

Sexual behavior, serological profile and use of psychoactive substances among sex workers



Comportamento sexual, perfil sorológico e uso de substâncias psicoativas entre profissionais do sexo

Comportamiento sexual, perfil serológico y consumo de sustancias psicoactivas entre trabajadoras sexuales

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How to cite this article:

Camargo Júnior EB, Rodrigues Júnior NS, Silva GG, Santos ACP, Marques CC, Moreira B. Sexual behavior, serological profile and use of psychoactive substances among sex workers. Rev Gaúcha Enferm. 2025;46(spe1):e20240305. <https://doi.org/10.1590/1983-1447.2025.20240305.en>

ABSTRACT

Objective: To analyze the prevalence of sexually transmitted infections (STIs) and the use of psychoactive substances among sex workers and their relationship with sexual behavior.

Method: Cross-sectional study conducted in the interior of the state of Goiás, Brazil, with sex workers. Sexual behaviors were assessed and information on substance use was obtained through the Alcohol, Smoking and Substance Involvement Screening. Laboratory tests detected human immunodeficiency virus (HIV), syphilis, hepatitis B, and hepatitis C. Descriptive analyses, chi-square, and logistic regression were performed.

Results: A total of 104 sex workers (88.4% women) participated in the study. The prevalence of STIs was HIV (1.9%), syphilis (14.4%), hepatitis B serological scar (3.8%), and hepatitis C (1.9%). Inconsistent condom use was reported by 64.4% of sex workers. The most prevalent patterns of substance abuse/dependence were tobacco (53.8%), alcohol (43.3%), cannabis (29.8%) and cocaine (26.9%). No significant associations were identified between condom use and substance use.

Conclusion: A high prevalence of syphilis, inconsistent condom use, and patterns of substance abuse/dependence were observed among sex workers. The findings reinforce the need for effective combined STI prevention strategies, harm reduction actions, and specific care interventions for this vulnerable population.

Descriptors: Sexual behavior; Serology; Sexually transmitted infections; Drugs; Sex workers.

RESUMO

Objetivo: Analisar a prevalência de infecções sexualmente transmissíveis (IST) e uso de substâncias psicoativas entre profissionais do sexo e sua relação com o comportamento sexual.

Método: Estudo transversal, realizado no interior do estado de Goiás, Brasil, com profissionais do sexo. Comportamentos sexuais foram avaliados e informações sobre o uso de substâncias foram obtidas pelo *The Alcohol, Smoking and Substance Involvement Screening*. Exames laboratoriais detectaram o vírus da imunodeficiência humana (HIV), sífilis, hepatite B e hepatite C. Foram realizadas análises descritivas, qui-quadrado e regressão logística.

Resultados: Participaram 104 profissionais do sexo (88,4% mulheres). As prevalências de IST foram: HIV (1,9%), sífilis (14,4%), cicatriz sorológica de hepatite B (3,8%) e hepatite C (1,9%). O uso inconsistente de preservativo foi relatado por 64,4% dos profissionais do sexo. Com maior padrão de uso abusivo/dependência verificou-se o tabaco (53,8%), álcool (43,3%), maconha (29,8%) e cocaína (26,9%). Não foram identificadas associações significativas entre o uso de preservativo e o uso de substâncias.

Conclusão: Evidenciou-se elevada prevalência de sífilis, o uso inconsistente de preservativo e o padrão de uso abusivo/dependência de substâncias entre profissionais do sexo. Os achados reforçam a necessidade de estratégias efetivas de prevenção combinada de IST, ações de redução de danos e intervenções assistenciais específicas para essa população vulnerável.

Descritores: Comportamento sexual; Sorologia; Infecções sexualmente transmissíveis; Drogas; Profissionais do sexo.

RESUMEN

Objetivo: Analizar la prevalencia de infecciones de transmisión sexual (ITS) y consumo de sustancias psicoactivas entre trabajadoras sexuales y su relación con el comportamiento sexual.

Método: Estudio transversal realizado en el interior del estado de Goiás, Brasil, con trabajadoras sexuales. Se evaluaron las conductas sexuales y se obtuvo información sobre el consumo de sustancias mediante la Prueba de Detección de Alcohol, Tabaquismo y Consumo de Sustancias. Las pruebas de laboratorio detectaron el virus de la inmunodeficiencia humana (VIH), sífilis, hepatitis B y hepatitis C. Se realizaron análisis descriptivos, chi-cuadrado y regresión logística.

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Resultados: Participaron en el estudio 104 trabajadoras sexuales (88,4 % mujeres). La prevalencia de ITS fue: VIH (1,9 %), sífilis (14,4 %), cicatriz serológica de hepatitis B (3,8 %) y hepatitis C (1,9 %). El 64,4 % de las trabajadoras sexuales reportó uso inconsistente del preservativo. Se observaron mayores patrones de uso abusivo/dependencia de tabaco (53,8%), alcohol (43,3%), cannabis (29,8%) y cocaína (26,9%). No se identificaron asociaciones significativas entre el uso del preservativo y el consumo de sustancias.

Conclusión: Se evidenció una alta prevalencia de sífilis, un uso inconsistente del preservativo y un patrón de abuso/dependencia de sustancias entre las trabajadoras sexuales. Los hallazgos refuerzan la necesidad de estrategias eficaces combinadas de prevención de ITS, acciones de reducción de daños e intervenciones de atención específicas para esta población vulnerable.

Descriptores: Comportamiento sexual; Serología; Infecciones de transmisión sexual; Drogas; Trabajadoras sexuales.

INTRODUCTION

Sex workers, defined as individuals who receive money in exchange for consensual sexual services or erotic performances, are among the populations most vulnerable to sexually transmitted infections (STIs), facing structural challenges that hinder the adoption of effective preventive practices⁽¹⁾. Exposure to multiple partnerships, negotiation of condom use, and the use of psychoactive substances are contributing factors to the increased prevalence of STIs⁽²⁾.

The high burden of STIs among sex workers has been evidenced in different contexts. A study conducted in 12 Brazilian cities, found that the HIV rate among these workers was estimated at 5.3%.⁽³⁾ The global prevalence of HIV among sex workers, reported by 85 countries, is 2.5%, ranging from 0% to 62.3%.⁽⁴⁾ In addition to HIV, other STIs, such as syphilis and viral hepatitis, also have a high incidence in this group, representing a significant public health problem due to high reporting rates and their implications for morbidity and mortality^(5,6). The high STI rates among sex workers are directly associated with multiple vulnerability factors, including limited access to healthcare services, difficulties in consistently adopting preventive measures, and engagement in risky sexual behaviors.

Risky sexual behavior refers to practices that increase the likelihood of STI transmission and is associated to multiple individual and contextual factors. Inconsistent condom use and multiple sexual partners are examples of risky sexual behaviors, which pose significant challenges to reducing STIs among sex workers⁽⁷⁾. Previous evidence indicates that between 25.6% and 32.1% of sex workers reported inconsistent condom use^(8,9), and this practice was associated with an increased risk of STI diagnosis in this population⁽¹⁰⁾.

It is important to highlight that inconsistent condom use, both with clients and steady partners, constitutes a significant risky sexual behavior among sex workers. Studies point out that this practice represents one of the main challenges for preventive interventions in this population, being associated with structural factors, occupational stigmas, sexual negotiation dynamics, and use of psychoactive substances^(8,9,10). The World Health Organization defines

psychoactive substances as those which, when ingested or administered, act on the central nervous system, altering its function and potentially causing changes in mood, perception, behavior, and states of consciousness⁽¹¹⁾.

Abuse of psychoactive substance can impair judgment, reduce the ability to negotiate condom use, and increase vulnerability to STIs⁽⁹⁾. A systematic review and meta-analysis estimated the prevalence of problematic alcohol use among female sex workers at 41%⁽¹²⁾, while another study identified prevalences of 21.5% for amphetamines and 16.9% for cannabis⁽¹³⁾. Given the high prevalence of psychoactive substance use in this population group, it is essential to understand the relationship between use of substance and sexual behavior in order to generate evidence that supports more effective prevention and harm reduction strategies.

Scientific literature shows that alcohol and other drug use is associated with greater involvement in unprotected sexual practices^(12,14). A study conducted in Brazil with female sex workers found that abusive alcohol use was associated with a higher likelihood of inconsistent condom use⁽¹⁵⁾. Similarly, another study conducted in Kenya showed that problematic use of illicit substances, such as cannabis and amphetamines, was significantly associated with a higher risk of inconsistent condom use among female sex workers⁽¹³⁾.

Despite the relevance of this topic, there are gaps in the literature, especially regarding the relationship between substance use and risky sexual behavior among sex workers, with an emphasis on the Brazilian context. It is important to note that existing studies often focus on samples composed exclusively of female sex workers^(6,9,12,13,15) which limits understanding of the diversity of experiences within this population group. Furthermore, there is a lack of studies using validated instruments to assess the patterns of consumption of different classes of substances^(12,16). The present study aims to overcome this limitation by including a more diverse sample and using a validated instrument to assess the patterns of consumption of different classes of substances. Therefore, it is necessary to investigate this relationship, considering that substance use may contribute to the adoption of risky sexual behaviors, particularly inconsistent condom use, consequently increasing vulnerability to STIs.

Considering these gaps, this study aims to provide evidence on the relationship between sexual behaviors and substance use, contributing to the development of more effective prevention strategies. Given this scenario, the present study seeks to answer the following questions: What is the prevalence of STIs among sex workers? Is there an association between the use of psychoactive substance and risky sexual behavior in this population? The objective of the study was to analyze the prevalence of STIs and use of psychoactive substance among sex workers and their relationship with sexual behavior.

■ METHOD

This is a cross-sectional, analytical study complied with the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

The research was conducted in Rio Verde, a municipality in the interior of the state of Goiás, Brazil, with an estimated population of 247,259. Data were collected through interviews using a standardized instrument covering sociodemographic variables, sexual behavior, and alcohol and drug use, as well as laboratory tests for HIV, syphilis, and hepatitis B and C.

The target population for this study consisted of sex workers aged 18 or older who reported having had at least one sexual intercourse in exchange for money in the last 30 days. Individuals with cognitive impairments, especially those related to psychoactive substance use, which could compromise their understanding of the data collection instrument, were excluded. The convenience sample consisted of 104 sex workers invited between February and May 2023.

Participant recruitment and data collection took place in locations previously mapped by the researchers, including workplaces and boarding houses where sex workers lived. This dynamic was determined by the researchers to ensure greater accessibility and adherence to the study. Initial contact was made in together with teams from the municipal healthcare network, who already had experience with this population. At the interview sites, sex workers were informed about the study objectives and invited to voluntarily participate in the study. Data collection was conducted in areas within the interview site that guaranteed privacy and confidentiality, ensuring a private space for the interview. Regardless of participation in the study, all sex workers approached had access to laboratory testing for STIs. Interviews were conducted by trained researchers and lasted an average of 25 minutes.

The sociodemographic variables assessed were: sex (male and female); age in complete years, calculated using the date of birth and presenting the average age; self-reported skin color (black and non-black); marital status (with and without

a partner); children (none, one, two or more); housing (with family or friends and alone); years of schooling (from 4 to 7 years, from 8 to 11 years and 12 years or more); monthly income in minimum wages (up to 1; from 2 to 4 and 5 or more).

Participants' sexual behavior was assessed using a questionnaire from the Information Counseling and Testing Centers Information System (*Sistema de Informação dos Centros de Testagem e Aconselhamento* – SI-CTA)⁽¹⁷⁾ which included the following questions: length of time working as a sex worker (up to 24 months; more than 24 months), types of sexual relations (with women, men, or both), number of clients per day (up to 3; 4 or more) and per month (up to 20; 21 to 40; 41 or more), and whether they had oral or anal sex in the past month (yes or no).

Condom use in the last month, both with steady partners and with clients, was considered the dependent variable. For its definition, participants answered the questions: "How often did you use a condom when having sexual intercourse with clients in the last month?" and "How often did you use a condom when having sexual intercourse with your steady partner in the last month?" Response options included: "Never", "Rarely", "Frequently", and "Always". For analysis purposes, any response other than "Always" was classified as inconsistent condom use.

After the interviews, blood samples were collected by venipuncture in a private space within the interview and screening locations, ensuring privacy and safety. The samples were packaged and transported to the Counseling and Testing Center (CTC) following biosafety protocols for serological testing for HIV, syphilis, and hepatitis B and C. Participants were instructed to return to the CTC within five business days to receive their results, along with post-test counseling. Those with positive results referred to follow-up and treatment at specialized public healthcare units.

The serological profile assessment, performed through laboratory analysis, followed the recommendations of the Department of STI/AIDS and Viral Hepatitis of the Brazilian Ministry of Health⁽¹⁸⁾. Laboratory analysis was essential for determining the prevalence of STIs in the study population, providing an accurate diagnosis and helping to identify the vulnerability of this population.

HIV screening was performed by immunochromatography. Reactive samples were subjected to a second test. If both tests were positive, a new sample was collected by fingerstick and submitted to the Abon test for confirmation. Subsequently, viral nucleic acid was quantified by PCR at the regional reference laboratory.

Laboratory diagnosis of syphilis was performed using treponemal and non-treponemal assays, using microparticle chemiluminescence and VDRL. In cases of discordant results,

an immunochromatography test was used. Diagnosis of HBV infection was performed by chemiluminescence, using HBsAg and total anti-HBc assays, both using the Architect – Abbott system. The sample was considered reactive for HBV if both markers were positive. The anti-HBs marker was used to assess vaccine immunity (isolated anti-HBs) or previous infection (total anti-HBs and reactive anti-HBs), also by chemiluminescence.

To determine HCV infection, anti-HCV antibodies were tested by chemiluminescence and subsequently confirmed by PCR at the regional reference laboratory. The serological test results were categorized as: HIV, syphilis, and hepatitis C (reactive or non-reactive); hepatitis B (reactive, non-reactive, serological scar, or vaccine response).

The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST), developed by the World Health Organization, identifies the risk associated with the use of nine substances (tobacco, alcohol, cannabis, cocaine, amphetamines, inhalants, hypnotics, hallucinogens, and opioids) in the last three months. The Brazilian version demonstrated satisfactory psychometric properties for use in primary and secondary healthcare services⁽¹⁹⁾.

The ASSIST assesses several domains through objective, multiple-choice questions for each substance used, related to duration of use, recent use, desire to use, health, social, and legal problems, difficulty in stopping use, among others. The tool is scored by adding the total values of the responses for each substance, ranging from 0 to 39. Higher scores indicate greater risk and allow participants to be classified into three groups: low risk; moderate risk; and high risk. The low-risk classification refers to occasional use, moderate risk is characterized by abuse, and high risk relates to probable dependence on the assessed substance. Due to the small number of participants categorized as high risk, two categories were adopted in this study. According to the ASSIST manual, scores equal to or below 3 (10 for alcohol) were considered occasional use, and scores equal to or above 4 (11 for alcohol) were categorized as abuse/dependence⁽¹¹⁾.

Analyses were performed using the Statistical Package for the Social Sciences (SPSS) (version 24), with descriptive and bivariate statistics. Categorical variables were presented as absolute and relative frequencies, while numerical variables were described as means and standard deviations.

Bootstrapping procedures (1,000 resamplings; 95% BCa CI) were applied to increase the reliability of the results, correct for any deviations from normality, and provide confidence intervals for the relative frequencies, representing population parameters of sex workers. To assess the association between

condom use and psychoactive substance consumption, bivariate logistic regression analyses were performed. The model estimated the odds ratio (OR) and the respective 95% confidence intervals (95% CI), with condom use as the dependent variable (consistent use vs. inconsistent use) and the different risk classifications of substance use, according to ASSIST, as independent variables. Each substance was analyzed separately, and participants categorized as occasional users were considered the reference group. The statistical significance level adopted was $p < 0.05$ (20-22).

The research was approved by the Research Ethics Committee (REC) of the *Universidade de Rio Verde – UniRV*, under CAEE number 28421820,1,0000,5077, in compliance with the recommendations of Resolution 466/12 of the National Health Council (*Conselho Nacional de Saúde – CNS*). Before the start of the interview, all participants received detailed information about the study, including its objectives, procedures, and data confidentiality. After this information, those who agreed to participate signed the Informed Consent Form (ICF).

■ RESULTS

A total of 110 sex workers were approached during the data collection, and there were 6 (5.45%) refusals, resulting in a final sample of 104 participants. Regarding sociodemographic characteristics, the average age of the sex workers evaluated was 30.53 (± 7.99) years, predominantly female, 93 (88.4%), and Black, 72 (69.2%). Regarding marital status, 99 (95.2%) sex workers lived without a partner, 67 (64.4%) had children, 76 (73.1%) lived with family or friends, 49 (47.1%) had between 8 and 11 years of schooling, and 67 (64.4%) had a monthly income between 2 and 4 minimum wages (Table 1).

Table 2 presents sexual behaviors and the results of serological tests for STIs. Most participants had been working as sex workers for more than 24 months (51%). Among women, 97.8% reported inconsistent use of female condoms. Sexual relations were mostly with men (77.2%), and the majority served, on average, 4 or more clients per day (64.4%) and 41 or more per month (67.3%).

In the last month, 64.4% of sex workers reported inconsistent use of male condom with steady partners or clients, 81.7% performed oral sex, and 36.5% performed anal sex. Serological tests revealed that 1.9% tested positive for HIV, 14.4% tested positive for syphilis, 3.8% had a hepatitis B serological scar, 31.7% had immunity due to a vaccine response (anti-HBs), and 1.9% tested positive for hepatitis C.

Table 1 – Sociodemographic characteristics of sex workers. Rio Verde, GO, Brazil, 2023

Variable	Mean	Standard Deviation
Age	30.53	7.99
	N*(%†)	95% CI‡
Sex		
Female	93 (88.4)	82.7 – 95.2
Male	11 (10.6)	4.8 – 17.3
Skin color		
Black (Black/Brown)	72 (69.2)	59.6 – 77.9
Non-Black	32 (30.8)	22.1 – 40.4
Marital status		
Without partner	99 (95.2)	91.3 – 99
With partner	5 (4.8)	1 – 8.7
Children		
None	37 (35.6)	20 – 38.9
1 child	34 (32.7)	26.3 – 46.3
2 or more children	33 (31.7)	25.3 – 45.3
Living situation		
With family or friends	76 (73.1)	64.4 – 80.8
Alone	28 (26.9)	19.2 – 35.6
Schooling		
4 to 7 years	24 (23.1)	15.4 – 30.8
8 to 11 years	49 (47.1)	37.5 – 56.7
12 years or more	31 (29.8)	21.2 – 39.4
Monthly income		
Up to 1 wage	24 (23.1)	15.4 – 30.8
2 to 4 wages	67 (64.4)	54.8 – 74
5 or more wages	13 (12.5)	6.7 – 20.2

Source: Authors, 2023.

*N= Absolute number; †%= Percentage; ‡95% CI = 95% confidence interval

Table 2 – Frequencies and confidence intervals for sexual behaviors and serological profile for sexually transmitted infections among sex workers. Rio Verde, GO, Brazil, 2023

Variable	Sample	N*(%†)	95% CI‡
Time working as a sex worker	104		
Up to 24 months		51 (49)	39.4 – 58.7
> 24 months		53 (51)	41.3 – 60.6
Female condom use	93		
Inconsistent use		91 (97.8)	94.6 – 99.9
Consistent use		2 (2.2)	0.01 – 5.4
Sexual intercourse	104		
Women		4 (3.5)	0.01 – 8.8
Men		80 (77.2)	64.9 – 87.7
Women and men		20 (19.3)	10.5 – 29.8
Number of clients per day	104		
Up to 3 clients		37 (35.6)	26.9 – 45.2
4 or more clients		67 (64.4)	54.8 – 73.1
Number of clients per month	104		
Up to 20 clients		16 (15.4)	9.6 – 22.1
21 to 40 clients		18 (17.3)	10.6 – 25
41 or more clients		70 (67.3)	57.7 – 76
Male condom use	104		
Inconsistent use		67 (64.4)	55.8 – 73.1
Consistent use		37 (35.6)	26.9 – 44.2
Oral sex	104		
No		19 (18.3)	10.6 – 25.9
Yes		85 (81.7)	74.1 – 89.4

Table 2 – Cont.

Variable	Sample	N*(%†)	95% CI‡
Anal sex	104		
No		66 (63.5)	53.9 – 72.1
Yes		38 (36.5)	27.9 – 46.1
HIV	104		
Non-reactive		102 (98.1)	95.2 – 99.9
Reactive		2 (1.9)	0.01 – 4.8
Syphilis	104		
Non-reactive		89 (85.6)	78.7 – 92.3
Reactive		15 (14.4)	7.7 – 21.2
Hepatitis B	104		
Non-reactive		70 (67.3)	64.4 – 70.2
Serological scarring		4 (3.8)	1 – 7.7
Vaccine response		30 (28.9)	25.9 – 31.2
Hepatitis C	104		
Non-reactive		102 (98.2)	95.2 – 99.9
Reactive		2 (1.9)	0.01 – 4.8

Source: Authors, 2023.

*N= Absolute number; †%= Percentage; ‡95% CI = 95% confidence interval

Regarding the risk classification of use of the different classes of drugs evaluated, tobacco was the substance with the highest number of sex workers classified as abuse/dependence (53.8%), followed by alcohol (43.3%). Regarding illicit substances, cannabis had the highest prevalence of users with abuse/dependence (29.8%), followed closely by cocaine (26.9%). Abuse/dependence among sex workers was also identified for hallucinogens (5.8%), amphetamines (4.8%), inhalants (3.8%), hypnotics (3.8%), and opioids (1.9%) (Table 3).

The Table 4 presents the frequencies and association analyses between condom use with clients and the risk classifications for the use of different substances. Inconsistent condom use was most common among sex workers with abuse/dependence on cocaine (71.4%), followed by alcohol (68.9%) and tobacco (66.1%). However, bivariate logistic regression analyses showed no statistically significant associations between the use patterns of use of the different substance classes and condom use.

Table 3 – Pattern of substance use among sex workers. Rio Verde, GO, Brazil, 2023

Substance use pattern	N*(%†)	95% CI‡
Tobacco		
Occasional use	48 (46.2)	36.5 – 55.8
Abuse/dependence	56 (53.8)	44.2 – 63.5
Alcohol		
Occasional use	59 (56.7)	47.1 – 65.4
Abuse/dependence	45 (43.3)	34.6 – 52.9
Cannabis		
Occasional use	73 (70.2)	61.5 – 78.8
Abuse/dependence	31 (29.8)	21.2 – 38.5
Cocaine		
Occasional use	76 (73.1)	63.5 – 80.8
Abuse/dependence	28 (26.9)	19.2 – 36.5
Amphetamines		
Occasional use	99 (95.2)	91.3 – 99
Abuse/dependence	5 (4.8)	1.0 – 8.7
Inhalants		
Occasional use	100 (96.2)	92.3 – 99
Abuse/dependence	4 (3.8)	1 – 7.7
Hypnotics		
Occasional use	100 (96.2)	92.3 – 99
Abuse/dependence	4 (3.8)	1 – 7.7
Hallucinogens		
Occasional use	98 (94.2)	89.4 – 98.1
Abuse/dependence	6 (5.8)	1.9 – 10.6
Opioids		
Occasional use	102 (98.1)	95.2 – 100
Abuse/dependence	2 (1.9)	0.01 – 4.8

Source: Authors, 2023.

*N= Absolute number; †%= Percentage; ‡95% CI = 95% confidence interval

Table 4 – Distributions of substance use risk classifications according to condom use with clients. Rio Verde, GO, Brazil, 2023

Substance Risk Classification	Condom use			
	Consistent use N* (%†) 37 (35.6)	Inconsistent use N*(%†) 67 (64.4)	Odds ratio (95%CI‡)	p
Tobacco				
Occasional use	18 (37.5)	30 (62.5)	Reference	0.705
Abuse/dependence	19 (33.9)	37 (66.1)	1.17 (0.52 – 2.61)	
Alcohol				
Occasional use	23 (39)	36 (61)	Reference	0.407
Abuse/dependence	14 (31.1)	31 (68.9)	1.41 (0.62 – 3.21)	
Cannabis				
Occasional use	24 (32.9)	49 (67.1)	Reference	0.379
Abuse/dependence	13 (41.9)	18 (58.1)	0.67 (0.28 – 1.61)	
Cocaine				
Occasional use	29 (38.2)	47 (61.8)	Reference	0.367
Abuse/dependence	8 (28.6)	20 (71.4)	1.54 (0.60 – 3.95)	
Amphetamines				
Occasional use	35 (35.4)	64 (64.6)	Reference	0.833
Abuse/dependence	2 (40)	3 (60)	0.82 (0.13 – 5.15)	
Inhalants				
Occasional use	35 (35)	65 (65)	Reference	0.545
Abuse/dependence	2 (50)	2 (50)	0.53 (0.07 – 3.99)	
Hypnotics				
Occasional use	35 (35)	65 (65)	Reference	0.546
Abuse/dependence	2 (50)	2 (50)	0.53 (0.07 – 3.89)	
Hallucinogens				
Occasional use	35 (35.7)	63 (64.3)	Reference	0.906
Abuse/dependence	2 (33.3)	4 (66.7)	1.11 (0.19 – 6.37)	

Table 4 – Cont.

Substance Risk Classification	Condom use			p
	Consistent use	Inconsistent use	Odds ratio	
	N* (%†) 37 (35.6)	N*(%†) 67 (64.4)	(95%CI‡)	
Opioids				
Occasional use	36 (35.3)	66 (64.7)	Reference	
Abuse/dependence	1 (50)	1 (50)	0.54 (0.03 – 8.98)	0.672

Source: Authors, 2023.

*N= Absolute number; †%= Percentage; ‡95% CI = 95% confidence interval for the odds ratio

DISCUSSION

This study assessed sexual behaviors, STIs serological profiles, and patterns of substance use among sex workers. Regarding risky sexual behavior, 64.4% of participants reported inconsistent use of male condom. Laboratory tests indicated that syphilis was the most prevalent STI in the sample, with 14.4% testing positive. Regarding psychoactive substance use, tobacco (53.8%), alcohol (43.3%), and cannabis (29.8%) were the substances most frequently used in patterns of abuse or dependence. Despite the high prevalence of risky behaviors, such as inconsistent condom use and substance abuse, no statistically significant association was observed between these variables.

The results of this study showed a higher frequency of inconsistent condom use than observed in other studies. In the United States, the prevalence was 39.2% among sex workers⁽²⁰⁾. In a sample of sex workers in the Netherlands, inconsistent use was reported by 35.7% of women and 29.6% of men⁽²¹⁾. In the Brazilian context, few studies address condom use among sex workers. In one of the few investigations conducted, inconsistent condom use was identified in 20% of female sex workers, a considerably lower frequency than that found in this study (64.4%)⁽¹⁵⁾. Indeed, this is one of the first investigations to assess condom use among sex workers in the Brazilian context. When comparing condom use in the general population of Brazil, inconsistent condom use in the past 12 months was reported by 88.2% of the population, highlighting the magnitude of the issue of this sexual behavior as an important risk factor for STIs⁽²²⁾.

Our results indicated that syphilis was the most prevalent STI among sex workers, with 14.4% of participants testing positive through laboratory diagnosis (95% CI: 7.7–21.2). This percentage is similar to that reported in studies conducted

in other regions of Brazil. A study conducted in cities in the Amazon region identified a prevalence of 14.1% (95% CI: 9.8–17.8) among sex workers⁽⁶⁾. However, in some locations, such as the state of Pará, even higher rates were recorded, reaching 36.94%⁽²³⁾. These variations in syphilis prevalence between different regions may be related to disparities in access to STI prevention, diagnosis, and treatment services, especially in rural areas of the country, where healthcare coverage may be more limited⁽²⁴⁾.

The prevalence of HIV identified in this study (1.9%) was lower than the estimated global average for sex workers, which is 2.5%⁽⁴⁾. A 2016 study conducted in Brazilian capitals revealed an HIV prevalence of 5.3% among sex workers⁽³⁾, a rate higher than that found in the present investigation. These discrepancies may be associated with contextual factors, such as differences in testing services, prevention strategies adopted, and access to public policies aimed at risk reduction in this population.

Additionally, the National Harm Reduction Policy, aimed at minimizing social and health harms related to the problematic use of psychoactive substances has demonstrated a positive impact on reducing STI transmission⁽²⁵⁾. In addition, access to pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) for HIV has been expanded, with both provided free of charge by the Unified Health System (*Sistema Único de Saúde* – SUS) as part of prevention strategies⁽²⁶⁾. A study conducted in Brazil found that the adoption of a PrEP distribution policy reduced the rate of new HIV cases in the country by 7.8%⁽²⁷⁾. In this context, combination prevention, which integrates biomedical interventions (such as PrEP and PEP), behavioral interventions (such as promoting consistent condom use), and structural interventions (such as reducing stigma and discrimination), emerges as an essential approach for addressing the multiple vulnerabilities to which

sex workers are exposed. It is recommended that future studies consider including variables that assess knowledge, access, and use of these combination prevention strategies.

Regarding substance use, tobacco showed the highest prevalence of abusive or dependent use in our results, followed by alcohol. These findings reinforce the role of psychoactive substances as risk factors in the sexual health of sex workers. A cohort study of sex workers identified problematic alcohol use as a predictor of risky sexual behaviors, suggesting that interventions aimed at reducing substance use may be crucial in preventing STIs in this population group⁽¹³⁾.

The results on illicit substance use among sex workers revealed a considerable prevalence, with cannabis being the most prevalent drug for abuse/dependence (29.8%; 95% CI: 21.2–38.5%), followed by cocaine (26.9%; 95% CI: 19.2–36.5). These data reinforce the vulnerability of this group regarding illicit drug use. A systematic review study identified a 35% overall lifetime prevalence of illicit drug use among sex workers⁽²⁸⁾. In a study conducted in Kenya, a significant prevalence of harmful substance use was observed among sex workers. Approximately 29.9% of participants reported alcohol abuse/dependence, 21.5% of participants reported amphetamine abuse/dependence and 16.9% reported cannabis abuse/dependence, demonstrating that this risk behavior is a global phenomenon⁽¹³⁾.

The findings of this study indicate high rates of inconsistent condom use among sex workers who presented patterns of substance abuse or dependence. However, no statistically significant associations were identified between these variables. These results diverge from previous studies conducted in Brazil, which indicated a significant relationship between excessive alcohol consumption and inconsistent condom use among sex workers (OR = 5.07; 95% CI: 1.87–13.74)⁽¹⁵⁾. A systematic review evaluating young populations also found a significant association between alcohol and other drug use and inconsistent condom use⁽²⁾.

The absence of a statistically significant association between substance abuse/dependence and inconsistent condom use among sex workers suggests that this relationship may be more complex than a direct effect of substance use patterns on sexual behavior. An important aspect to consider is that the effect of consumption can vary depending on the frequency, quantity, and type of substance used. Alcohol, for instance, can impair decision-making and reduce condom negotiation, while stimulants, such as cocaine and amphetamines, can intensify impulsive behaviors in different ways. Furthermore, the interval between consumption and sexual activity may be a determining factor, given that the effects of some substances are transient and may not influence all decisions related to condom use^(29,30).

Despite the relevance of the findings, some limitations should be considered. The sample size may have impacted on the statistical analyses, reducing the power to detect subtle associations between the variables investigated. Furthermore, other variables that could act as mediators or moderators of this relationship were not analyzed, such as social support, access to healthcare services, length of professional experience, and mental health aspects, including impulsivity and depressive symptoms. Another limitation worth noting is the absence of sociodemographic variables in the bivariate logistic regression models, which could provide a broader understanding of the factors associated with risky sexual behavior and use of psychoactive substances. Future studies should consider these variables for a more comprehensive assessment of the relationship between substance use and inconsistent condom use among sex workers. Information on gender identity and sexual orientation was also not collected, which limits the identification of disparities among more vulnerable subgroups, such as transgender people, gays, lesbians, bisexuals, and other non-heterosexual identities.

The results of this study have important practical implications for health, with the potential to guide interventions aimed at preventing and controlling diseases in vulnerable populations. Public health policies need to implement programs that expand access to regular STI testing among sex workers, ensuring that these services are provided in accessible and confidential places. Furthermore, it is essential to develop practical harm-reduction interventions focused on substance use, such as offering drug addiction treatment programs and distributing prevention materials such as condoms and sterile syringes. Healthcare professionals should be trained to work directly in the areas where sex workers act, conducting regular educational campaigns on the risks of unprotected sexual behavior and the dangers of substance abuse. These actions can include preventive consultations, awareness workshops, and counseling to reduce risk behaviors, as well as promoting early detection and treatment of STIs.

■ CONCLUSION

This study identified a considerable proportion of risky sexual behavior, primarily due to inconsistent condom use among sex workers. Regarding STIs, syphilis had the highest prevalence, as identified through the serological profile assessment of sex workers. Despite the high frequency of substance abuse/dependence patterns, no significant associations were found with inconsistent condom use among sex workers.

This study contributes to the understanding of the serological profile, sexual behavior, and substance use among sex workers. The findings highlight the importance of further research, especially studies that explore other potential variables capable of influencing both the serological profile and sexual risk behaviors in this population. Given these vulnerabilities, there is a need to adopt combined prevention strategies that contextually integrate different interventions. Furthermore, the data point out to the need for practical interventions that integrate teaching aimed at the training of future healthcare professionals, empowering them to provide qualified and targeted care for this population, as well as fostering the development of specialized healthcare actions aimed at the specific needs of sex workers.

REFERENCES

- Harris MT, Shannon K, Krüsi A, Zhou H, Goldenberg SM. Social-structural barriers to primary care among sex workers: findings from a community – based cohort in Vancouver, Canada (2014–2021). *BMC Health Serv Res.* 2025;25(134):134. <https://doi.org/10.1186/s12913-025-12275-x>
- Silva RS, Bossonario PA, Ferreira MRL, Andrade RLP, Bonfim RO, Alencar V, et al. Factors associated with inconsistent condom use among young people: systematic review. *Rev Gaúcha Enferm.* 2024;45:e2030207. <https://doi.org/10.1590/1983-1447.2024.2030207>
- Braga LP, Szwarcwald CL, Damacena GN. Characterization of female sex workers in Brazilian state capitals: 2016. *Epidemiol Serv Saude.* 2020;29(4):e2020111 <https://doi.org/10.5123/S1679-49742020000400002>
- UNAIDS. HIV and sex workers in 2024 Global AIDS Update [Internet]. 2024 [cited 2024 Oct 28]. Available from: https://www.unaids.org/sites/default/files/media_asset/2024-unaids-global-aids-update-sex-workers_en.pdf
- Daka D, Hailemeskel G, Fenta DA. Prevalence of Hepatitis B Virus infection and associated factors among female sex workers using respondent-driven sampling in Hawassa City, Southern Ethiopia. *BMC Microbiol.* 2022;22(1):37. <https://doi.org/10.1186/s12866-022-02444-x>
- Souza RL, Santos Madeira LDP, Pereira MVS, Silva RM, Luna Sales JB, Azevedo VN, et al. Prevalence of syphilis in female sex workers in three countryside cities of the state of Pará, Brazilian Amazon. *BMC Infect Dis.* 2020;20(1):129. <https://doi.org/10.1186/s12879-020-4850-1>
- Ssenyonjo J, Mistler C, Adler T, Shrestha R, Kyambadde P, Copenhaver M. Examining HIV Knowledge and Sexually Risky Behaviors among Female Sex Workers in Kampala, Uganda. *Int J Environ Res Public Health.* 2024;21(2):163. <https://doi.org/10.3390/ijerph21020163>
- Kielhold K, Shannon K, Krüsi A, Valencia E, Pearson J, Goldenberg SM. Association between sex work occupational stigma and inconsistent condom use: findings from a community-based cohort of women sex workers in Vancouver, Canada (2014–2022). *J Epidemiol Community Health.* 2024;79(1):36–41. <https://doi.org/10.1136/jech-2024-221989>
- Muleia R, Banze AR, Damião SL, Baltazar CS. Patterns of inconsistent condom use and risky sexual behaviors among female sex workers in Mozambique. *BMC Public Health.* 2024;24:2711. <https://doi.org/10.1186/s12889-024-20236-y>
- Mukuku O, Kiakuvue YN, Numbi GY, Ruhindiza BM, Kakisingi C, Mwamba CM, et al. Assessing high-risk sexual practices associated with human immunodeficiency virus infection among young female sex workers in Lubumbashi, Democratic Republic of the Congo: a cross-sectional study. *AIDS Res Ther.* 2024;21(1):16. <https://doi.org/10.1186/s12981-024-00602-x>
- Humeniuk R, Edwards H, Ali R, Poznyak V, Monteiro MG. Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): manual de uso na atenção primária [Internet]. Fiocruz; 2020[cited 2024 Oct 28]. Available from: <https://www.arca.fiocruz.br/handle/icict/43471>
- Beksinska A, Karlsen O, Gafos M, Beattie TS. Alcohol use and associated risk factors among female sex workers in low- and middle-income countries: a systematic review and meta-analysis. *PLOS Glob Public Health.* 2023;3(6):e0001216. <https://doi.org/10.1371/journal.pgph.0001216>
- Beksinska A, Nyariki E, Kabuti R, Kungu M, Babu H, Shah P, et al. Harmful Alcohol and Drug Use Is Associated with Syndemic Risk Factors among Female Sex Workers in Nairobi, Kenya. *Int J Environ Res Public Health.* 2022;19(12):7294. <https://doi.org/10.3390/ijerph19127294>
- Llangari-Arizo LM, Sadiq ST, Márquez C, Cooper P, Furegato M, Zhou L, et al. Sexually transmitted infections and factors associated with risky sexual practices among female sex workers: a cross sectional study in a large Andean city. *PLOS ONE.* 2021;16(5):e0250117. <https://doi.org/10.1371/journal.pone.0250117>
- Magalhães RLB, Sousa LRM, Gir E, Galvão MTG, Oliveira VMC, Reis RK. Factors associated to inconsistent condom use among sex workers. *Rev Latino-Am Enfermagem.* 2019;27:e3226. <https://doi.org/10.1590/1518-8345.2951.3226>
- Yeo EJ, Hlongwane K, Otwombe K, Hopkins KL, Variava E, Martinson N, et al. Key risk factors for substance use among female sex workers in Soweto and Klerksdorp, South Africa: a cross-sectional study. *PLOS One.* 2022;17(1):e0261855. <https://doi.org/10.1371/journal.pone.0261855>
- Barro A, Cardoso AJC, Nascimento BY, Aids BMSSPSCND. Sistema de informação dos centros de testagem e aconselhamento em Aids Si-CTA: manual de utilização [Internet]. 2002[cited 2024 Oct 28]. Available from: <https://pesquisa.bvsalud.org/bvsms/resource/pt/mis-32309>
- Ministério da Saúde (BR). Departamento de HIV, Aids, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. Manuais técnicos para diagnóstico [Internet]. 2021 [cited 2024 Oct 15]. Available from: <https://www.gov.br/aids/pt-br/central-de-conteudo/manuais-tecnicos-para-diagnostico>
- Henrique IFS, De Micheli D, Lacerda RB, Lacerda LA, Formigoni MLOS. Validação da versão brasileira do teste de triagem do envolvimento com álcool, cigarro e outras substâncias (ASSIST). *Rev Assoc Médica Bras.* 2004;50:199–206. <https://doi.org/10.1590/S0104-42302004000200039>
- Decker MR, Park JN, Allen ST, Silberzahn B, Footer K, Huettner S, et al. Inconsistent condom use among female sex workers: partner-specific influences of substance use, violence, and condom coercion. *AIDS Behav.* 2020;24(3):762–74. <https://doi.org/10.1007/s10461-019-02569-7>
- Kampman CJG, Peters CMM, Koedijk FDH, Berkenbosch TS, Hautvast JLA, Hoebe CJP. Sexual risk and STI testing behaviour among Dutch female and male self-employed sex workers; a cross-sectional study using an Internet based survey. *BMC Public Health.* 2022;22(1):1155. <https://doi.org/10.1186/s12889-022-13582-2>
- Felisbino-Mendes MS, Araújo FG, Oliveira LVA, Vasconcelos NM, Vieira MLFP, Malta DC. Sexual behaviors and condom use in the Brazilian population: analysis of the National Health Survey, 2019. *Rev Bras Epidemiol.* 2021;24:e210018. <https://doi.org/10.1590/1980-549720210018.supl.2>

23. Cavalcante NDS, Lima HRR, Tabosa DF, Barbosa ESS, Costa NPS, Costa LM, et al. Syphilis in female sex workers: an epidemiological study of the highway system of the state of Pará, northern Brazil. *Rev Soc Bras Med Trop*. 2019;52:e20180064. <https://doi.org/10.1590/0037-8682-0064-2018>
24. Ramos Jr AN. Persistence of syphilis as a challenge for the Brazilian public health: the solution is to strengthen SUS in defense of democracy and life. *Cad Saúde Pública*. 2022;38(5):PT069022. <https://doi.org/10.1590/0102-311XPT069022>
25. Strong C, Huang P, Li CW, Ku SWW, Wu HJ, Bourne A. HIV, chemsex, and the need for harm-reduction interventions to support gay, bisexual, and other men who have sex with men. *Lancet HIV*. 2022;9(10):e717–25. [https://doi.org/10.1016/S2352-3018\(22\)00124-2](https://doi.org/10.1016/S2352-3018(22)00124-2)
26. Ministério da Saúde (BR). Protocolo Clínico e Diretrizes Terapêuticas (PCDT) para Profilaxia Pré-Exposição (PrEP) Oral à Infecção pelo HIV – Departamento de HIV, Aids, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis [Internet]. 2025[cited 2024 Oct 28]. Available from: <https://www.gov.br/aids/pt-br/central-de-conteudo/pcdts/protocolo-clinico-e-diretrizes-terapeuticas-para-profilaxia-pre-exposicao-prep-oral-a-infeccao-pelo-hiv.pdf/view>
27. Cavalcanti FMS. Scaling up PrEP: evidence from a policy to prevent HIV in Brazil [Internet]. 2022[cited 2024 Oct 28]. Available from: <https://hdl.handle.net/10438/32015>
28. Goldenberg SM, Morgan Thomas R, Forbes A, Baral S. (Eds.). *Sex Work, Health, and Human Rights: global inequities, challenges, and opportunities for action* [Internet]. Springer; 2021[cited 2024 Oct 28]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK585696/>
29. Palfai TP, Luehring-Jones P. How alcohol influences mechanisms of sexual risk behavior change: contributions of alcohol challenge research to the development of HIV prevention interventions. *AIDS Behav*. 2021;25(3):314–32. <https://doi.org/10.1007/s10461-021-03346-1>
30. Pedersen CJ, Wickersham JA, Altice FL, Kamarulzaman A, Khoshnood K, Gibson BA, et al. Prevalence and correlates of active amphetamine-type stimulant use among female sex workers in Malaysia. *Front Psychiatry*. 2022;13:879479. <https://doi.org/10.3389/fpsy.2022.879479>

■ Data and material availability:

Access to the dataset is available upon request from the corresponding author.

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Associate editor:

Gabriella de Andrade Boska

Editor-in-chief:

João Lucas Campos de Oliveira

Received: 10.08.2024

Approved: 07.01.2025