

# Knowledge of PEP and PrEP Among People Living with HIV/aids in Brazil

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## Research article

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# Abstract

**Background:**The objective was to analyze the factors associated with knowledge of PrEP and PEP among people living with HIV/aids in Brazil. Cross-sectional analytical study carried out among people living with HIV/aids treated at five specialized services in the city of Ribeirão Preto, São Paulo, Brazil.

**Methods:**Logistic regression analysis was used to assess the influence of independent variables on dependent variables: having knowledge about PrEP and PEP. Of the 397 participants, 140 (35.26%) were heterosexual women, aged 40 to 49 years (36.27%).

**Results:** Participants with less than 11 years of study (adjusted odds: 0.2903; 95% CI: 0.1340-0.6007); who did not have a low viral load or did not know how to report viral load (adjusted odds: 0.2931; 95% CI: 0.0961-0.8398) and those with casual partners (adjusted odds: 0.2931; 95% CI: 0.0961- 0.8398) were less likely to have knowledge about the PrEP. MSM (adjusted odds: 2.8788; 95% CI: 1.5912-5.3092) and those who used alcohol during sexual intercourse (adjusted odds: 1.7305; 95% CI: 1.0656-2.8248) were more likely to have knowledge about the PEP.

**Conclusions:** Awareness about PrEP and PEP should be widely disseminated by health promoting institutions in order to expand knowledge of these two methods.

## Background

Infection caused by the Human Immunodeficiency Virus (HIV), more than three decades after notification of the first cases, remains a worldwide public health problem, despite all the advances achieved in the treatment and expansion of prevention strategies. It is estimated that approximately 37.9 million people were living with HIV worldwide by the end of 2018[1].

In 2018, approximately 44,000 new cases of HIV infection were reported in Brazil, of which 16,586 (37.7%) were in the Northeast region. From 1980 to June 2019, 966,058 AIDS cases were reported in Brazil; with regard to HIV cases (without AIDS), 300,496 were reported from 2007 to June 2019 [2]. However, the epidemic disproportionately affects key populations in the country [2]. The main route of HIV transmission is sexual, among people aged 13 and over. National statistics indicate that 78.9% were infected through unsafe sexual practices, with 86.9% among women[2].

Condom use was central as a method of prevention of sexual transmission of HIV widely recommended and widespread throughout the historical path of the epidemic [3]. In fact, condoms have advantages in terms of low cost, easy access and low adverse effects when they are adopted consistently and correctly. In addition, they are effective in preventing other sexually transmitted infections[4]and considered fundamental to a comprehensive approach to prevention [5].

However, this strategy does not eliminate the risk of HIV transmission. A systematic review study showed that the consistent use of condoms (for all acts of vaginal penetration) in heterosexual relationships results in an 80% reduction in the incidence of HIV[6]and 70% among male homosexuals (for anal sex)[7].In addition, studies have shown inconsistent condom use among partners living with HIV and relating to HIV-negative people or with unknown HIV status [4, 8].

Consistent condom use among people living with HIV (PLHIV) comes up against gender norms and psychosocial, cultural and relationship barriers that imply vulnerabilities for HIV-negative sexual partners[4].

Therefore, important advances in the field of HIV prevention have provided paradigm shifts with the implementation of combined biomedical, behavioral and structural interventions[9]. Combined prevention is a broader concept that combines different prevention methods that can interfere with the sexual transmission of the virus, with the use of antiretrovirals, including Pre-Exposure Prophylaxis (PrEP) and Post-Exposure Prophylaxis (PEP), termed as biomedical interventions. Such strategies have been considered to be effective in reducing the risk of HIV transmission and are part of combined prevention[10].

PEP is a method used in situations where sexual exposure to HIV occurs, especially when the sexual act was performed in the absence of condoms, or in times of condom failures, such as breakage or problems with structural characteristics due to inappropriate use. Their use can contribute to reducing the risk of acquiring the infection through a therapeutic regimen, with antiretrovirals[10].

PrEP is an important advance in prevention[11] and is used before exposure to the virus, recommended for homosexuals, men who have sex with men (MSM), trans people (transsexuals and transvestites), sex workers, people who use drugs, those who are incarcerated, serodiscordant partnerships, taking into account also the repetitions of anal and / or vaginal sexual practices with penetration without the use of condoms, frequency of sexual relations with casual partners, quantity and diversity of sexual partnerships, contexts of transactional sex (for money, valuables, housing, drugs, among others), history of sexually transmitted infections and repeated search for post-exposure prophylaxis (PEP) [12–14]. This was implemented in Brazil, by the public health system on December 1, 2017 [15].

Although these two biomedical interventions based on drug treatment are considered essential for prevention, there are gaps in the knowledge of both HIV-negative/unknown people and among PLHIV. When revisiting studies that investigated the awareness of PrEP and PEP, it was found that the levels were below expectations. Even with the release of the use of PrEP in the United States[3]. Similar results were observed among Nigerian university students[16]. In Canada, MSM demonstrated incipient knowledge about PrEP including those who were HIV-negative and HIV-positive[16].

To achieve relevant results in HIV prevention through the use of such strategies, it is necessary to expand awareness and use education actions, focusing on people most exposed to the virus [17], such as sexual partners, whether fixed or casual, of PLHIV. In addition, expanding education actions for the general population may contribute to adherence to HIV prevention methods.

In general, knowledge about PrEP and PEP is surprisingly recent and low, even in developed countries [18–20] and in the developing world, as in the case of Brazil[20] even among populations with strong motivations for learning to use these methods[3], such as couples living with HIV / AIDS. However, despite low levels of knowledge, interest in using the method was high among participants in studies from the United States[3].

The sexual partners of people living with HIV are populations at risk for acquiring the virus. High-risk behaviors among PLHIV may represent an important source for sexual transmission [21], among those who do not have an undetectable viral load. In addition, studies have shown inconsistent condom use among partners living with HIV and relating to HIV-negative people or those with unknown HIV status [4, 8].

Due to the scarcity of studies that address the theme in Brazil, this study aimed to analyze the factors associated with the knowledge of PEP and PrEP among people living with HIV / AIDS to improve policies for the implementation and distribution of strategies in a broader prevention plan among people at risk of infection.

## Methods

This is a cross-sectional and analytical study conducted with people living with HIV undergoing clinical-outpatient follow-up at five health services in a city in the interior of the state of São Paulo, Brazil. The health services in which the study was conducted are specialized in serving people living with HIV.

Participants needed to meet the following criteria to be included in the study: being aware of the diagnosis of HIV infection; being 18 years of age or older; being under clinical-outpatient monitoring at selected health services; have an active sex life and a seronegative or unknown sexual partner for HIV in the last six months. In addition, they were excluded if they were in confinement, regardless of the type of institution.

Data were collected from July 2016 to July 2017. Individual interviews were conducted, in a private environment, by researchers trained for this function. The approach to the participants occurred at the time of their visits to the health services and the interviews were scheduled according to the time chosen by the participant, before or after the medical consultation, if they agreed to participate. The average duration of the interviews was 30 minutes and only started after the participant gave their free and informed consent in writing.

The sample size was estimated from the approximate number of people with active records in the specialized services of the municipality where the study was conducted. Another parameter was the estimate of sexually active people living with HIV after diagnosis (62%). Therefore, the sample was set at 286. The calculation was performed with the aid of software R version 3.4.1. However, more people were included in the study in order to avoid potential losses from invalid or incomplete questionnaires.

The independent variables of the study were: sexual orientation, age, skin color, education (in years of study), work situation, length of HIV diagnosis, type of partner, partner's serology, use of alcohol during sexual intercourse, use of other drugs during sexual intercourse and condom use. The dependent variables were: having knowledge about PrEP (yes, no) and having knowledge about PEP (yes, no).

The data were tabulated in Microsoft Excel 2010 and after double typing the databank was exported to the Statistical Package for the Social Sciences (SPSS), version 22.0. Descriptive statistics was used to characterize the sample. Association tests were performed (Chi-square and Fisher's Exact), considering a level of statistical significance at  $p < 0.05$ .

Logistic regression analysis was used to assess the influence of independent variables on dependent variables, to have knowledge about PrEP and PEP. For the selection of independent variables, the automatic variable selection procedure called "Stepwise" was used, using the Akaike Information criterion [22]. For the analysis, the significance level of 5% ( $\alpha = 0.05$ ) was used. The programs used in the analyzes were SPSS (IBM Corp. Released, 2013) version 22 and R (R Core Team, 2018) version 3.5.3.

The study was approved by the Research Ethics Committee of the Ribeirão Preto School of Nursing under protocol 084/2016 and CAAE: 52012515.0.00000.5393. All participants signed the Free and Informed Consent Form. The participants were guaranteed anonymity by the researchers.

## Results

This study included 397 people living with HIV. It is noteworthy that 140 (35.3%) were heterosexual women, 136 (34.3%) were men who have sex with men (MSM), 147 (37%) aged 35–44 years, 214 (53.9%) with less than 11 years of study, 210 (53.3%) were white and 254 (64%) used condoms consistently.

As for knowledge about PrEP, being MSM was associated with knowledge ( $p = 0.000$ ). Having less than 11 years of study was associated with not having knowledge about PrEP ( $p = 0.000$ ), according to Table 1.

Table 1  
Sociodemographic and behavioral variables and knowledge about PrEP. Ribeirão Preto, SP, 2020.

Characteristics	Knowledge of PrEP			
	Total	Yes	No	P Value
<b>Sexual Orientation</b>				
Heterosexual Woman	140 (35.3%)	11 (18.6%)	129 (38.5%)	0.000
Heterosexual Man	121 (30.5%)	13 (22%)	106 (31.6%)	
MSM	136 (34.3%)	35 (59.3%)	100 (29.9%)	
<b>Age</b>				
18–24	30 (7.6%)	5 (8.5%)	25 (7.5%)	0.417
25–34	87 (21.9%)	18 (30.5%)	68 (20.3%)	
35–44	147 (37%)	21 (35.6%)	124 (37%)	
45+	133 (33.5%)	15 (25.4%)	118 (35.2%)	
<b>Education</b>				
< 11 years	214 (53.9%)	13 (22%)	199 (59.4%)	0.000
> 11 years	183 (46.1%)	46 (78%)	136 (40.6%)	
<b>Race</b>				
White	210 (53.3%)	32 (54.2%)	176 (52.9%)	0.407
Not white	184 (46.7%)	27 (45.8%)	157 (47.1%)	
<b>Employment status</b>				
Employed	259 (65.2%)	43 (72.9%)	213 (63.6%)	0.621
Unemployed	84 (21.2%)	11 (18.6%)	73 (21.8%)	
Others	49 (12.3%)	4 (6.8%)	45 (13.4%)	
Unable to work	5 (1.3%)	1 (1.7%)	4 (1.2%)	
<b>Time since HIV diagnosis (years)</b>				
< 2 to 2-4.9	154 (38.8%)	26 (44.1%)	127 (37.9%)	0.657
≥ 5	243 (61.2%)	33 (55.9%)	208 (62.1%)	
<b>Type of Partner</b>				
Fixed	255 (64.2%)	41 (69.5%)	213 (63.6%)	0.579
Casual	125 (31.5%)	15 (25.4%)	108 (32.2%)	
Fixed/Casual	17 (4.3%)	3 (5.1%)	14 (4.2%)	
<b>Serology of partner</b>				
HIV-positive	111 (28%)	10 (16.9%)	101 (30.1%)	0.064
Source: The authors.				

<b>Characteristics</b>	<b>Knowledge of PrEP</b>			
HIV-negative/unknown	286 (72%)	49 (83.1%)	234 (69.9%)	
<b>Use of alcohol during sex</b>				
Yes	169 (42.6%)	24 (40.7%)	142 (42.4%)	0.126
No	228 (57.4%)	35 (59.3%)	193 (57.6%)	
<b>Use of drugs during sex</b>				
Yes	76 (19.1%)	8 (13.6%)	67 (20%)	0.419
No	321 (80.9%)	51 (86.4%)	268 (80%)	
<b>Use of condom</b>				
Consistent	254 (64%)	46 (78%)	208 (62.1%)	0.004
Inconsistent	143 (36%)	13 (22%)	127 (37.9%)	
Source: The authors.				

It is noteworthy that being an MSM, having more than 11 years of study and being employed were associated with knowledge about PrEP ( $p = 0.000$ ), according to Table 2.

Table 2  
Sociodemographic and behavioral variables and knowledge about PEP. Ribeirão Preto, RP, 2020.

Characteristics	Knowledge of PEP			P Value
	Total	Yes	No	
<b>Sexual orientation</b>				
Heterosexual Woman	140 (35.3%)	25(20.5%)	115(41.8%)	0.000
Heterosexual Man	121 (30.5%)	29(23.8%)	92(33.5%)	
MSM	136 (34.3%)	68(55.7%)	68(55.7%)	
<b>Age</b>				
18–24	30(7.6%)	11(9%)	19(6.9%)	0.066
25–34	87(21.9%)	36(29.5%)	51(18.5%)	
35–44	147(37%)	39(32%)	108(39.3%)	
45+	133(33.5%)	36(29.5%)	97(35.3%)	
<b>Education</b>				
< 11 years	214(53,9%)	43 (35.2%)	171(62.2%)	0.000
> 11 years	183 (46,1%)	79 (64.8%)	104(37.8%)	
<b>Color</b>				
White	210(53.3%)	69(57%)	141(51.6%)	0.324
Not white	184(46.7%)	52(43%)	132(48.4%)	
<b>Employment Status</b>				
Employed	259(65.2%)	94 (77%)	165 (60%)	0.007
Unemployed	84(21.2%)	18 (14.8%)	66 (24%)	
Others	49(12.3%)	8 (6.6%)	41 (14.9%)	
Unable to work (incapacity/disability)	5(1.3%)	2 (1.6%)	3 (1.1%)	
<b>Time since HIV diagnosis (years)</b>				
< 2 to 4.9	154(38.8%)	47(38.5%)	107(38.9%)	0.942
≥ 5	243(61.2%)	75(61.5%)	168(61.1%)	
<b>Type of partner</b>				
Fixed	255(64.2%)	72(59%)	183(66.5%)	0.353
Casual	125(31.5%)	44(36.1%)	81(29.5%)	
Fixed and Casual	17(4.3%)	6(4.9%)	11(4%)	
<b>Serology of partner</b>				
Source: The authors.				

<b>Characteristics</b>	<b>Knowledge of PEP</b>			
HIV-positive	84(28%)	18(20.5%)	66(31.1%)	0.061
HIV-negative/unknown	216(72%)	70(79.5%)	146(68.9%)	
<b>Use of alcohol during sex</b>				
Yes	169(42.6%)	62(50.8%)	107(38.9%)	0.027
No	228(57.4%)	60(49.2%)	168(61.1%)	
<b>Use of drugs during sex</b>				
Yes	76(19.1%)	29(23.8%)	47(17.1%)	0.119
No	321(80.9%)	93(76.2%)	228(82.9%)	
<b>Use of condom</b>				
Consistent	254(64%)	77(63.1%)	177(64.4%)	0.811
Inconsistent	143(36%)	45(36.9%)	98(35.6%)	
Source: The authors.				

As for the factors associated with PrEP, participants with less than 11 years of study were (adjusted odds: 0.2903; 95% CI: 0.1340–0.6007) less likely to have knowledge about PrEP compared to participants with more than 11 years of study. Those who did not have a low viral load or did not know how to report their viral load were (adjusted odds: 0.2619; 95% CI: 0.0961–0.8398) less likely to have knowledge about PrEP compared to those with low viral load. Likewise, those with casual partners had (adjusted odds: 0.2931; 95% CI: 0.0961–0.8398) less chance (or a 71% lower chance (1-0.29) of having knowledge about PrEP compared with those who were in a fixed relationship, as shown in Table 3.

Table 3  
Adjusted model of factors associated with knowledge of PrEP. Ribeirão Preto, SP, 2020.

Variable	Crude odds [95% CI <sup>†</sup> ]	P Value <sup>‡</sup>	Adjusted Odds [95% CI]	P Value
<b>Education (years)</b>				
< 11	0.19 (0.1,0.37)	<b>0.0010</b>	0.2903 (0.1340,0.6007)	0.0011
<b>Sexual Orientation</b>				
Heterosexual Women	0.69 (0.3,1.6)	0.3860	0.7788(0.3081, 1.9444)	0.5914
MSM	2.88 (1.44,5.77)	<b>0.0030</b>	2.0839(0.9712,4.6737)	0.0654
<b>Low Viral Load</b>				
No/Unknown	0.3 (0.16,0.55)	<b>0.0010</b>	0.2619(0.1309,0.5003)	0.0001
<b>Type of Partner</b>				
Casual	0.71 (0.38,1.34)	0.2930	0.2931(0.0961,0.8398)	0.0259
Fixed and Casual	1.1 (0.3,3.99)	0.8880	0.2517(0.0427,1.1993)	0.0984
<b>Status of partner</b>				
Negative/Unknown	2.05 (1,4.21)	0.0500	2.1224(0.9558,05.0593)	0.0743
<b>Number of sexual partners</b>				
Multiple partners	1.48 (0.83,2.65)	0.1820	2.3860(0.9364,6.2272)	0.0707
<b>Conversations with partner</b>				
No	0.41 (0.23,0.76)	<b>0.0040</b>	0.5488(0.2529,1.1482)	0.1182
Source: The authors.				

As for the factors associated with PEP, MSM participants were 2.88 (Adjusted Odds: 2.8788; 95% CI: 1.5912–5.3092) times more likely to have knowledge about PEP than heterosexual male participants. Participants who used alcohol during intercourse were 1.73 (adjusted odds: 1.7305; 95% CI: 1.0656–2.8248) times more likely to have knowledge about PEP than those who did not use alcohol during intercourse.

Participants with less than 11 years of education (adjusted Odds: 0.4331; 95% CI: 0.2564–0.7271) were less likely to have knowledge about PEP compared to participants with more than 11 years of education. Participants who did not have a low viral load or did not know about viral load were (adjusted odds: 0.4054; 95% CI: 0.2493–0.6511) less likely to have knowledge about PEP than those with low viral load, as shown in Table 4.

Table 4  
Adjusted Model of the factors associated with the knowledge of PEP. Ribeirão Preto, RP, 2020.

Variable	Crude odds [95% IC <sup>†</sup> ]	P Value	Adjusted odds [95% IC]	P value
<b>Sexual Orientation</b>				
Heterosexual Woman	0.73 (0.4,1.35)	0.3272	0.9066(0.4763,1.7259)	0.7645
MSM	3.32 (1.92,5.74)	0.0010	2.8788 (1.5912,5.3092)	<b>0.0006</b>
<b>Education</b>				
< 11	0.33 (0.21,0.51)	0.0010	0.4331 (0.2564,0.7271)	<b>0.0016</b>
<b>Time since HIV diagnosis</b>				
Five years or more	0.9935 (0.638,1.547)	0.9770	1.4595 (0.8887,2.4302)	0.1399
<b>Low VL</b>				
No/Unknown	0.42 (0.27,0.65)	0.0010	0.4054 (0.2493,0.6511)	<b>0.0002</b>
<b>Use of alcohol during sex</b>				
Yes	1.58 (1.02,2.43)	0.0410	1.7305 (1.0656,2.8248)	<b>0.0272</b>
Source: The authors.				

## Discussion

Participants in this study had low knowledge of PrEP. People with less than 11 years of study, who did not have a low viral load or did not know about viral load rates, who had fixed partners, were less likely to have knowledge of PrEP. As for the knowledge about PEP, it was identified that MSM and individuals who reported using alcohol during sexual intercourse were more likely to have knowledge about PEP.

International evidence corroborates these findings and indicates that awareness of PrEP and PEP is low, even among key populations that are considered a priority for infection control, the percentage of participants who had knowledge about either of the two methods ranges from 18.9–47.2% [16, 23]. In addition, a study with MSM identified low awareness of the two methods, but a high level of interest in using them[3].

In general, priority populations do not have satisfactory knowledge about sexually transmitted infections and prevention methods. For example, in 12 Brazilian cities, 4,176 MSM were recruited with the intention of evaluating the knowledge of these individuals about HIV / AIDS. The proportion who had a high level of knowledge was 23.7% and those with 12 or more years of study were linked[24]. MSM are a key population and, therefore have access rights to PrEP, and as far as PEP is concerned, it is recommended in specific cases [25]. However, it is necessary that these populations have knowledge about the infection and its main forms of prevention, so that they have access to the methods and can discuss them with their sexual partners.

Some facts have been reported in the literature as barriers to adherence to PrEP. These issues were noted in 2004, when the PrEP movement started in the United States. The volunteers were the target of prejudice with derogatory expressions aimed mainly at gay men. This association between promiscuity and homosexuality also happened in Brazil with headlines from magazines with high circulation. This view can provide individuals with distance from the

possibilities of coping with new infections and the quality of life for those who live with HIV[25]. In this sense, the need is emphasized for populations at high risk of infections to have access to quality information about the infection and its methods of prevention and control.

Endorsing this discussion, a higher level of education was associated with having knowledge about PEP among PLHIV / AIDS, residing in Italy. Among MSM, a higher level of education remained an associated factor[26]. Data from a study conducted in the United States showed that attending a college or a higher education course was associated with awareness of PrEP[27]. Such a finding provokes interest in the construction of health education strategies that are able to reach people with a lower level of education through the provision of information that meets their needs in terms understanding and access to information, especially with instructions that present the method to those with no knowledge[24].

PLHIV/AIDS and their sexual partners are central to controlling the epidemic[8, 28]. Therefore, providing support to PLHIV strengthens the bond with the health professional and can expand their participation in health promotion activities. Community support was found to be relevant for a group of MSM and women, those who received support were more likely to be aware of PrEP [29]. In fact, building paths to enrich the knowledge of PLHIV about the infection seems to be a challenge that deserves the engagement of governmental and non-governmental entities, health professionals, and civil society, in order to overcome barriers that can hinder access to all forms of prevention available.

As for the use of alcohol during sexual intercourse, it was shown to be positive in view of the knowledge of PEP. It is worth mentioning that the use of alcohol in sexual relations makes the individual more vulnerable, including sexual practices without the use of protection[11]. Another important contribution to this discussion is the belief in the toxicity of antiretrovirals with alcohol. That is, to believe that when consuming alcoholic beverages, there may be a decrease in the effect of the ingested medicine. A study on beliefs related to PrEP reported that 75% of participants had beliefs about interactive toxicity between alcohol and antiretrovirals[30].

In this sense, researchers highlighted that the forms of disclosure of PrEP can include messages that generate stigma against its users. Strategies should be guided by a comprehensive view of health in order to include people without segregating them into pre-existing groups tied to old stigmas [31]. Other studies have corroborated the idea that adherence to PrEP is hindered by stigma, even though its central function is the prevention of sexual transmission of HIV [32].

This study has limitations. The fact that this research did not include the affective / sexual partnerships of PLHIV who have negative / unknown serology reduces the understanding of the knowledge of the two methods addressed and centralizes the discussion of the approach to prevention from the perspective of PLHIV/AIDS. Therefore, future research should include sexual partnerships and investigate the complexity involved in negotiating the use of different methods to prevent sexual transmission of the virus.

## Conclusions

Knowledge about PrEP and PEP is low among PLHIV in Brazil. People with less than 11 years of study, who did not have a low viral load or did not know how to report this, with casual partners, were less likely to have knowledge about PrEP. Knowledge about PEP was more satisfactory, MSM and participants who used alcohol during sexual intercourse were more likely to have knowledge about PEP. Therefore, providing health education at appropriate times for PLHIV reinforces their knowledge of these methods and may arouse interest in including different prevention strategies in their daily relationships with affective-sexual relationships with negative / unknown status partners.

## Abbreviations

HIV: Human Immunodeficiency Virus (HIV); AIDS: Human Immunodeficiency Syndrome; PLHIV: people living with HIV; PrEP: Pre-Exposure Prophylaxis; PEP: Post-Exposure Prophylaxis; MSM: men who have sex with men; SPSS: Statistical Package for the Social Sciences

## Declarations

## Availability of data and materials

The data sets used and / or analyzed during the present study are available with the corresponding author, upon reasonable request.

## Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of the Ribeirão Preto School of Nursing under protocol 084/2016 and CAAE: 52012515.0.00000.5393.

## Consent for publication

Not applicable.

## Competing interests

The authors declare that they have no competing interests.

## References

1. UNAIDS: Estatísticas. [https://unaids.org.br/estatisticas/?gclid=Cj0KCQjwrIf3BRD1ARIsAMuugNtYacSjL96gog8xQTsQnTM46T21yAv-v58q8XqTTxYj-3ldJ7PinAMaAokwEALw\\_wcB](https://unaids.org.br/estatisticas/?gclid=Cj0KCQjwrIf3BRD1ARIsAMuugNtYacSjL96gog8xQTsQnTM46T21yAv-v58q8XqTTxYj-3ldJ7PinAMaAokwEALw_wcB) (2020). Accessed June 11, 2020.
2. BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde: Boletim Epidemiológico. HIV/Aids. file:///C:/Users/User/Downloads/boletim\_hiv\_aids\_2019%20(1).pdf(2019). Accessed June 11, 2020.
3. Dolezal C, Frasca T, Giguere R, Ibitoye M, Cranston RD, Febo I, et al. Awareness of post-exposure prophylaxis (PEP) and pre-exposure prophylaxis (PrEP) is low but interest is high among men engaging in condomless anal sex with men in Boston, Pittsburgh, and San Juan. *AIDS Education and Prevention*. 2015;27(4):289-297.
4. Reis RK, Melo ES, Fernandes NM, Antonini M, Neves LADS, GirE. Inconsistent condom use between serodifferent sexual partnerships to the human immunodeficiency virus. *Revista Latino-Americana de Enfermagem*. 2019; 27: 1-13.
5. Koff A, Goldberg C, Ogbuagu, O. Condomless sex and HIV transmission among serodifferent couples: current evidence and recommendations. *Annals of medicine*. 2017; 49(6): 534-544.
6. Weller S, Davis K. Condom effectiveness in reducing heterosexual HIV transmission. *Cochrane Database Syst Rev*. 2002; (1): 1-24.

7. Smith DK, Herbst JH, Zhang X, Rose CE. Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. *JAIDS Journal of Acquired Immune Deficiency Syndromes*. 2015; 68(3): 337-344.
8. Silva TCFD, Sousa LRM, Jesus GJD, Argolo JGM, Gir E, Reis RK. Fatores associados ao uso consciente do preservativo masculino entre mulheres vivendo com HIV/Aids. *Texto&Contexto-Enfermagem*. 2019; 28: 1-12.
9. UNAIDS: Combination HIV Prevention: Tailoring and Coordinating Biomedical, Behavioural and Structural Strategies to Reduce New HIV Infections A UNAIDS Discussion Paper. [https://www.unaids.org/sites/default/files/media\\_asset/JC2007\\_Combination\\_Prevention\\_paper\\_en\\_0.pdf](https://www.unaids.org/sites/default/files/media_asset/JC2007_Combination_Prevention_paper_en_0.pdf)(2010). Accessed June 11, 2020.
10. BRASIL. Ministério da Saúde: Prevenção Combinada do HIV: bases conceituais para profissionais, trabalhadores e gestores de saúde. file:///C:/Users/User/Downloads/prevencao\_combinada\_-\_bases\_conceituais\_web.pdf (2017). Accessed June 11, 2020.
11. Monteiro APVB, Andrade KS, Santos WL. O aumento do HIV entre jovens e a aderência da profilaxia de pré - exposição (PREP) como intervenção. *Revista JRG de Estudos Acadêmicos*. 2019; 2(5):84-99.
12. Center for Disease Control and Prevention [homepage na internet]. Novas diretrizes recomendam pílula diária de prevenção do HIV para pessoas em risco substancial. <https://www.cdc.gov/nchhstp/newsroom/2014/prep-guidelines.html>(2014). Accessed June 11, 2020.
13. Jiang J, Yang X, Ye L, Zhou B, Ning C, Huang J, et al. Pre-exposure prophylaxis for the prevention of HIV infection in high risk populations: a meta-analysis of randomized controlled trials. *PLoSOne*. 2014; 9(2):1-8.
14. BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais: Diretrizes para organização dos serviços de saúde que ofertam a Profilaxia Pré-Exposição Sexual ao HIV (PrEP) no Sistema Único de Saúde / Ministério da Saúde, Secretaria de Vigilância em Saúde. Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais. file:///C:/Users/User/Downloads/diretrizes\_prep\_11\_2017\_web.pdf (2017). Accessed June 11, 2020.
15. Fundação Oswaldo Cruz : Ministério da Saúde inicia hoje o lançamento da Profilaxia Pré-Exposição (PrEP). <http://www.fiocruz.br/noticias/projetos/4648-ministerio-da-saude-inicia-hoje-o-lancamento-da-profilaxia-pre-exposicao-prep#:~:text=Os%20estudos%20para%20comprovar%20a,resposta%20global%20ao%20HIV%2FAids>(2017). Accessed June 11, 2020.
16. Lachowsky NJ, Lin SY, Hull MW, Cui Z, Sereda P, Jollimore J, et al. Pre-exposure Prophylaxis Awareness Among Gay and Other Men who have Sex with Men in Vancouver, British Columbia, Canada. *AIDS and Behavior*. 2016; 20(7): 1408-1422.
17. Ajayi, AI, Ismail KO, Adeniyi OV, Akpan W. Awareness and use of pre-exposure and postexposure prophylaxes among Nigerian university students: Findings from a cross-sectional survey. *Medicine*.2018; 97(36): 1-6.
18. Mayer KH, Oldenburg CE, Novak DS, Elsesser SA, Krakower DS, Mimiaga MJ. Early adopters: Correlates of HIV chemoprophylaxis use in recent online samples of US men who have sex with men. *AIDS and Behavior*. 2016; 20(7):1489-1498.
19. Walters SM, Rivera AV, Starbuck L, Reilly KH, Boldon N, Anderson BJ, et al. Differences in awareness of pre-exposure prophylaxis and post-exposure prophylaxis among groups at-risk for HIV in New York State: New York City and Long Island, NY, 2011–2013. *JAIDS Journal of Acquired Immune Deficiency Syndromes*.2017; 75: 383-391.
20. Wolfgang S, Portinari D. La recomendación de laprofilaxispreexposición al VIH/SIDA: la enfermedad inscrita en el cuerpo sano. *Temas y Debates*. 2019; 12(3):184-191.

21. Du P, Crook T, Whitener C, Albright P, Greenawalt D, Zurlo J. HIV transmission risk behaviors among people living with HIV/AIDS: the need to integrate HIV prevention interventions and public health strategies into HIV care. *Journal of public health management and practice: JPHMP*. 2015; 21(2): 1-15.
22. Akaike, H. A new look at the statistical model identification. *IEEE transactions on automatic control*. 1974; 19(6): 716-723.
23. Chuang DM, Newman PA. Pre-exposure prophylaxis(PrEP) awareness and acceptability among men who have sex with men in Taiwan. *AIDS EducationandPrevention*. 2018; 30(6): 490-501.
24. Guimarães MDC, Kerr LRFS. Conhecimento sobre HIV/Aids entre HSH no Brasil: um desafio para as políticas públicas. *Rev. bras. epidemiol*. 2019; 22(26): 1-15.
25. Carvalho CA, Azevedo JHP. Do AZT à PrEP e à PEP: aids, HIV, movimento LGBTI e jornalismo. *Reciis – RevEletronComunInflnov Saúde*. 2019; 13(2): 246-60.
26. Prati G, Zani B, Pietrantonio L, Scudiero D, Perone P, Cosmaro L, et al. PEP and TasP awareness among Italian MSM, PLWHA, and high-risk heterosexuals and demographic, behavioral, and social correlates. *PloSone*. 2016; 11(6): 1-12.
27. Schueler K, Ferreira M, Nikolopoulos G, Skaathun B, Paraskevis D, Hatzakis A, et al. Pre-exposure prophylaxis (PrEP) awareness and use within high HIV transmission networks. *AIDS and behavior*. 2019; 23: 1893-1903.
28. Sousa LRM, Moura LKB, Valle ARMDC, Magalhães RDLB, Moura MEB. Representações sociais do HIV/Aids por idosos e a interface com a prevenção. *RevistaBrasileira de Enfermagem*. 2019; 72(5): 1129-1136.
29. Friedman MR, Sang JM, Bukowski LA, Chandler CJ, Egan JE, Eaton LA, et al. Prevalence and Correlates of PrEP Awareness and Use Among Black Men Who Have Sex with Men and Women (MSMW) in the United States. *AIDS and behavior*. 2019; 1-12.
30. Kalichman SC, Eaton L. Alcohol antiretroviral interactive toxicity beliefs as a potential barrier to HIV pre exposure prophylaxis among men who have sex with men. *Journal oftheInternational AIDS Society*. 2017; 20(1):1-8.
31. Amico KR, Bekker LG. Global PrEP roll-out: recommendations for programmatic success. *The Lancet HIV*. 2019; 6(2):137- 140.
32. Golub SA. PrEP stigma: implicit and explicit drivers of disparity. *Current HIV/AIDS Reports*. 2018; 15(2):190-197.