $p < 0.01$). These results support the hypothesis that increased knowledge about HIV/AIDS positively influences attitudes and behaviours, underscoring the importance of educational interventions in addressing this public health concern.

DISCUSSION

This study shows that high school students of Papuan ethnicity in Sorong City with a history of tattoos demonstrate varying levels of knowledge, attitudes, and behaviours regarding HIV/AIDS prevention. The principal findings indicated that most students possessed moderate knowledge, neutral attitudes, and relatively adequate preventive behaviours. Moreover, a significant positive correlation was observed between knowledge levels, attitudes, and preventive behaviours. These results correspond to the research objective of identifying students' levels of knowledge, attitudes, and behaviours related to HIV/AIDS prevention.

From a theoretical perspective, these findings corroborate the relationship model between knowledge, attitudes, and behaviours commonly employed in public health research. Enhanced knowledge appears to

influence positive attitudes, which subsequently promote preventive behaviours. However, specific unexpected findings, such as the proportion of students with negative attitudes despite moderate knowledge levels, necessitate further analysis. This pattern suggests the presence of additional factors that influence students' attitudes and behaviours, such as social norms and personalities (Balaskas et al., 2023; F. Alves, 2024).

The primary findings indicated that students' knowledge levels fell within the moderate category. This suggests that information about HIV/AIDS has reached most students, but that their comprehension requires further enhancement. The neutral attitudes held by many respondents reflected their ambivalence towards HIV/AIDS prevention. While they recognise the importance of preventive measures, social stigma or lack of environmental support may affect their responses (Qashqari et al., 2022; Ruff et al., 2023; Terra et al., 2024).

These findings are consistent with those of previous studies that highlight how knowledge alone is insufficient to change behaviour. Additionally, the observed positive correlation between knowledge and behaviour aligns with the Health Belief Model (HBM), which emphasises the importance of understanding risks and benefits as drivers of behaviour (Alyafei & Easton-Carr, 2025; Mosleh et al., 2024).

In the existing literature, Utami et al. demonstrated that increasing knowledge through school-based health education significantly improved HIV/AIDS preventive behaviours (Ratnawati, Huda, et al., 2024). This is consistent with the findings of the present study, which indicate that students with higher knowledge levels are more likely to exhibit adequate preventive behaviours. However, this study also identified inconsistencies, particularly in students' attitudes, which did not always align with their knowledge levels. Cultural factors, local norms, and community beliefs might explain these inconsistencies.

The findings reveal that nearly one-third of students have negative attitudes towards HIV/AIDS prevention despite possessing moderate knowledge levels. Alternative explanations for this finding might include limited exposure to effective awareness campaigns or the prevalence of misinformation about HIV/AIDS within communities. Further research is necessary to determine the influence of these external factors.

This study provides new insights into the dynamic relationship between knowledge, attitudes, and behaviours in the context of HIV/AIDS prevention among Papuan adolescents. It also underscores the importance of adopting a holistic approach when designing interventions, considering cultural and social factors alongside individual (Ratnawati, Setiawan, et al., 2024b; Romantir et al., 2024b). These findings

extend the existing conceptual frameworks and address knowledge gaps among under-represented communities in the global literature.

From a practical standpoint, these findings highlight the need for locally tailored intervention programmes. Culturally sensitive awareness campaigns and participatory educational approaches can help foster positive attitudes and encourage better preventive behaviours. Stakeholders, including schools and healthcare institutions, can utilise these findings to design more effective and inclusive programs. For instance, integrating HIV/AIDS information into school curricula through interactive and experiential approaches could yield significant (Chooniedass et al., 2025; Wagner et al., 2025).

Limitations and Directions for Future Research

This study has several methodological limitations, including the use of a cross-sectional design, which does not allow causal analysis. Additionally, the sample, which only included high school students in Sorong City, limits the generalisability of the findings to a broader population. Challenges in data collection, such as respondents' openness to answering the questionnaires, may also affect the validity of the results.

Future research should employ longitudinal designs to explore changes in knowledge, attitudes, and behaviours over time. Expanding the sample to include other regions in Papua and populations with similar risk factors would enhance the scope of the study. Furthermore, investigating the role of psychosocial factors, such as family and peer support, could provide deeper insights into the determinants of HIV/AIDS preventive attitudes and behaviours. This study offers a robust foundation for developing intervention programmes and conducting follow-up studies focusing on strengthening factors that support effective preventive behaviours in vulnerable populations.

CONCLUSION

This study aimed to identify the levels of knowledge, attitudes, and HIV/AIDS preventive behaviours among secondary school students of Papuan ethnicity in Sorong City with a history of tattoos. The findings indicated that many students possessed moderate knowledge levels, neutral attitudes, and relatively adequate preventive behaviours. The significant positive correlation between knowledge, attitudes, and behaviours underscores the importance of knowledge-based educational interventions to enhance HIV/AIDS prevention efforts. This research contributes theoretically by reinforcing the relationship between knowledge, attitudes, and behaviours as conceptualised in the Health Belief Model (HBM). Additionally, it offers practical insights into the necessity of culturally tailored approaches to intervention programs within local communities. Despite the study's limitations, including its cross-sectional design and geographical focus, the findings provide a robust foundation for the development of effective public

health policies. Further research is recommended to explore additional determinants, such as psychosocial factors and cultural norms, and adopt longitudinal designs to evaluate long-term changes. Practical recommendations include integrating HIV/AIDS education into school curricula and fostering collaboration with communities to reduce stigma and promote positive preventive behaviours.

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