



Factors Associated with Sexually Transmitted Infections among Adults Attending Biak Kota Health Center, Papua: A Case–Control Study

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ABSTRACT

Sexually transmitted infections (STIs) remain a major global health concern, with significant impacts in Indonesia and Papua. This study aimed to identify protective and risk factors associated with STIs in Biak Numfor. A quantitative case–control design was conducted involving 80 adults attending Biak Kota Health Center, Papua (40 cases and 40 controls). Cases were defined based on physician-confirmed STI diagnoses in medical records, while controls were adults visiting the same facility for non-STI conditions and confirmed free of STIs. Data were collected using validated questionnaires on education, knowledge, media exposure, peer support, and alcohol consumption. Logistic regression was applied to estimate adjusted odds ratios (AORs) with 95% confidence intervals. Higher education (AOR = 0.006; 95% CI: 0.000–0.320; $p = 0.015$), media exposure (AOR = 0.001; 95% CI: 0.000–0.120; $p = 0.015$), and peer support (AOR = 0.008; 95% CI: 0.000–0.450; $p = 0.025$) were associated with lower odds of STIs. Alcohol consumption before sexual intercourse was associated with higher odds (AOR = 44.6; 95% CI: 1.6–1230; $p = 0.026$). Knowledge showed a non-significant association ($p = 0.057$). In conclusion, Education, media exposure, and peer support were associated with lower odds of STIs, while alcohol consumption was associated with higher odds. Integrated interventions are recommended to reduce STI prevalence in Papua.

INTRODUCTION

Sexually transmitted infections (STIs) remain a major global health concern. More than 1 million curable STIs are acquired every day worldwide among individuals aged 15–49 years, the majority of which are asymptomatic. In 2020, an estimated 374 million new infections occurred with one of four curable STIs: chlamydia, gonorrhoea, syphilis, and trichomoniasis. In 2022, approximately 8 million adults aged 15–49 years were infected with syphilis, while herpes simplex virus type 2 (HSV-2), the main cause of genital herpes, affected 520 million people globally in this age group (13%). Human papillomavirus (HPV) infection is associated with more than 311,000 cervical cancer deaths annually, and maternal syphilis in 2022 was estimated to result in over 390,000 adverse birth outcomes (WHO, 2025). These infections are particularly prevalent among young adults aged 15 to 24, a demographic often characterized by increased curiosity and engagement in risky sexual behaviors (Sodré et al., 2021). Limited

awareness regarding the transmission dynamics and clinical severity of these conditions often compounds this vulnerability, frequently leading to delayed diagnosis and diminished engagement in safe sexual practices (Dzulkarnine et al., 2024). Furthermore, academic evidence indicates that misconceptions regarding transmission and insufficient understanding of preventive measures significantly contribute to this ongoing public health crisis (SEZAK & Baser, 2026). Beyond individual cognitive deficits, the role of social networks and peer dynamics serves as a critical determinant in health-seeking behaviors and the adoption of protective measures (Massa & Ali, 2023). Research indicates that while peer-led education leverages community trust and shared lived experiences to promote safer practices, it must operate alongside formalized health literacy interventions (Yani, 2022).

These infections contribute significantly to morbidity, mortality, and economic losses, particularly in low- and middle-income countries where access to preventive services and treatment remains limited. Moreover, persistent knowledge gaps regarding disease transmission continue to hinder the efficacy of primary prevention strategies among vulnerable populations, including maritime workers and adolescents (Lestari & Aulia, 2023; Umagapi et al., 2025). Empirical evidence suggests that targeted educational programs and supportive group interventions can effectively bridge these information deficits, fostering significant improvements in both sexual health literacy and the adoption of preventive behaviors (Sari et al., 2025). Indeed, enhancing foundational knowledge has been shown to decrease the likelihood of engaging in high-risk activities by a factor of 1.7 (Sitepu, 2021).

In Indonesia, STIs continue to pose a serious public health challenge, with recent data highlighting a high incidence rate of infections and a significant burden of cases that underscores the urgent need for robust, evidence-based intervention strategies (Ghozaly et al., 2024). Although knowledge dissemination is crucial, existing literature suggests that addressing psychosocial barriers such as the stigma surrounding testing and the influence of substance use on decision making remains essential for successful health outcomes (Neves et al., 2025; Roşioară et al., 2025).

The burden of STIs is further complicated by co-infections with HIV and other communicable diseases, which amplify health risks and strain the healthcare system. Furthermore, the integration of comprehensive health education with community-based screening initiatives has been identified as a critical pathway to shifting prevailing cultural ideologies and reducing transmission rates among high-risk youth populations (El-Sherbiny et al., 2025). Despite these identified strategies, there is a noted preference among adolescents and young women to rely on informal networks such as peers, partners, and family members—over institutionalized health facilities for sexual health guidance (Paul et al., 2024).

Papua represents one of the regions with a disproportionately high burden of STIs. Data from the Biak Numfor District Health Office in 2022 reported a rising trend of STI cases, particularly among young adults and high-risk groups. Contributing factors include low educational attainment, limited access to health information, peer influence, and risky behaviors such as alcohol consumption before sexual intercourse (Dinas Kesehatan Biak Numfor, 2023). These contextual challenges highlight the urgent need for localized research to identify determinants of STIs in Papua. By analyzing demographic and socioeconomic variations in disease prevalence, policymakers can design culturally sensitive strategies that

address the multifaceted vulnerabilities within Indonesia's diverse population (Winarto et al., 2023). This study therefore aims to evaluate the interplay between educational access, knowledge levels, and the protective influence of peer social support in mitigating STI acquisition among the youth in Biak Numfor. By examining these variables, the research seeks to fill existing gaps in local literature regarding how interpersonal relationships and health literacy intersect to shape sexual health outcomes (Dookhith et al., 2024; Patel et al., 2023).

Therefore, this study was conducted to analyze protective and risk factors associated with STIs in Biak Numfor, Papua. Specifically, it seeks to examine the roles of education, knowledge, media exposure, peer support, and alcohol consumption in influencing STI occurrence, thereby providing evidence to inform public health interventions and policy development.

METHODS

Study Design and Setting

This study employed a quantitative case-control design conducted at Biak Kota Health Center, Biak Numfor District, Papua, between May and July 2026.

Population and Case-Control Definitions

The study population consisted of adults aged 18–49 years attending Biak Kota Health Center during the study period.

- Cases: Adults newly diagnosed with sexually transmitted infections (STIs) including chlamydia, gonorrhoea, syphilis, and trichomoniasis. Diagnosis was based on clinical examination and physician confirmation recorded in medical records.
- Controls: Adults visiting the same facility for non-STI conditions, confirmed free of STIs through clinical examination and medical records review. Both cases and controls were drawn from the same source population.
- Eligibility criteria: Inclusion criteria were adults aged 18–49 years who provided informed consent. Exclusion criteria included incomplete medical records or refusal to participate.
- Matching: No formal matching was performed; controls were recruited consecutively to approximate the age and sex distribution of cases.

Sampling and Sample Size

Separate sampling frames were used for cases and controls. All eligible STI cases during the study period were included, while controls were selected consecutively from non-STI patients. A 1:1 case-to-control ratio (40 cases and 40 controls) was applied to maximize comparability and statistical efficiency.

Variables and Instruments

Data were collected using structured questionnaires covering:

- Education: categorized as primary, secondary, or tertiary.
- Knowledge: assessed using a 6-item questionnaire adapted from WHO STI knowledge modules; scores ranged from 1–6 and were classified as adequate or inadequate.
- Media exposure: measured using a 4–16 score based on frequency of accessing sexual health information from print, broadcast, or digital media.

- Peer support: measured using a 4–15 score reflecting perceived encouragement from peers to adopt safe sexual practices.
- Alcohol consumption: self-reported intake before sexual intercourse (yes/no).
- Data Analysis Data were analyzed using SPSS.
- Univariate analysis: described variable distributions.
- Bivariate analysis: chi-square tests were used for categorical variables.
- Multivariate analysis: logistic regression was applied to estimate crude and adjusted odds ratios (AORs) with 95% confidence intervals (CI). Variables with $p < 0.25$ in bivariate analysis were included in the multivariable model. A p -value < 0.05 was considered statistically significant.

Ethical Considerations This study obtained official research permission from the Ministry of Health of the Republic of Indonesia (Letter No: PK.01.01/F.XXVII/985/2026). All procedures complied with general research ethics principles. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, and respondents were assured of confidentiality and anonymity. Data were stored securely and used solely for research purposes.

RESULTS

Table 1. Characteristics of Participants

	Variable	Cases (n=40)	Controls (n=40)
Sex	Male	9 (77.5%)	13 (32.5%)
	Female	31 (22.5%)	27 (67.5%)
Age at first sexual intercourse (years)		Mean $\pm$ SD: xx	24.52 $\pm$ 3.404
Education level	No schooling–Elementary School	16 (40%)	3 (7.5%)
	Junior High School	18 (45%)	4 (10%)
	Senior High School	6 (15%)	16 (40%)
	Collage University	0 (0%)	17 (42.5%)
Knowledge score	Good	17 (57.5%)	31 (77.5%)
	Poor	23 (42.5%)	9 (22.5%)
Media exposure	Good	3 (7.5%)	31 (77.5%)
	Poor	37 (92.5%)	9 (22.5%)
Peer support	Good	6 (15%)	31 (77.5%)
	Poor	34 (85%)	9 (22.5%)
Alcohol consumption	Yes	28 (70%)	10 (25%)
	No	12 (30%)	30 (75%)
Occupation Status	Unemployed	9 (22.5%)	12 (30%)
	Contract Worker	9 (22.5%)	8 (20%)
	Private Sector/Entrepreneur	9 (22.5%)	8 (20%)
	Civil Servant/Military/Police	13 (32.5%)	12 (30%)

Source: Primary Data, 2026

Table 1 presents the univariate characteristics of participants. Cases were predominantly female, with lower education levels, poorer knowledge, limited media exposure, weaker peer support, and higher alcohol consumption compared to controls. In contrast, controls were more likely to be male, better educated, knowledgeable about STIs, exposed to health media, supported by peers, and abstained from alcohol before sexual intercourse. Occupation status showed relatively balanced distribution between the two groups.

Table 2. Bivariate (Chi-Square)

Variable	Cases (n=40)	Controls (n=40)	χ^2 (df)	p-value	Odds Ratio (95% CI)
Education level	Low: 34 (85%) High: 6 (15%)	Low: 7 (17.5%) High: 33 (82.5%)	36.47 (1)	<0.001	OR = 0.037 (0.011–0.123)
Knowledge score	Poor: 23 (57.5%) Good: 17 (42.5%)	Poor: 9 (22.5%) Good: 31 (77.5%)	10.21 (1)	0.001	OR = 0.215 (0.081–0.567)
Media exposure	Poor: 37 (92.5%) Good: 3 (7.5%)	Poor: 9 (22.5%) Good: 31 (77.5%)	40.10 (1)	<0.001	OR = 0.024 (0.006–0.095)
Peer support	Poor: 34 (85%) Good: 6 (15%)	Poor: 9 (22.5%) Good: 31 (77.5%)	31.43 (1)	<0.001	OR = 0.051 (0.016–0.161)
Alcohol consumption	Ever: 28 (70%) Never: 12 (30%)	Ever: 10 (25%) Never: 30 (75%)	16.24 (1)	<0.001	OR = 7.000 (2.615–18.738)
Number of sexual partners (6 months)	1 partner: 0 >1 partner: 40 (100%)	1 partner: 36 (90%) >1 partner: 4 (10%)	65.46 (1)	<0.001	OR = 11.000 (4.321–28.002)

Source: Primary Data, 2026

Table 2 presents the bivariate analysis of risk and protective factors for STIs. Education level, knowledge, media exposure, peer support, alcohol consumption, and number of sexual partners in the last six months were significantly associated with STI status ($p < 0.001$). Participants with lower education, poor knowledge, limited media exposure, weak peer support, alcohol consumption, and more than one sexual partner were more likely to be cases.

These findings suggest that education, media exposure, peer support, and alcohol consumption are independent predictors of STI risk. Higher education, adequate media exposure, and positive peer support act as protective factors, while alcohol consumption substantially increases vulnerability. Knowledge level contributes to risk reduction but did not reach statistical significance in the adjusted model. Number of sexual partners was excluded

from the multivariate logistic regression model due to perfect separation, which prevented stable parameter estimation (Table 3).

Table 3. Multivariat of Logistic Regression

Variable	B	S.E.	Sig.	AOR (Exp(B))	95% CI for AOR
Education level	-5.115	2.103	0.015	0.006	0.000 – 0.370
Knowledge score	-3.410	1.790	0.057	0.033	0.001 – 1.104
Media exposure	-7.004	2.883	0.015	0.001	0.000 – 0.258
Peer support	-4.804	2.149	0.025	0.008	0.000 – 0.553
Alcohol consumption	3.798	1.708	0.026	44.608	1.569 – 1267.984
Constant	6.849	2.827	0.015	942.524	—

Source: Primary Data, 2026

DISCUSSION

The findings of this study demonstrate that education, knowledge, media exposure, peer influence, and alcohol consumption are key determinants of sexually transmitted infection (STI) risk among respondents. The protective role of education and knowledge is consistent with health behavior theories, which emphasize that higher educational attainment enhances individuals' capacity to access, process, and apply health information. Previous studies in Indonesia and other low and middle-income countries have similarly reported that limited education is strongly associated with risky sexual practices and poor STI prevention outcomes. Furthermore, these results indicate that self-efficacy serves as a vital mediator, as targeted sexual education programs are most effective when they move beyond mere factual dissemination to actively empower students in their decision-making processes (Dana & Yulia, 2025). Moreover, consistent with the observed impact of peer influence, social networks provide essential scaffolding for the adoption of protective behaviors, where positive reinforcement from friends reduces engagement in high-risk activities (Manwong et al., 2022). Conversely, the identification of alcohol consumption as a significant risk factor underscores the necessity of addressing behavioral moderators that may undermine informed decision-making during sexual encounters (Ambaye et al., 2023). These results align with evidence suggesting that peer pressure significantly shapes sexual behavior, with a substantial portion of students acknowledging external influence when engaging in unprotected sexual acts (Adaka et al., 2025).

In the present study, respondents with greater media exposure demonstrated lower odds of STI occurrence, reinforcing the importance of integrating media-based interventions into community health strategies. Moreover, these initiatives are particularly vital for early adolescents who may lack prior sexual experience, as community-based awareness serves to normalize preventive dialogues and proactively cultivate informed health behaviors (Ofori et al., 2025). Furthermore, the interplay between functional digital health literacy and knowledge acquisition underscores the necessity of tailoring digital resources to improve the efficacy of sexual education, especially for young individuals (Prinitha & Jose, 2025). Comprehensive

school based initiatives remain the most effective vehicle for this dissemination, as they successfully bridge the gap between abstract health information and the practical self-efficacy required to resist peer pressure and delay sexual onset (Khatimah et al., 2025; Wang et al., 2025). These programs also provide a structured environment for adolescents to engage in open dialogue, which addresses the lack of guidance often found in families where reproductive health remains a sensitive or stigmatized topic (Ramírez-Villalobos et al., 2021).

Peer influence also emerged as a protective factor, with positive peer support associated with reduced risk of infection. This finding aligns with social learning theory, which posits that behaviors are shaped through observation and reinforcement within peer groups. Research conducted in Ireland and the Philippines has documented that adolescents with supportive peer networks are more likely to adopt safe sexual practices and resist peer pressure toward risky behaviors. The present study confirms that peer dynamics play a crucial role in shaping health-related decision-making. Given that adolescents frequently identify peers and schools as primary conduits for reproductive health information, leveraging these networks to disseminate accurate preventive strategies can effectively normalize safe practices (Mohnchimbare et al., 2025). Furthermore, fostering these supportive environments acts as a buffer against the negative consequences of unmediated digital exposure, where adolescents might otherwise encounter misleading information (Mohanty et al., 2026). To maximize these benefits, program designers must actively involve local stakeholders, such as community elders and religious leaders, in the co-production of health interventions to ensure that peer-led initiatives remain culturally resonant and socially acceptable (Aventin et al., 2021).

Conversely, alcohol consumption before sexual intercourse was identified as a significant risk factor, markedly increasing the likelihood of STI occurrence. This association highlights how substance use impairs cognitive appraisal and impulse control, thereby eroding the protective self-efficacy cultivated through educational interventions (Corrêa et al., 2024). Consequently, longitudinal data suggests that early intervention strategies targeting substance use reduction alongside sexual health literacy can mitigate these risks (Namuwonge et al., 2023). Building on this, future policy frameworks must prioritize the integration of family-centered support, as the lack of constructive dialogue at home often leaves adolescents reliant solely on peer networks for guidance (Bosire et al., 2021). Prioritizing the involvement of parents and caregivers in sexual health discourse is essential to create a comprehensive support system that reinforces, rather than complicates, the guidance provided by school-based programs. This result is consistent with international evidence showing that alcohol use impairs judgment and increases vulnerability to unsafe sexual practices. Studies in the United States and Southeast Asia have reported similar associations, where alcohol consumption is linked to higher rates of unprotected sex and multiple sexual partners. The strong odds ratio observed in this study underscores the urgent need for preventive interventions addressing substance use in sexual health programs. Integrating substance abuse education into broader reproductive health curricula is essential to mitigate these cognitive impairments and promote safer decision-making (Mohnchimbare et al., 2025). Beyond these clinical approaches, addressing the underlying sensation-seeking dispositions that drive both substance use and risky encounters remains a critical component for long-term behavioral change (Sifer & Getachew, 2024).

Taken together, these findings highlight the multifactorial nature of STI risk, where sociodemographic, behavioral, and environmental factors interact to influence outcomes. The study contributes to the growing body of evidence emphasizing the importance of education, media, and peer support as protective mechanisms, while also identifying alcohol consumption as a critical risk factor. These insights provide valuable implications for policymakers and health practitioners in designing integrated interventions that combine educational initiatives, media campaigns, peer-based programs, and substance use prevention to reduce STI incidence in vulnerable populations. Future efforts should prioritize longitudinal research to evaluate the long term efficacy of these multifaceted strategies in diverse cultural settings, particularly in regions where socioeconomic instability exacerbates existing health disparities (Abhadionmhen et al., 2026). Moreover, given the prevalence of risky sexual behavior among university students in sub-Saharan Africa, institutional frameworks must specifically target male students and those with heavy alcohol consumption to mitigate the ongoing risk of STI transmission (Lungu et al., 2022). Beyond targeted institutional policies, it is imperative to broaden the scope of information, education, and communication packages to emphasize the asymptomatic nature of many infections and the critical importance of partner notification and timely healthcare utilization (Mcharo et al., 2022). Additionally, universities should integrate substance reduction policies within their student health services, as evidence confirms that limiting alcohol and drug accessibility is essential to mitigating undesirable sexual behaviors (Llamosas-Falcón et al., 2023; Yadeta et al., 2026). Further strengthening these preventative frameworks requires the validation of culturally sensitive diagnostic and educational tools, ensuring that metrics used to assess sexual risk are robust across diverse populations (Kaggwa et al., 2022; Llamosas-Falcón et al., 2023; Yadeta et al., 2026). Integrating these preventive measures necessitates a shift toward holistic interventions that simultaneously address the management of drug use, the reduction of social stigma surrounding screening, and the enhancement of comprehensive sexual health literacy (Maatouk et al., 2021).

CONCLUSION

Higher educational attainment, greater media exposure, and positive peer support were associated with lower odds of STI occurrence, whereas alcohol consumption before sexual intercourse was associated with higher odds among adults attending Biak Kota Health Center. STI-related knowledge showed an inverse but statistically non-significant association. Given the small, facility-based sample and the observational design, these findings should be interpreted with caution and require confirmation in larger, multi-center studies.

STI and alcohol counseling services at Biak Kota Health Center should be strengthened. Culturally appropriate educational materials should be developed to improve awareness, and trained peer educators should be actively involved to enhance community support and engagement. Integrating alcohol screening and sexual counseling into reproductive health services is also recommended to enable early identification of risky behaviors and timely intervention within the existing health system.

Future studies should include larger, multicenter samples to improve generalizability. They should use laboratory-based diagnoses, validated instruments, and longitudinal designs,

while controlling for confounding factors related to sexual behavior to strengthen causal inference.

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