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Article

Determinants of HIV Risk Behaviors among Female Sex Workers: A Scoping Review (2016–2026)

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Abstract. Human immunodeficiency virus (HIV) remains a major global public health problem, and ending AIDS by 2030 requires reaching key populations. Female sex workers (FSW) carry a disproportionate burden given frequent exposure to inconsistent condom use, alcohol and drug use, sexual violence, and multiple partnerships. Evidence on these determinants remains fragmented across countries, hampering comprehensive prevention program development. Systematic mapping of this evidence is therefore urgently needed. This scoping review aimed to identify and map the determinants of HIV-related risk behaviors among FSW. The review followed the Joanna Briggs Institute (JBI) methodology and the PRISMA-ScR guideline. Scopus, PubMed, and ScienceDirect were searched for studies published between 2016 and 2026. Of 1,630 records identified, 18 articles met the inclusion criteria and were analyzed descriptively. Inconsistent condom use was the most frequently reported determinant (16/18; 88.9%), followed by alcohol and drug use (10/18; 55.6%), sexual violence (8/18; 44.4%), and multiple sexual partnerships (7/18; 38.9%). Limited knowledge, depression, stigma, limited condom access, and low income were also documented, operating simultaneously at individual, interpersonal, and structural levels. The findings support combination HIV prevention integrating individual counseling, interpersonal risk reduction, and structural measures, including stigma reduction, economic empowerment, and expanded access to condoms and testing services.

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1. Introduction

Human immunodeficiency virus (HIV) remains one of the major global public health challenges. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), an estimated 40.8 million people were living with HIV in 2024, with approximately 1.3 million new infections and 630,000 deaths from AIDS-related illnesses recorded in that year [1]. By the end of 2024, around 31.6 million people had access to antiretroviral therapy (ART), although this coverage remained below the level required to end AIDS as a public health threat by 2030 [1]. The persistence of new infections shows that prevention efforts have not reached all populations at risk equally. Key populations therefore continue to deserve specific attention in the global HIV response.

Among the populations affected by HIV, sex workers are considered a key population with substantially higher vulnerability to infection. UNAIDS estimates HIV prevalence among sex workers at 2.7%, almost four times higher than the global prevalence among adults, which was only 0.7% [1]. Female sex workers (FSW) face biological vulnerabilities that distinguish them from other sex worker groups, since repeated mucosal exposure to semen during vaginal intercourse raises the probability of virus acquisition in each unprotected sexual encounter [2-3]. Their social position also places them in unequal power relations with clients and regular partners, which limits their ability to negotiate condom use and increases their exposure to violence [3-4]. Economic dependence on sex work further increases the likelihood of accepting higher-paying unprotected transactions [3], [5]. The World Health Organization consequently recommends a comprehensive package of prevention, diagnosis, treatment, and care interventions that is specifically tailored to sex workers [2].

Recent studies published within the last five years confirm that the burden of HIV among FSW remains high in many settings. A national survey in Togo estimated HIV prevalence among FSW at 6.3%, which is far higher than the prevalence in the general adult population [6]. In Nairobi, Kenya, an analysis of the epidemiology of HIV among FSW documented sustained transmission across the life course of sex work, shaped by structural conditions such as income insecurity and limited service access [7]. A community-led study in South Africa reported an HIV prevalence of 61.96% among FSW [8], while a vaccine preparedness cohort in Maputo, Mozambique recorded an HIV incidence of 2.02 per 100 person-years among young adults with multiple sexual partners [9]. These recent findings confirm that HIV transmission within this population is still far from controlled.

Although these studies have identified important determinants of HIV-related risk behaviors, the available evidence remains dispersed across countries with different population characteristics, research designs, and contextual factors. Reported determinants are usually presented as separate variables without an explicit account of how individual, interpersonal, community, and structural factors interact in shaping risk [3], [10]. A comprehensive overview of the most frequently reported determinants and the remaining research gaps is therefore still lacking. This scoping review addressed that gap by systematically mapping the evidence on determinants of HIV-related risk behaviors among FSW, and its novelty lies in organizing the reported determinants within a social-ecological framework rather than treating them as isolated variables.

Consistent with the guidance of the Joanna Briggs Institute (JBI) for scoping reviews, the review was framed using the Population, Concept, and Context (PCC) strategy [11]. The population element comprised female sex workers, the concept element referred to the determinants of HIV-related risk behaviors, and the context element covered community and health service settings in all countries where the included studies were conducted. Based on this framework, two research questions were formulated. First, what determinants of HIV-related risk behaviors among FSW are reported in studies published between 2016 and 2026? Second, which determinants are most frequently reported, and at which levels of the social-ecological model do they operate?

2. Method

2.1. Study Design

This study employed a scoping review approach to summarize existing evidence on the behavioral determinants associated with HIV/AIDS-related risk behaviors among female sex workers. The review followed the methodological guidance of the Joanna Briggs Institute for scoping reviews [11] and was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR). The review process was organized into three systematic stages, consisting of a preparation stage, an implementation stage, and an evaluation stage, as illustrated in Figure 1. The preparation stage covered the formulation of research questions, the development of the protocol and eligibility criteria, and the design of the search strategy. The implementation stage covered literature searching, screening, and data extraction, while the evaluation stage covered data interpretation, analysis, and reporting.

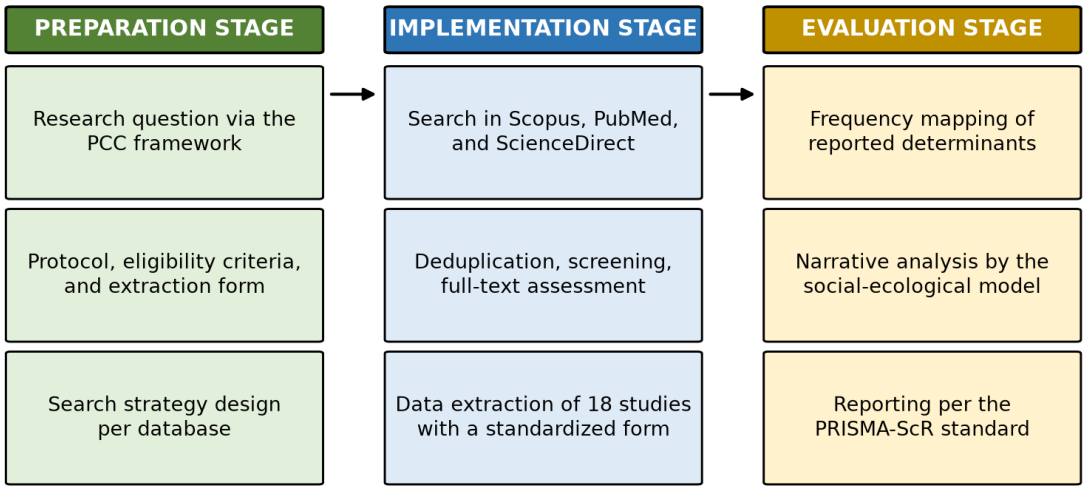


Figure 1. Flow chart of the scoping review stages

2.2. Eligibility Criteria

2.2.1. Inclusion Criteria

Eligible studies employed qualitative, quantitative, or mixed-methods designs that examined HIV/AIDS-related risk behaviors among female sex workers, including condom use, drug use, injection drug use, alcohol consumption, and the number of sexual partners. Studies of broader sex worker or key populations were retained only when they reported findings relevant to FSW or allowed the findings to be disaggregated for this group. Eligible articles were published between 2016 and 2026, written in English or Indonesian, and accessible in full text.

2.2.2. Exclusion Criteria

Studies that did not specifically involve female sex workers were considered irrelevant to the review scope and excluded. Studies that did not examine behavioral risk factors were also excluded. In addition, duplicate records, publications without accessible full texts, and non-original research articles were removed during the selection process.

2.3. Information Sources

The literature search was conducted in three international databases commonly used in health research, namely Scopus, PubMed, and ScienceDirect. These databases were selected because they

index the majority of peer-reviewed journals in epidemiology, public health, and HIV research. The search covered publications released between 2016 and 2026.

2.4. Search Strategy

The search strategy combined keywords relevant to the research topic using the Boolean operators AND and OR to identify relevant studies while maintaining a broad search scope. The search terms targeted HIV/AIDS, female sex workers, risk behaviors, and their determinants. The core search string was constructed as follows, ("HIV" OR "AIDS" OR "Human Immunodeficiency Virus" OR "Acquired Immunodeficiency Syndrome") AND ("female sex workers" OR "FSW" OR "women sex workers" OR "sex workers" OR "commercial sex workers") AND ("risk behavior" OR "risky behavior" OR "sexual risk behavior") AND ("determinant" OR "factor"). The strategy was adapted to the indexing characteristics and search requirements of each database.

2.5. Study Selection

All articles identified during the initial search were imported into a reference management software program to facilitate record organization and screening. First, duplicate records were removed to prevent double counting. The remaining articles were then screened by title and abstract to assess their relevance to the research topic, and articles considered potentially eligible proceeded to full-text assessment against the predefined inclusion and exclusion criteria. The complete selection process was documented using a PRISMA-ScR flow diagram, as presented in Figure 2.

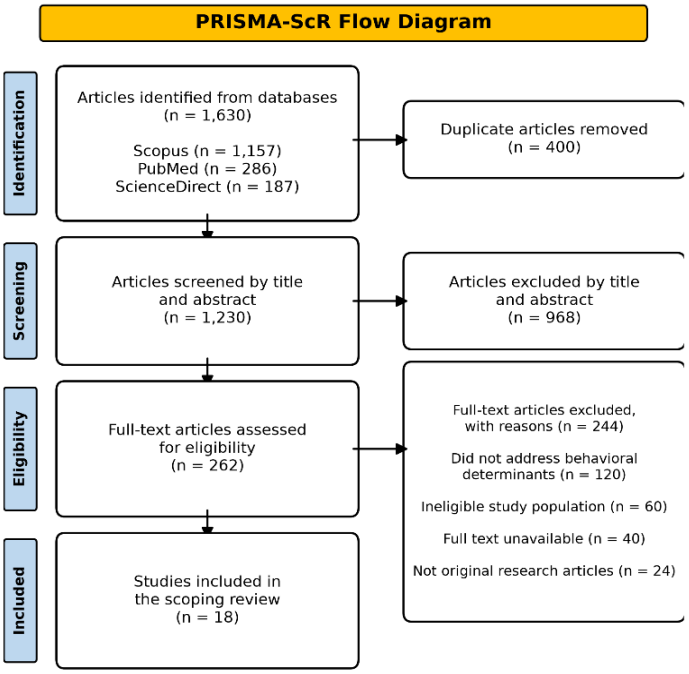


Figure 2. PRISMA-ScR flow diagram of the study selection process

2.6. Data Extraction

Data were extracted from all articles that met the inclusion criteria following full-text screening. The extraction process aimed to collect relevant information from each study systematically to support the synthesis of findings. The extracted data included the author(s) and publication year, study country, research design, sample size, behavioral determinants examined, and the main findings related to HIV-related risk behaviors among FSW. All extracted information was organized into a standardized

data extraction matrix to facilitate the identification, comparison, and mapping of study characteristics and findings.

2.7. Data Synthesis

The findings were synthesized narratively using a descriptive approach. Reported determinants were first grouped by behavioral category and subsequently mapped onto the levels of the social-ecological model, covering individual, interpersonal, community, and structural levels [10]. Frequency counts were used to describe how often each determinant was reported across the included studies. The synthesized findings are presented in tables, a frequency chart of the identified determinants, and a descriptive narrative.

2.8. Protocol Registration and Quality Appraisal

The review protocol was not prospectively registered in an open repository such as the Open Science Framework (OSF). Consistent with the JBI guidance, which considers critical appraisal optional for scoping reviews, a formal assessment of methodological quality was not performed because the aim of this review was to map the breadth of the available evidence rather than to estimate pooled effects [11]. Methodological transparency was instead maintained through the systematic application of predefined eligibility criteria and the complete documentation of the search, selection, and extraction processes in accordance with the PRISMA-ScR standard.

3. Results and Discussion

This scoping review synthesized evidence on individual, interpersonal, and community or structural determinants associated with HIV risk among female sex workers (FSWs). The findings are presented alongside their interpretation to provide an integrated understanding of the factors influencing HIV-related vulnerability among FSWs. The synthesis focuses on evidence derived specifically from FSW populations. Findings from other key populations are not used to support conclusions about FSWs unless FSW-specific results are reported separately.

3.1. Study Selection Results

The study selection process was conducted in accordance with the PRISMA-ScR guidelines. The initial search identified 1,630 records from three electronic databases: Scopus (n = 1,157), PubMed (n = 286), and ScienceDirect (n = 187). After removing 400 duplicate records, 1,230 records were screened based on their titles and abstracts. Of these, 968 records were excluded because they did not meet the eligibility criteria.

A total of 262 full-text articles were subsequently assessed for eligibility. Following the full-text assessment, 244 articles were excluded for the following reasons: the articles did not address behavioral determinants (n = 120), the study population was ineligible (n = 60), the full text was unavailable (n = 40), or the articles were not original research studies (n = 24). The studies included in the final synthesis were required to report findings specifically related to FSWs. Studies involving other populations were excluded when FSW-specific results were unavailable.The study selection process is illustrated in Figure 2.

3.2. Study Characteristics

The characteristics of the included studies are summarized in Table 1. The table presents the authors and publication years, study locations, sample sizes, study designs, and key findings related to HIV risk determinants among FSWs. The studies represent different geographical settings and research approaches, reflecting the diverse social and epidemiological contexts in which FSWs experience HIV-related risks.

Differences in study settings, sampling procedures, and definitions of HIV-related risk behaviors should be considered when interpreting the findings. In particular, studies using different measures of condom use or examining different types of sexual relationships may produce estimates that are not directly comparable. Therefore, the synthesis considers both the reported findings and the methodological characteristics of the individual studies.

Table 1. Characteristics of the included studies on determinants of HIV-related risk behaviors among female sex workers

Author and Year	Country	Study Design	Sample Size	Behavioral Determinants	Main Findings
Ekama et al., 2025 [23]	Nigeria	Cross-sectional study	461	HIV knowledge, perceived HIV risk, condom use	Number of sexual partners (aOR 1.555; 95% CI 1.035–2.335), condom use (aOR 4.701; 95% CI 1.418–15.584), and experience of condom breakage (aOR 2.550; 95% CI 1.817–7.959).
Kakisingi et al., 2020 [19]	Democratic Republic of the Congo	Analytical cross-sectional study	1,555	Alcohol consumption, condom use, history of STIs, duration of sex work	Condom use and sex work as the main source of income (OR = 12.6, $p < 0.001$) were significantly associated with HIV infection. Alcohol consumption also showed a significant association with HIV infection among female sex workers ($p < 0.05$).
Namwat et al., 2024 [25]	Thailand	Prospective longitudinal cohort study	1,003	Perceived HIV risk, condom use	Receptive anal sex (aHR 3.40, 95% CI 1.32–8.74) and diagnosis within the previous six months (aHR 3.58, 95% CI 1.19–10.76) were associated with HIV incidence. Sex with a sex worker within the previous six months was associated with reduced risk (aHR 0.11, 95% CI 0.02–0.67).
Yu et al., 2022 [22]	China	Cross-sectional study	5,116	Condom use, HIV knowledge, HIV testing, number of sexual partners	MSW were more likely to use drugs than MSM (8.09% vs. 0.89%, $p < 0.05$). They had a higher proportion of consistent condom use during anal sex (56.50% vs. 41.95%, $p < 0.05$), but a lower proportion during commercial sex (81.28% vs. 98.48%, $p < 0.05$).

Author and Year	Country	Study Design	Sample Size	Behavioral Determinants	Main Findings
Mukuku et al., 2024 [24]	Democratic Republic of the Congo	Analytical cross-sectional study	573	Age at sex-work initiation, condom use, history of STIs, sexual violence, alcohol consumption	Risky sexual behavior was associated with early initiation of sex work and being forced to have sex (aOR = 12.2; 95% CI 3.2–46.4; p < 0.0001), inconsistent condom use (aOR = 4.1; 95% CI 1.3–13.0; p = 0.018), and anal sex (aOR = 23.8; 95% CI 6.9–82.4; p < 0.0001).
Lépine et al., 2020 [5]	Senegal	Cross-sectional survey (list experiment)	786	Stigma, discrimination, access to HIV services	Condom use among HIV-positive female sex workers was only 34%, 47 percentage points lower than condom use among HIV-negative sex workers.
Augustine et al., 2024 [15]	Tanzania	Cross-sectional study	212	HIV knowledge, condom use, alcohol consumption, history of STIs	Good HIV knowledge was associated with greater condom use, while alcohol consumption and a history of STIs were associated with risky sexual behavior, including having more than 10 sexual partners (reported as 86.6%).
Milovanovic et al., 2021 [8]	South Africa	Community-led cross-sectional study	3,005	Duration of sex work, inconsistent condom use, sexual violence	HIV prevalence was 61.96%; the average duration of sex work was six years. Inconsistent condom use was reported by 81.6%; physical or sexual violence was reported by 46.2% from intimate partners and 57.4% from clients.
Rameto et al., 2023 [26]	Ethiopia	Cross-sectional study	6,085	Age, condom use, alcohol consumption, drug use, sexual violence, access to HIV services	HIV infection was associated with inconsistent condom use, alcohol consumption, and experiences of sexual violence. The prevalence of inconsistent condom use was 17.1% (95% CI 16.5–17.8).
Faini et al., 2022 [20]	Tanzania	Prospective cohort study	700	Condom use, history of STIs, number of sexual partners, drug use	A total of 88% had not used condoms with one or more sexual partners during the previous three months, and 13% reported illicit drug use.

Author and Year	Country	Study Design	Sample Size	Behavioral Determinants	Main Findings
Manathunge et al., 2020 [14]	Sri Lanka	Cross-sectional study (respondent-driven sampling)	1,180	HIV knowledge, condom use, HIV testing	Condom use during the most recent sexual encounter was relatively high, but consistent use remained low. Approximately 90% of female sex workers used a condom during their most recent encounter with a client in Colombo and Galle, compared with 57.1% in Kandy.
Muleia et al., 2024 [21]	Mozambique	Cross-sectional study	2,565	Knowledge of female condoms, physical violence, sexual violence, age at sex-work initiation, alcohol consumption, drug use	Inconsistent condom use was associated with limited knowledge of female condoms, experiences of physical or sexual violence, and residential location (aRR = 2.40; 95% CI 1.77–3.25). Risky sexual behavior was also associated with alcohol consumption, early sexual activity, and duration of sex work.
Chen et al., 2022 [30]	South Africa	Cross-sectional study	1,373	Stigma toward sex workers	Anticipated sex-work stigma was associated with the reported outcome (aPR = 0.74; 95% CI 0.61–0.90).
Braga et al., 2020 [13]	Brazil	Cross-sectional biological and behavioral surveillance study (respondent-driven sampling)	4,328	Education, income, workplace, age at sex-work initiation, drug use	HIV prevalence was 5.3% (95% CI 4.5–6.3), with variation across cities. Differences in socioeconomic characteristics, work location, age at sex-work initiation, and drug use contributed to variations in HIV prevalence.
Shen et al., 2016 [16]	China	Multicenter cross-sectional study	653	Depression, syphilis knowledge, condom use, regular partners	A total of 52.4% of female sex workers experienced depression. Depression was associated with adequate syphilis knowledge (aOR = 1.45; 95% CI 1.04–2.03) and having a regular partner (aOR = 1.63; 95% CI 1.14–2.33). Inconsistent condom use with regular partners was also associated with depression.

Author and Year	Country	Study Design	Sample Size	Behavioral Determinants	Main Findings
Grosso et al., 2022 [28]	Guinea-Bissau	Cross-sectional study (respondent-driven sampling)	505	Age at sex-work initiation (<18 years), history of sexual violence, HIV testing, contraceptive use	A total of 26.3% of female sex workers began sex work before age 18. Early initiation was associated with a history of sexual violence before age 18 (aOR = 6.74; 95% CI 2.05–22.13), lower likelihood of prior HIV testing (aOR = 0.43; 95% CI 0.20–0.91), and lower use of effective contraception.
Macicame et al., 2024 [9]	Mozambique	Prospective observational cohort study	505	Number of sexual partners, MSM status, history of partners living with HIV	HIV incidence was 2.02 per 100 person-years. HIV risk was higher among MSM (HR = 27.95; 95% CI 4.39–117.94), participants with ≥3 sexual partners (HR = 7.39; 95% CI 1.64–33.25), and those with a partner living with HIV (HR = 9.64; 95% CI 2.23–41.71).
Bongomin et al., 2023 [12]	Uganda	Cross-sectional study	314	Pregnancy history, dual contraceptive use, HIV status	A total of 66.2% of female sex workers used dual contraception and 13.8% were living with HIV. Having experienced at least one pregnancy was associated with dual contraceptive use (adjusted PR = 1.87; 95% CI 1.40–2.51; $p < 0.001$).

The 18 included articles originated from 13 countries. Most studies were conducted in Africa (13 articles; 72.2%), followed by Asia (4 articles; 22.2%) and the Americas (1 article; 5.6%). Fifteen studies used cross-sectional designs (83.3%), while three studies used prospective cohort designs (16.7%). Sample sizes ranged from 212 to 6,085 participants, with a combined total of 30,919 FSW across all studies. This variation illustrates the breadth of the available evidence, although the dominance of cross-sectional designs limits causal interpretation.

The studies varied in their sample sizes, study designs, and operational definitions of HIV-related risk behaviors. Such variation reflects the breadth of the available evidence but may also affect the comparability of findings across settings. In addition, the predominance of cross-sectional designs limits the ability to establish temporal relationships or causal associations between the reported determinants and HIV-related risk behaviors.

3.3. Overview of Reported Determinants

The distribution of HIV risk determinants reported across the included studies is presented in Figure 3. The determinants were categorized into individual-level, interpersonal-level, and community or structural-level factors. This classification provides an overview of the frequency with which different

determinants were reported in the included studies and facilitates comparison across the identified domains.

The frequency of a determinant represents the number of included studies reporting that factor; it does not necessarily indicate the magnitude of its association with HIV risk or its causal importance. Therefore, the distribution should be interpreted alongside the study designs, populations, and measurement approaches used in the original research.

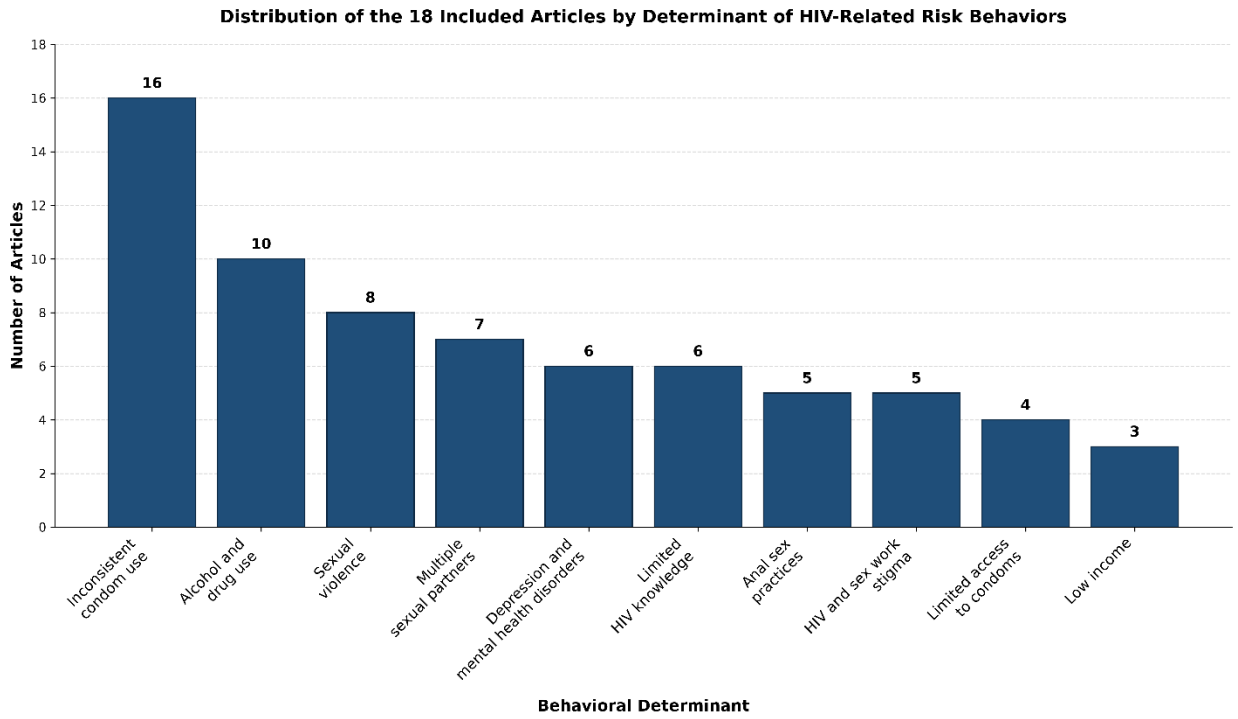


Figure 3. Distribution of the reported determinants of HIV-related risk behaviors across the 18 included studies

As shown in Figure 3, the determinants most frequently reported across the 18 studies were inconsistent condom use (16 articles; 88.9%), alcohol consumption and drug use (10 articles; 55.6%), sexual violence (8 articles; 44.4%), and multiple sexual partnerships (7 articles; 38.9%). Other determinants included depression and mental health disorders (6 articles; 33.3%), limited HIV knowledge (6 articles; 33.3%), anal sex practices (5 articles; 27.8%), HIV and sex work stigma (5 articles; 27.8%), limited access to condoms (4 articles; 22.2%), and low income (3 articles; 16.7%). These determinants are not isolated variables but operate at connected levels of social life. They can be grouped into individual factors, such as limited knowledge, psychological distress, and substance use, interpersonal factors, such as condom negotiation, partner concurrency, and violence, and community and structural factors, such as stigma, service access, and economic conditions. This layered distribution provides the organizing framework for the discussion that follows.

The findings indicate that HIV-related risk behaviors among FSWs are influenced by multiple, interconnected determinants. Individual factors include HIV-related knowledge, psychological distress, and substance use. Interpersonal factors include condom-use practices, multiple sexual partnerships, and experiences of violence. Community and structural factors include stigma, access to prevention services, and economic conditions. These determinants are interconnected and should not be interpreted as mutually exclusive or independent causes of HIV-related risk behaviors.The

distribution of these determinants provides an organizing framework for the discussion, which considers how individual characteristics interact with interpersonal relationships and broader social and structural conditions.

3.4. Determinants Associated with HIV Risk among FSWs

The findings were synthesized across three levels: individual, interpersonal, and community or structural. These levels are interconnected, as individual behaviors may be influenced by interpersonal relationships and the broader social and service environments in which FSWs live and work. Previous research has highlighted the importance of considering structural conditions, including employment circumstances, stigma, and access to health services, when examining HIV-related vulnerability among sex workers [3], [7].

3.4.1. Individual-Level Determinants

Individual-level determinants reported in the included studies included HIV-related knowledge, alcohol and drug use, mental health conditions, and other behavioral factors. These factors may influence HIV-related decision-making and the ability to adopt protective behaviors. However, their effects should not be interpreted independently of the social and structural circumstances experienced by FSWs [2-3].

Limited HIV-related knowledge was reported in several studies [6-7], [19]. Insufficient knowledge may affect the ability to assess HIV-related risks and make informed decisions regarding prevention. Nevertheless, knowledge alone may not be sufficient to facilitate protective behavior when FSWs face barriers such as economic pressure, violence, or limited access to prevention services. The findings therefore suggest that educational interventions should be accompanied by accessible and supportive prevention services, consistent with the recommended package of interventions for key populations [2].

Mental health-related factors, including depression, were also reported in the included evidence [16-18]. Mental health challenges may influence decision-making, engagement with prevention services, and the ability to negotiate safer sexual practices. These findings highlight the importance of considering mental health support as part of comprehensive HIV prevention services for FSWs. A systematic review has also identified mental health conditions and related vulnerabilities as important concerns among sex workers [17]. However, the cross-sectional nature of several included studies limits the ability to determine whether mental health conditions precede or result from HIV-related risks.

Alcohol and drug use were reported in studies involving FSWs [4], [15]. Substance use may be associated with reduced capacity to negotiate condom use or maintain protective behaviors in some contexts. Nevertheless, the relationship between substance use and HIV risk may vary according to the type of substance, frequency of use, and circumstances in which it occurs. The association between gender-based violence and sexual or drug-related HIV risk among FSWs who use drugs has also been examined in the literature [4]. These findings support the need for prevention strategies that address substance use alongside sexual health needs, rather than treating substance use as an isolated individual behavior.

3.4.2. Interpersonal-Level Determinants

Interpersonal-level determinants included condom-use practices, number and type of sexual partners, condom negotiation, and experiences of violence. These factors reflect the influence of sexual and working relationships on HIV prevention among FSWs. In particular, the ability to use condoms consistently may depend not only on individual intentions but also on partner preferences, economic considerations, and the presence of coercion or violence [3-4], [7].

Inconsistent condom use was frequently reported across the included studies [14], [20], [21], [23], 24], [26]. However, condom-use estimates should be interpreted carefully because studies used different measurement approaches, including condom use at the last sexual encounter and consistent condom use over a specified period. Condom use at the last sexual encounter does not necessarily indicate consistent use across all sexual encounters. Consequently, estimates based on these different measures should not be directly compared as equivalent indicators.

Lépine et al. [5] used a list experiment to examine condom use among FSWs in Senegal. The study reported condom use among HIV-positive FSWs at 34%, which was 47 percentage points lower than the estimate among HIV-negative FSWs. This finding illustrates the value of considering measurement approaches when interpreting sensitive self-reported behaviors. However, the result should be interpreted within the specific study context and should not be generalized as evidence of a uniform direction or magnitude of social desirability bias across all FSW populations.

The number and type of sexual partners may also influence HIV risk. Sexual relationships with clients and non-paying partners may involve different expectations and levels of condom negotiation. In some circumstances, condom use may be affected by relationship dynamics, trust, financial dependence, or partner resistance. Studies examining sexual practices and condom-use patterns among FSWs have considered these behaviors in different settings, including Sri Lanka, Tanzania, Mozambique, and Nigeria [14], [20], [21], [23]. These findings indicate that prevention interventions should consider the diversity of FSWs' sexual relationships rather than focusing exclusively on client encounters.

Violence was reported as an important interpersonal determinant in several studies. Physical, sexual, or intimate partner violence may limit FSWs' ability to negotiate condom use and may increase vulnerability to HIV-related risks. Violence may also intersect with economic insecurity and stigma, further constraining access to prevention and health services. Research has examined the association between gender-based violence and sexual or drug-related HIV risk among FSWs [4], while a global systematic review and meta-analysis has synthesized evidence on the impact of violence on HIV outcomes among sex workers [27]. These findings support the integration of violence prevention, referral pathways, and confidential support services into HIV prevention programs for FSWs.

3.4.3. Community- and Structural-Level Determinants

Community- and structural-level determinants included stigma, limited access to condoms and HIV prevention services, economic insecurity, and barriers to health care. These factors may shape the conditions in which FSWs make decisions about sexual health and prevention. Unlike individual-level factors, structural determinants may require changes in service delivery, institutional practices, and the broader social environment [3], [7].

Stigma and discrimination were reported in several included studies. Stigma may discourage FSWs from seeking HIV testing, accessing prevention services, or disclosing relevant health information to providers. Negative experiences in health care settings may further reduce trust in services and contribute to delayed care-seeking. Research has documented the relationship between HIV- and sex-work-related stigma and quality of life among FSWs living with HIV [30]. The UNAIDS report also identifies stigma, discrimination, violence, and punitive legal environments as barriers to HIV and sexual and reproductive health services for sex workers [1]. Therefore, accessible and non-discriminatory health services are important components of HIV prevention for FSWs.

Limited access to condoms and prevention services was also identified in the included evidence. Access may be affected by service availability, cost, confidentiality concerns, and the acceptability of services. Structural research on immigrant sex workers has highlighted the relationship between structural determinants, access to HIV/STI and sexual and reproductive health services, and condom use [3]. Even when FSWs have adequate HIV-related knowledge, limited access to prevention

commodities or supportive health services may restrict their ability to adopt protective behaviors. This suggests that prevention strategies should address both demand-side and supply-side barriers, in line with WHO recommendations for services tailored to key populations [2].

Economic insecurity may also influence HIV-related risk. Financial pressures can affect the ability to negotiate condom use or refuse sexual encounters under unfavorable conditions. Structural conditions and employment circumstances have been identified as relevant to HIV vulnerability and condom use among sex workers [3], [7]. These circumstances demonstrate that HIV prevention should not rely solely on individual behavior-change messages. Instead, interventions may benefit from combining education and prevention services with approaches that address the social and economic vulnerabilities experienced by FSWs. Evidence from a combination HIV risk-reduction and economic empowerment intervention among women engaged in sex work also supports considering economic empowerment alongside HIV prevention [31].

Overall, the findings indicate that HIV risk among FSWs is shaped by interacting individual, interpersonal, and structural determinants. Prevention programs should therefore adopt a comprehensive approach that combines accessible HIV prevention services, condom availability, mental health support, violence response, and stigma reduction. Such an approach is consistent with international recommendations for comprehensive HIV prevention, diagnosis, treatment, and care for key populations [2] and with evidence highlighting the importance of structural determinants in shaping HIV-related vulnerability among sex workers [3], [7].

3.5. Limitations

This review has several limitations. First, the search was conducted using three databases, and relevant studies indexed in other databases may not have been identified. Second, the included studies used heterogeneous designs, populations, and measurements of HIV-related determinants, limiting the comparability of their findings. Third, many studies relied on self-reported behaviors, which may be affected by recall or social desirability bias. The use of different condom-use measures, including last-sex condom use and consistent condom use, further limits direct comparisons across studies. The list experiment reported by Lépine et al. [5] illustrates the importance of considering measurement methods when examining sensitive sexual behaviors.

Fourth, the predominance of cross-sectional studies limits the ability to establish temporal relationships or causal associations between the identified determinants and HIV risk. In addition, the review did not conduct a formal methodological quality appraisal of the included studies. The findings should therefore be interpreted with caution, particularly when comparing associations across studies with different methodological characteristics. Methodological guidance emphasizes the importance of clearly describing the review process and interpreting synthesized evidence in light of the characteristics of the included studies [11]. Despite these limitations, the review provides an integrated synthesis of individual, interpersonal, and structural determinants associated with HIV risk among FSWs and highlights the need for comprehensive, context-sensitive prevention strategies.

4. Conclusion

Among female sex workers based on 18 articles published between 2016 and 2026. Inconsistent condom use was the most frequently reported determinant (16 of 18 articles; 88.9%), followed by alcohol consumption and drug use (10 of 18; 55.6%), sexual violence (8 of 18; 44.4%), and multiple sexual partnerships (7 of 18; 38.9%). Depression and mental health disorders, limited HIV knowledge, anal sex practices, stigma, limited access to condoms, and low income were also documented across the included studies. When organized through the social-ecological model, these determinants operated simultaneously at individual, interpersonal, community, and structural levels, indicating that HIV risk is produced by the interaction of personal, relational, and environmental factors rather than by any single variable.

The review also revealed research gaps that remain under-explored within the 18 included studies. Only three studies used longitudinal designs, so the causal pathways linking determinants to HIV risk remain largely untested. Client-level determinants, partner dynamics, and the effects of structural interventions, such as legal protection and economic empowerment, were rarely examined directly. Future research should therefore prioritize longitudinal and intervention studies, apply consistent measurement of risk behaviors across settings, and involve female sex workers in the design of prevention research. Practically, these findings provide an evidence base for combination HIV prevention programs that integrate individual counseling, interpersonal negotiation support, violence prevention, stigma reduction, economic empowerment, and expanded access to condoms and HIV testing services for female sex workers.

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