



RESEARCH ARTICLE

Systematic Literature Review: Determinants of HIV Transmission Prevention Behavior

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HIV/AIDS remains a global health challenge, with an estimated 39.9 million people living with HIV by 2023. Prevention of HIV transmission is more effective and economical than treatment. Studies show that knowledge, risk perception, and access to contraceptives play an important role in prevention behavior. However, stigma and discrimination remain barriers. Community-based interventions that improve education and access to health services are needed to reduce HIV prevalence, especially in high-risk groups such as sex workers and drug users. This type of research is a systematic literature review where the data collection of this study was obtained and collected from searching scientific research articles from the time span of 2020-2025 using search engines, namely the Garuda Portal and Google Scholar using Publish or Perish and producing 12 national journals that fit the inclusion and exclusion criteria. From the 12 articles analyzed, it was found that while HIV knowledge was good in some groups, prevention practices were low. For example, in Togo, despite high condom use, HIV prevalence remained high, suggesting the need for a more holistic and community-based prevention approach. HIV prevention requires integrated and locally-based interventions involving all stakeholders. A focus on stigma reduction, improved access to health services, and effective education is essential to create an enabling environment for HIV prevention behaviors.

INTRODUCTION

HIV remains a major global public health problem, having claimed an estimated 42.3 million lives to date. Transmission is still ongoing in all countries of the world. It is estimated that there will be 39.9 million people living with HIV by the end of 2023, 65% of whom will be in the WHO African Region. By 2023, an estimated 630,000 people will die from HIV-related causes and an estimated 1.3 million people will contract HIV. There is no cure for HIV infection. However, with access to effective prevention, diagnosis, treatment and care, including for opportunistic infections, HIV infection has become a manageable chronic health condition, allowing people living with HIV to lead long and healthy lives (WHO, 2024).

Prevention of HIV-AIDS transmission is far preferable to treatment for many important reasons. Prevention can significantly reduce the spread of infection, especially through condom use, regular screening, and effective public education. This will help reduce the risk of HIV transmission in the community (Abdillah, 2022). Prevention is far more economically efficient as HIV treatment requires lifelong antiretroviral (ARV) therapy which is very expensive. Prevention also plays an important role in preventing serious long-term health complications, such as decreased immune system function and the emergence of opportunistic infections often experienced by people with HIV. Prevention can reduce the stigma and discrimination often faced by people with HIV-AIDS, and provide opportunities for individuals to live healthy lives without having to face the fear of the long-term effects of this infection. Prevention efforts through sexual education, contraceptive use, and HIV testing services should be prioritized to reduce HIV prevalence in the community (Chou, 2023).

Based on the complexity of the HIV problem, which continues to be a global health challenge despite the implementation of various prevention and treatment strategies, a literature review is needed to analyze the effectiveness of existing interventions and identify gaps in prevention approaches. Based on the explanation above, researchers are interested in conducting research with a *systematic literature review* on HIV transmission prevention behavior.

METHODS

The research method used a systematic literature review by first determining research questions including HIV prevention behavior identified in the literature. Furthermore, the literature search was carried out on Publish or Perish (PoP) assistance with the Google Scholar database and the Garuda Portal with the keywords "Behavior" OR "Prevention", OR "Transmission" AND "HIV" and selected literature according to the inclusion and exclusion criteria as determined in this study are (1) research time with a range of the last 5 years; (2) Articles in English or Indonesian; (3) Not a type (review article); (4) Articles are not duplicated; (5) Can be accessed full text and free; (6) Articles relevant to the title and according to keywords and exclusion criteria are articles that do not meet the inclusion criteria. The next stage is data extraction from the selected articles.

The following is a PRISMA diagram of the article extraction process

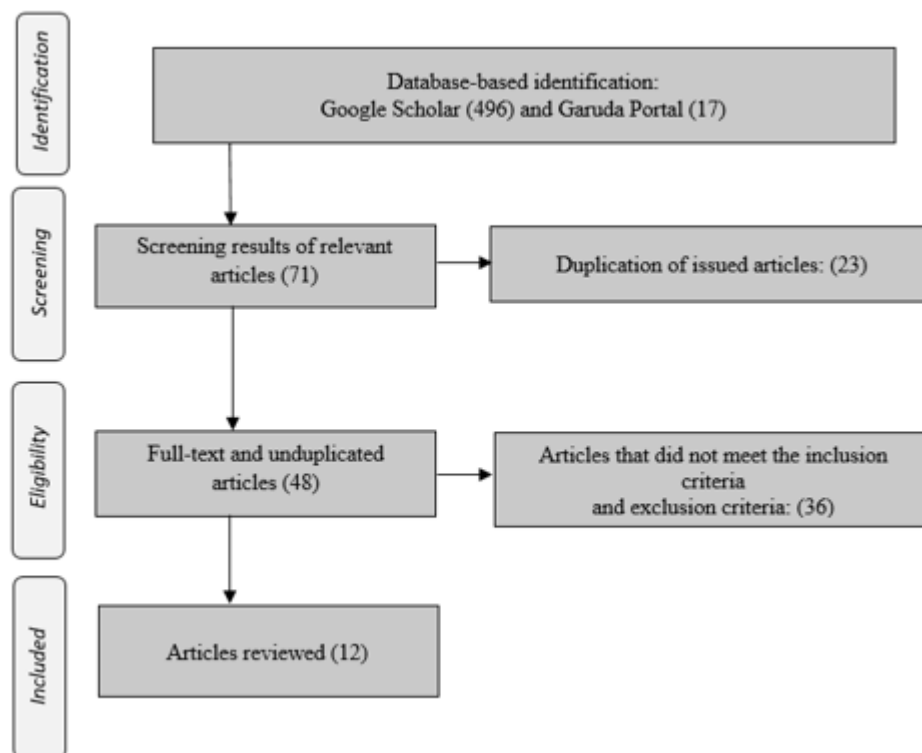


Figure 1. Source: PRISMA diagram David Mother et al (2009).

The final stage is data analysis and synthesis, including the results of the research analyzed and synthesized to find patterns and conclusions. The results of data analysis and synthesis are presented in the table below.

Table 1. Results of Data Synthesis

| No. | Title | Researcher | Sample | Research Design | Research Findings | Research Results |
|-----|--|--------------------------|---|-----------------|---|---|
| | Predictors of preventive behaviors of AIDS/HIV based on Health Belief Model constructs in women with | Alizade M., et al (2021) | 200 female commercial sex workers in Tabriz, Iran | Cross Sectional | There were significant associations between prevention behavior (BP) and HBM constructs | Perceived sensitivity and perceived benefits are key predictors of HIV prevention behavior. Training programs are needed to improve health beliefs related to HIV prevention behaviors. |

| No. | Title | Researcher | Sample | Research Design | Research Findings | Research Results |
|-----|---|----------------------------------|---|--|---|---|
| | high-risk sexual behaviors: A cross-sectional survey | | | | such as perceived sensitivity, perceived benefits, self-efficacy, and HIV knowledge. | |
| | HIV risk behavior, viremia, and transmission across HIV cascade stages including low-level viremia | Edun O., et al (2024) | 368,373 participants (14 surveys) | Analysis of data from 14 Population-based HIV Impact Assessment (PHIA) surveys in sub-Saharan Africa (2015-2019) | The majority of HIV transmission comes from undiagnosed and diagnosed but untreated PLHIV, reflecting risky sexual behavior and higher viral loads. Individuals with low-level viremia (LLV) do not contribute significantly to HIV transmission. | HIV risk behavior, viremia, and transmission across HIV cascade stages including low-level viremia |
| | Prevalence of HIV and sexually transmitted and blood-borne infections, and related preventive and risk behaviors, among gay, bisexual and other men who have sex with men in Montreal, Toronto and Vancouver: results from the Engage Study | Hart, T.A., et al (2021) | 2449 GBM | Respondent-driven sampling (RDS) | HIV prevalence: Montreal (14.2%), Toronto (22.2%), Vancouver (20.4%). History of syphilis: 14-16% in all cities. PrEP use: Vancouver (18.9%), Toronto (11.1%), Montreal (9.6%). | There were differences in HIV prevalence, STBBI testing, and PrEP use among GBM in Montreal, Toronto, and Vancouver. Increased STBBI testing and PrEP uptake are needed to reduce HIV and STBBI transmission in Canada. |
| | HIV/AIDS Transmission among Adolescent Female Sex | Ni'matutstani A L., et al (2021) | 6 Female sex workers in their teens (10-24 years old) | Qualitative, purposive sampling, in-depth interviews | Knowledge and attitudes about HIV/AIDS were good, | Informants believed that herbal medicine can prevent STIs and HIV/AIDS. Perceived barriers included the absence of free |

| No. | Title | Researcher | Sample | Research Design | Research Findings | Research Results |
|-----|--|----------------------------------|--|---|--|--|
| | Workers (FSWs) | | | | but prevention practices were poor. All informants felt their jobs were high-risk. | condom stocks, difficulties in condom negotiation, the influence of alcohol, and costs for STI screening and VCT testing. |
| | Analysis of Factors Affecting Prevention of HIV Transmission by PLHIV to Others | Faisal N., et al (2021) | 100 PLHIV respondents in Makassar City | Cross Sectional | Factors associated with HIV prevention were duration of HIV infection ($p=0.000$) and knowledge ($p=0.000$). | Knowledge and duration of HIV infection were the most influential factors in preventing HIV transmission by PLHIV. |
| | High-risk behaviors and their association with awareness of HIV status among participants of a large-scale prevention intervention in Athens, Greece | Pavlou poulu L.D., et al (2020). | 3320 People Who Inject Drugs (PWID) | Respondent-driven sampling (RDS) with five rounds, questionnaire interviews, and HIV testing. | The proportion of PWID who were HIV positive and aware of their status increased from 21.8% to 36.4% during the intervention. Injection-related risk behaviors decreased significantly, especially among those who were aware of their HIV status. Condom use increased among HIV-aware men. | Knowledge of HIV status is associated with safer injection behaviors. Comprehensive interventions are needed to increase HIV testing and status awareness among PWID. Decreased risk behaviors may explain the decrease in HIV incidence among PWID. |
| | Health related behaviors among HIV-infected people who are successfully linked to care: an institutional-based cross- | Xu J.F., et al (2020) | 2575 people living with HIV/AIDS | Cross Sectional | 34.2% smokers, 33.8% alcohol drinkers, 2.3% drug users; 59.0% had sex in the last 6 months | Men are more likely to engage in risky sexual behaviors and general unhealthy health behaviors. Interventions that focus on reducing gender-specific risky behaviors are needed. |

| No. | Title | Researcher | Sample | Research Design | Research Findings | Research Results |
|-----|--|----------------------------|--|--|--|---|
| | sectional study | | | | | |
| | Risky sexual behavior among people living with HIV/AIDS in Andabet district, Ethiopia | Woreda J.B., et al (2022) | 181 PLWHA | Mixed-method | 46.3% of participants engaged in at least one risky sexual activity in the 3 months prior to the study. | Living in rural areas and poor perception of HIV risk were positively associated with risky sexual behavior. Economic factors, stigma, discrimination, and substance use contributed to unsafe sexual activity. 71.3% of participants had knowledge about HIV, but only 48.7% had a favorable perception of HIV risk. |
| | High Risk Behaviors for HIV and STIs Among Men Who Have Sex with Men Aged 15-19 Years - Guangzhou City and Tianjin Municipality, China, 2018 | Liu H., et al (2020) | 288 MSM in Guangzhou, 258 MSM in Tianjin | The online survey used the Respondent Driven Sampling (RDS) method through the WeChat application. | HIV knowledge and condom use varied between Guangzhou and Tianjin. 46.9% in Guangzhou and 79.4% in Tianjin had ever taken an HIV test. 17.6% in Guangzhou and 2.1% in Tianjin reported HIV positive results. | Many MSM aged 15-19 engage in high-risk behaviors, including inconsistent condom use and drug use before sex. Education on HIV and STI prevention needs to start earlier. There is a need for training for educators and health care providers on the special needs of AMSM. |
| | Variation in HIV Transmission Behaviors Among People Who Use Drugs in Rural US Communities | Jenkins W.D., et al (2023) | 3048 people who use drugs (PWUD) in rural communities from 10 states (Illinois, Kentucky, New Hampshire, Massachusetts, North Carolina, Ohio, Oregon, Vermont, West Virginia, Wisconsin) | Cross Sectional | 84.9% reported injection drug use in the past 30 days. 41.8% reported needle sharing. 80.0% reported unprotected sex. 12.8% reported transactional sex. | HIV-related behaviors varied significantly among sites. Individual characteristics such as age, sexual orientation, and partnership status are associated with HIV transmission behaviors. Interventions need to be tailored to local factors for better effectiveness. |

| No. | Title | Researcher | Sample | Research Design | Research Findings | Research Results |
|-----|--|------------------------------|--------------------------------|-----------------|--|--|
| | HIV Preventive Behaviors and Associated Factors among Gold Mining Workers in Dima District, Southwest Ethiopia, 2019 | Nigussie T, et al (2021) | 455 mine workers | Cross Sectional | 61.3% of mine workers have good HIV prevention practices. | Factors associated with good HIV prevention practices include not consuming alcohol, not chewing khat, having good knowledge about HIV, positive attitudes towards HIV prevention, and high perceived susceptibility to HIV. |
| | HIV prevalence and risk behaviors among female sex workers in Togo in 2017: a cross-sectional national study | Bitty-Anderson, et al (2022) | 1,036 Female Sex Workers (PSP) | Cross Sectional | HIV prevalence was 13.2% [95% CI: 11.2 - 15.4], with 95.6% using condoms during their last sexual encounter with a client. | HIV prevalence is high among PSPs, associated with age (26-32 years and ≥33 years), low education level, and number of sexual partners. Despite high condom use, risk behaviors persist, and access to health services is limited. |

RESULTS

Based on the results of this systematic literature review, of the 513 articles identified, 12 articles were obtained, all of which used 100% qualitative research type, this method is very relevant to describe the situation to be observed in the field more specifically, transparently, and in depth. The research was conducted in various countries. The most frequently used keywords in the research articles found were "Behavior", "Prevention", "Transmission" and "HIV".

DISCUSSION

Based on a systematic analysis of 12 articles, it was found that HIV prevalence varies widely, with at-risk groups such as commercial sex workers (CSWs), men who have sex with men (MSM), and people who inject drugs (PWID) showing higher prevalence. Key factors influencing prevention include knowledge, risk perception, access to contraceptives such as condoms and PrEP, and stigma and discrimination. The study also showed the need for a locally-based approach to increase the effectiveness of interventions.

Key factors influencing the effectiveness of preventive measures are knowledge, risk perception, access to contraceptives such as condoms and PrEP, and the impact of stigma and discrimination. Community-based interventions and education have shown positive results in raising awareness and reducing risk behaviors, but remain constrained by social barriers and stigma, especially in areas with limited healthcare infrastructure. For example, despite condom use reaching 95% in Togo, HIV prevalence remains high, indicating the need for more holistic prevention strategies. Successful approaches involve empowering local communities through education and improving access to friendly and inclusive health services.

Knowledge is a form of the result of human sensing of an object and is very important in determining one's behavior. In theory, the higher a person's level of knowledge, especially about their health, will affect their health behavior. Lack of knowledge is the cause of some respondents not knowing information about HIV/AIDS before being infected. This results in low preventive behavior from the community about HIV/AIDS. Similarly, in HIV/AIDS cases where the sufferers are housewives, there is a significant influence between education and HIV incidence. Housewives with lower education

levels have a 2.513 times greater risk of suffering from HIV than housewives with higher education (Dawina Putri et al., 2022).

Various types of risky behaviors and factors affecting the prevention of HIV transmission have been identified in the literature. Research shows that risky behaviors such as drug use, unprotected sex, and sexual intercourse with multiple partners are strongly associated with HIV transmission rates. For example, among men who have sex with men (GBM) in Montreal, Toronto, and Vancouver, there were significant differences in HIV prevalence and testing behavior and PrEP (pre-exposure prophylaxis) use (Hart T.A et al., 2021)). In addition, a study among female sex workers in Togo showed high HIV prevalence, despite high condom use, suggesting gaps in prevention practices (Bitty-Anderson et al., 2022)

Condom use is one of the main methods of preventing the transmission of sexually transmitted infections, including HIV. Sexual intercourse in serodiscordant couples can be prevented from HIV transmission if condoms are used consistently and in intact condition without damage or tears. This emphasizes the importance of proper and quality condom use as an effective protection measure against the risk of transmission (Riani, 2021).

Factors that influence HIV prevention behavior include knowledge about HIV, attitudes towards prevention, and risk perception. For example, in Makassar, knowledge and length of time living with HIV were shown to be the most influential factors in preventing HIV transmission by people living with HIV/AIDS (PLWHA) (Faisal et al, 2021). In Ethiopia, although 71.3% of participants had knowledge about HIV, only 48.7% had a good perception of HIV risk, which contributed to risky sexual behavior (Worede et al, 2022).

Barriers to HIV prevention were also identified, including lack of access to health services, stigma, and discrimination. Among female sex workers in Iran, although knowledge of HIV was good, prevention practices were poor due to barriers such as the absence of free condoms and difficulties in negotiating condom use (Ni'matutstania et al, 2021). Moreover, in Africa the majority of HIV transmission comes from undiagnosed and diagnosed but untreated PLHIV, reflecting risky sexual behavior and higher viral loads. Individuals with low-level viremia (LLV) do not contribute significantly to HIV transmission. (Edun et al, 2024).

Effective interventions are needed to address risky behaviors and improve HIV prevention. Research shows that training and education programs that focus on increasing knowledge and awareness about HIV can help reduce risky behaviors (Alizade et al, 2021; Pavloupoulu et al, 2020). In addition, approaches that consider the local context and specific needs of at-risk groups, such as men who have sex with men and sex workers, are critical to the success of prevention programs (Liu et al, 2020; Nigussie et al, 2021). Overall, the literature shows that reducing HIV transmission requires a multifaceted approach that includes improving knowledge, access to health services, and reducing stigma and discrimination.

CONCLUSION

The positive association between knowledge and access to prevention tools with reduced risk behaviors is evidence that integrated and locally-based interventions are needed to overcome challenges such as stigma and discrimination. Therefore, prevention programs need to be expanded by involving all stakeholders to create an enabling environment, with a focus on reducing social barriers and improving access to health services.

Conflict of interest

There have been no competing interests regarding this manuscript.

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Ethical statement

This manuscript has followed the Committee on Publication Ethics (COPE) and International Committee of Medical Journal Editors (ICMJE) guidelines regarding publication ethics.

AUTHOR CONTRIBUTION

The author fully contributed to the design, intelligent content description, literature quest, data collection, data processing, and manuscript writing.

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