

Risk Factors for HIV incidence in Men Who Have Sex With Men (MSM) and Viral Load Status in Indonesia: Literature Review

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Abstract

Introduction: HIV incidence among Men who have Sex with Men (MSM) continues to rise and is influenced by behavioral, social, and health-related factors. MSM remain a high-risk group due to risky sexual practices and barriers to accessing healthcare. **Objective:** This study aims to identify and analyze the key behavioral, demographic, social, and health determinants contributing to HIV infection among MSM, as well as to provide evidence-based recommendations for prevention strategies. **Methods:** This study employed a systematic literature review of 15 articles that met inclusion criteria from PubMed, PMC, and Google Scholar. Screening followed the PRISMA approach, and findings were synthesized qualitatively based on behavioral, demographic, social, and health characteristics. **Results and Discussion:** Risky sexual behaviors including unprotected anal/oral intercourse, multiple sexual partners, and receptive sexual positioning were identified as dominant contributors to HIV infection among MSM. Demographic factors (productive age, low education), social-psychological factors (stigma, discrimination, lack of family support), and sexually transmitted infections further increased vulnerability. Poor adherence to antiretroviral therapy resulted in unsuppressed viral load, heightening transmission risk. **Conclusion:** Comprehensive prevention strategies are essential, including behavioral education, MSM-inclusive healthcare services, stigma reduction, and strengthened ART adherence to reduce HIV transmission among MSM.

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Introduction

HIV (Human Immunodeficiency Virus) is a retrovirus that weakens a person's immune system by infecting immune system cells, especially CD4 T-lymphocytes, and causes progressive destruction of these cells. HIV infection is transmitted vertically (mother to child), horizontally (blood, blood products), and transsexually (heterosexual, homosexual, bisexual). WHO states that key populations are people in populations at increased risk of HIV in all countries and regions, including men who have sex with men. Men who have sex with men is one of the LGBT (Lesbian, gay, bisexual, and transgender) sexual orientations in the gay group, namely a group of men who are physically, emotionally, and/or spiritually attracted to other men. Many MSM still engage in unsafe sexual behavior / high risk of HIV infection, such as from a young age of first sexual intercourse, inconsistent condom use, and having sex with more than one sexual partner or changing partners, which are risk factors for HIV incidence in MSM.(Djalilah & Subagyo, 2021).

Many MSM still engage in unsafe sexual behavior/high risk of HIV infection, such as having their first sexual intercourse at a young age, inconsistent condom use, and having sexual intercourse with more than one sexual partner, which are risk factors for HIV infection in MSM(Djalilah & Subagyo, 2021). Epidemiological data from many countries indicate that the HIV epidemic among men who have sex with men (MSM) has become a top priority in combating HIV/AIDS. In China, 2011 surveillance data showed a national HIV prevalence of 6.3%, and 24 of 105 sentinel sites showed an HIV prevalence among MSM of more than 10%(Qi et al., 2015). Men who have sex with men (MSM) are at significant risk of HIV infection in Thailand. Despite an overall decline in HIV prevalence in the general population in Thailand, HIV prevalence among Thai MSM increased from 8.0% in 2010 to 9.2% in 2015.(Khawcharoenporn et al., 2019).

In 2022, HIV cases in Indonesia reached 329,581, and AIDS cases reached 137,397. HIV infections were predominantly among men (63%), with the highest prevalence among those aged 25-49 (Sri Wahyuni et al., 2025).According to UNAIDS data, in 2021, there were approximately 38.4 million people living with HIV (PLHIV), 1.5 million new HIV infections, and 650,000 deaths due to HIV-related illnesses. Globally, 76% of adults (>15 years) living with HIV accessing antiretroviral therapy (ARVs) and 66% in Asia(Marantika *et al.*, 2023). In 2024, 1.2 million adults were found to be infected with HIV, 87% of people living with HIV knew their status, 54% of deaths were due to HIV, 77% of people living with HIV received antiretroviral therapy (ARV), and 73% of people living with HIV experienced viral load suppression, (Key populations are estimated to still make the largest contribution to the projected number of new HIV infections until 2020-2024 with the population of MSM (35%), Clients of Sex Workers (14%), FSW (3%), IDU (1%) and Transvestites (0.5%)(Laporan Pemodelan Epidemi HIV, 2020).

The factors influencing HIV incidence among MSM in Indonesia are likely similar to those in other countries and continue to occur without significant change, resulting in a continued increase in HIV prevalence among MSM. However, this increase may be due to increased access to healthcare for MSM. Viral load, or the number of HIV virus particles in the blood, is a key indicator in tracking HIV disease progression and response to treatment. High viral load indicates a high level of viral replication activity and a higher risk of transmission, while viral load status is associated with improved patient immunological status and morbidity and mortality rates. (Yunita, et.,al 2020). Although many people living with HIV (PLHIV) have undergone antiretroviral therapy (ARV), not all have achieved viral load suppression. Unsuppressed viral load levels can be caused by

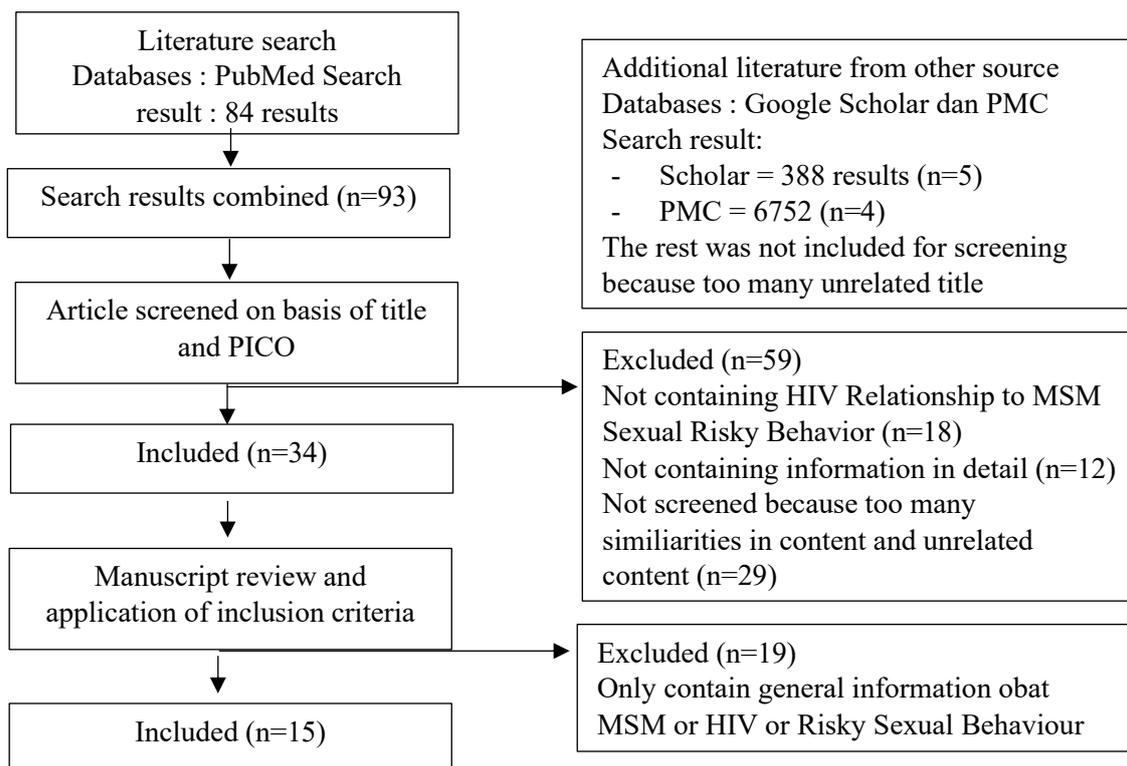
several factors. Previous research on factors associated with viral load levels on repeat tests 3 months or more has found that gender, educational status, duration of ART use, and initial viral load levels influence HIV viral load test results in PLHIV (Direess, G., Dagne, S., Alemnew, B., & Adane, 2020).

As for the research conducted by (Pturi *et al.*, 2019) Related to the results of viral load examinations with treatment adherence, it states that there is a significant relationship between adherence to taking ARV medication and the amount of viral load in PLHIV undergoing ARV treatment with a p-value of 0.01 with an OR value of 22.50, which means that compliant respondents have a 22.50 times chance of having an undetectable viral load. Lifelong use of ARV medication is certainly closely related to adherence to taking medication itself, because adherence to taking medication is an important factor in suppressing the number of viruses in the body (Putri *et al.*, n.d.). From the data above, it can be seen that not all PLHIV undergoing ARV therapy have suppressed viral load levels. Viral load is one indicator to measure the extent and how quickly the disease infection develops in the body which can be identified through the amount of virus in blood samples. The purpose of this study was to identify HIV risk factors in MSM and their association with viral load status. Therefore, based on the background above, the prevalence and impact of HIV are still significant, research on viral load makes an important contribution to our understanding of the dynamics of infection, the response to therapy undergone by PLHIV patients.

Method

This study employed a systematic literature review method, conducted by searching for information from online sources relevant to the problem formulation through PMC, PubMed, and Google Scholar, such as official statistical data, original research articles, and literature reviews. Offline sources included books. The keywords used were men, sex, men, risky sexual behavior, men, sex, women, and HIV/AIDS. The articles and literature obtained were selected using the PRISMA method, as shown in Figure 1 below:

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The inclusion and exclusion criteria in this study are:

Table 1
 Inclusion and Exclusion Criteria

Criteria	Inklusi	Ekslusi
Publication Year	2021-2025	Publications before 2021
Literature Type	Quantitative, Qualitative, Systematic Review, Meta-Analysis	<i>Clinical Trial</i>
Language	English, Indonesian	Languages other than English and Indonesian
Population and Literature Context	Risky sexual behavior of men who have sex with men (MSM)	Bisexual risky sexual behavior (men who have sex with men and women)
External	Risky sexual behavior (sex without condoms/protection, changing partners, anal/oral intercourse), risk factors, comparison with heterosexuals and HIV management strategies in men who have sex with men.	Other Outputs

Readings that do not meet the requirements will be excluded. After several screenings, the inclusion data will be tabulated and a discussion will be made based on the information. Of the 93 articles that match the keywords, and have been systematically selected using the PRISMA method, 15 articles were found that were included in the inclusion criteria and managed using the Mendeley Reference Manager Application. Quantitative and qualitative data were manually extracted and converted into qualitative data in Microsoft Word manually. Then synthesized the data by summarizing the important points contained in the literature that are in accordance with PICO (Population:

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Men Sex Men, Intervention: Risky Sexual Behavior, Comparators: Men Sex Women, Outcome: HIV/AIDS).

Results and Discussion

Table 2
Search Result Details

No	Title	Author (Year)	Article Type	Important Conclusions
1	Risk Behaviors for Transmission of HIV-AIDS among Men Who Have Sex with Men: Literature Study	(Amanda et al., 2023)	Review Article	Some of the sexual behaviors identified in research that are associated with a higher risk of HIV/AIDS among homosexuals include Oral ejaculation, Oral sex-licking/rimming and having multiple sexual partners.
2	Risky Sexual Behavior among Men Who Have Sex with Men (MSM) in Indonesia: A Literature Review	(Putri & Herbawani, 2024)	Review Article	MSM frequently engage in risky sexual behaviors, such as anal sex, condom failure, VCT (Vocational Counseling), and the receptive (bottom) sexual position. The determinants of MSM behavior are influenced by environmental, psychological, economic, behavioral, and parental factors.
3	Determinants of HIV/AIDS Incidence in Key Populations in Indonesia: A Systematic Review	(Rahma et al., 2024)	Review Article	Several risk factors associated with HIV incidence in key populations are age, education, marital status, age at first sexual intercourse, knowledge and risky sexual behavior including condom use, combined sexual activity, number of sexual partners ≥ 2 , and frequency of sexual intercourse. In addition, a history of sharing needles and a history of sexually transmitted infections (STIs) are also risk factors for HIV/AIDS incidence in key populations.
4	Analysis of Factors Related to Human Immunodeficiency Virus (HIV) Status in Msm Group in Bandar Lampung City	(Sari, 2021)	Journal Articles	The most dominant factor related to Human Immunodeficiency Virus (HIV) status in the MSM group in Bandar Lampung City in 2020 was the STI symptom variable with an OR value of 64.78.
5	Factors Related to HIV/AIDS Prevention Behavior on MSM Group (Male Sex Male) in Palu City	(Septiani et al., 2025)	Journal Articles	There is a relationship between knowledge, attitudes, support from health workers and HIV/AIDS prevention behavior in the MSM group in Palu City. It is recommended that MSM improve prevention behavior by using condoms consistently and utilizing HIV counseling and testing services, and health workers can provide care and counseling assistance without stigma and discrimination.
6	Determinant Factors of HIV Incidence in Men Sex with Men (MSM) in Indonesia in 2018	(Hasby & Sudaryo, 2021)	Journal Articles	The results of the study showed that MSM age ≥ 25 years, not being married, not having undergone circumcision, having participated in sex parties, and positive syphilis status were risk factors for HIV incidence in MSM.

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7	Risk Factors for HIV Incidence in the Productive Age Group in Indonesia	(Rohmatullailah & Fikriyah, 2021)	Journal Articles	Risk factors for HIV incidence are male gender OR=1.77, age <40 years OR=7.25, age at first marriage <20 years OR=5.62, married status OR=2.54, low education OR=4.70, low knowledge OR=3.32, history of alcohol consumption OR=7.65, history of non-sterile needle piercing OR=3.42, family history of HIV/AIDS OR=2.95, husband's history of HIV/AIDS OR=83.74, history of STDs OR=2.92, homosexual OR=1.97, having >1 sexual partner OR=23.32, unprotected sexual intercourse OR=5.34, alternating use of injecting drugs OR=9.3.
8	The Relationship between Risky Sexual Behavior and the Incidence of HIV/AIDS in Men	(Herda et al., 2021)	Review Article	Risky sexual behavior in men such as (i) unsafe anal sex, (ii) unsafe oral sex, (iii) inconsistent condom use, (iv) multiple or more than one sexual partner
9	Analysis of Risk Factors for Human Immunodeficiency Virus (Hiv) in Men (Msm)	(Carolin et al., 2021)	Original Article	There a significant relationship between condom use and risky sexual behavior and the incidence of HIV among male homosexual. While the history of sexual infectious disease, and injecting drug use do not have a significant relationship with HIV incidence among male homo sexual.
10	HIV Experiences of Men Who Have Sex with Men (MSM): A Qualitative Analysis of Self-Perception, Response to Diagnosis, Preventive Behaviors, and Peer Support	(Purnamawati et al., 2022)	Original Article	Almost all perceived themselves as abnormal and attracted to the same sex for various reasons, such as experiencing harassment, failed relationships, experimenting, or feeling like a woman. Some had negative self-esteem, but all still believed in their religion. All felt shocked, hopeless, afraid of death, and depressed when diagnosed with HIV, but this did not change the behavior of some informants, because some were still sexually active and rarely or never used condoms, while others chose to be sexually inactive since being diagnosed with HIV. Peer support was felt in terms of information, social support, and treatment.
11	<i>Factors Associated with the Incidence of HIV/AIDS in Men in Gorontalo Province</i>	(Wahab et al., 2025)	Original Article	The results of the analysis for the marital status factor p -value 0.012 $r = -0.276$, level of knowledge p -value 0.000 $r = 0.407$, MSM behavior p -value 0.000 $r = 0.655$, IDU p -value 0.450 $r = -0.084$ and socioeconomic status p -value 0.017 $r = 0.261$. It was concluded that there was a significant relationship between marital status, knowledge level, MSM behavior and socioeconomic status.
12	Behavior of Men Who Have a Potential for Hiv/Aids on the Michat Application in the Tamalanrea Zone of Makassar City	(Babual & Togubu, 2024)	Journal Articles	Men who have sex with men (MSM) face significant social challenges in the form of stigma, discrimination, and marginalization. This directly impacts their behavior in accessing health services, particularly services related to HIV testing and counseling on STI and HIV/AIDS prevention.
13	(Robert Kosasih et al., 2023) The	(Robert Kosasih et al., 2023)	Journal Articles	Risky sexual behaviors such as inconsistent condom use for anal sex and multiple and

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	Influence of Male-Male Sex on the Risk of Sexually Transmitted Infections in Men Promiscuous Sexual Behavior		concurrent sexual intercourse. However, while sexual behavior changes are an important consideration for HIV/STIs, the HIV epidemic among MSM is substantially driven by other factors, including social and structural factors underlying high-risk sexual practices.
14	Systematic Literature Review: The Impact of Risky Sexual Behavior on HIV/AIDS Incidence in Men Who Have Sex with Men	(Alia et al., 2024) Journal Articles	Unprotected risky sexual behaviors such as frequently changing sexual partners and engaging in anal and oral sex without condoms have a significant impact on HIV/AIDS incidence among MSM. Therefore, strategies are needed to minimize the risk of HIV/AIDS transmission among MSM, including promoting PrEP use, consistent condom use, routine HIV testing, behavioral interventions through counseling and education, engaging with MSM communities, and addressing structural barriers such as stigma and discrimination.
15	<i>The Role of Social Factors in the Incidence of HIV/AIDS in the Men Who Have Sex with Men (MSM) Community at the Banuta Pura Support Foundation, Palu City</i>	(Umar et al., 2024) Journal Articles	The results of this study indicate a lack of affection and parenting from parents, leading men who have sex with men (MSM) to seek affection and attention from their partners. It is also known that mass media can influence their sexual orientation. They use mass media to find or connect with same-sex partners. This study suggests the need for parents to play a role in children's development so that children receive the affection they need and there is no discrimination between children and their siblings, as this can make children feel unloved and uncared for.

The review of 15 articles that met the inclusion criteria shows that HIV incidence among Men who have Sex with Men (MSM) is influenced by a combination of behavioral, social, demographic, and health-related factors. Risky sexual behavior emerges as the most dominant factor identified across nearly all studies. Several articles highlight that unprotected anal and oral intercourse, oral ejaculation, rimming, and having multiple or concurrent sexual partners significantly increase the risk of HIV transmission (Amanda et al., 2023; Putri & Herbawani, 2024; Herda et al., 2021; Alia et al., 2024). The receptive sexual position (bottom) is also reported as the highest-risk behavior due to direct exposure to infectious bodily fluids (Putri & Herbawani, 2024).

In addition to behavioral factors, individual and demographic characteristics also play an important role. Studies indicate that being ≥ 25 years old, unmarried, having low educational attainment, and first engaging in sexual intercourse at a young age are associated with a higher likelihood of HIV infection (Rahma et al., 2024; Rohmatullailah & Fikriyah, 2021; Hasby & Sudaryo, 2021). Poor knowledge about HIV/AIDS further contributes to this vulnerability (Wahab et al., 2025). A study in Palu showed that knowledge, attitudes, and healthcare worker support strongly influence MSM's HIV prevention behaviors (Septiani et al., 2025).

Social and psychological factors also significantly shape the risk environment for MSM. Qualitative studies reveal that many MSM experience identity pressure, childhood trauma, lack of parental affection, and emotional neglect, which push them toward

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seeking validation and intimacy through same-sex relationships, often accompanied by high-risk sexual activities (Purnamawati et al., 2022; Umar et al., 2024). Additionally, the use of dating applications such as MiChat facilitates rapid access to sexual partners, thereby increasing exposure to risky sexual encounters (Babual & Togubu, 2024). Social stigma and discrimination further exacerbate the issue, discouraging MSM from accessing healthcare services such as HIV testing and STI counseling (Babual & Togubu, 2024).

Sexually transmitted infections (STIs) are strongly associated with HIV incidence among MSM. One study reported a very strong correlation between STI symptoms—particularly syphilis—and HIV status (Sari, 2021). Other studies also confirm that STIs and non-sterile needle use significantly elevate HIV risk (Hasby & Sudaryo, 2021; Carolin et al., 2021; Rohmatullailah & Fikriyah, 2021). STIs cause tissue inflammation and ulceration in genital and anal areas, allowing easier entry of HIV into the bloodstream.

From a healthcare perspective, the reviewed literature demonstrates that healthcare worker support has a considerable influence on prevention behaviors, such as consistent condom use and regular HIV testing. Healthcare workers who offer non-discriminatory and stigma-free services encourage MSM to utilize available health facilities more frequently (Septiani et al., 2025). However, many MSM continue to avoid medical services due to fear of stigma, leading to delayed diagnosis and suboptimal prevention efforts (Babual & Togubu, 2024).

The discussion also highlights that viral load suppression among people living with HIV (PLHIV) is strongly influenced by adherence to antiretroviral therapy (ART). Although ART coverage continues to rise, several studies note that non-adherence results in failure to achieve viral suppression, maintaining high viral loads and increasing the likelihood of transmission (Putri et al., n.d.; Yunita et al., 2020; Diress et al., 2020). When high-risk sexual behavior continues after receiving an HIV diagnosis, the potential for transmission remains high, particularly within closely connected MSM sexual networks.

Overall, the reviewed literature underscores that HIV incidence among MSM is a multidimensional issue shaped by behavioral risk, socio-demographic factors, STIs, stigma, and healthcare access barriers. Effective HIV prevention among MSM requires a comprehensive, multidimensional approach that goes beyond behavior change interventions. It must include strengthening health literacy, reducing stigma and discrimination, improving access to MSM-inclusive healthcare services, addressing psychosocial needs, and enhancing ART adherence to achieve viral suppression and reduce transmission.

Conclusion

The review of 15 articles demonstrates that HIV incidence among MSM is driven by an interplay of risky sexual behaviors, socio-demographic vulnerabilities, psychological factors, and health system barriers. High-risk practices such as unprotected anal and oral intercourse, multiple sexual partners, and receptive sexual positioning represent the strongest contributors to HIV transmission. Demographic factors—such as being in the productive age group, low education, and early sexual debut—further increase vulnerability. Social and psychological aspects, including stigma, discrimination, childhood trauma, and lack of family support, also shape risky behavior and limit healthcare utilization. Sexually transmitted infections significantly heighten susceptibility to HIV, while poor adherence to ART results in unsuppressed viral load

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and ongoing transmission risk. Comprehensive HIV prevention among MSM requires behavioral interventions, improved health literacy, stigma reduction, MSM-inclusive health services, and strengthened ART adherence.

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