






# HIV post-exposure prophylaxis in vulnerable populations: a retrospective longitudinal study in a public health outpatient clinic in Rio Grande do Sul, Brazil, 2015-2018

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## Abstract

**Objective:** To describe the profile of people who initiated HIV post-exposure prophylaxis (PEP) in a public health service, evaluating the use of this technology by key populations as recommended by the Brazilian Ministry of Health. **Methods:** This was a retrospective longitudinal study using secondary data on service users receiving care between 2015-2018. Absolute and relative frequencies were calculated and Pearson's chi-square test was used to compare behavioral characteristics. **Results:** Of the 270 people evaluated, there was a higher frequency of young adults (45.4%), males (74.7%), people of white race/skin color (76.3%), with a high level of education (65.7%) and with multiple sex partners (40.7%). Among the key populations, there was a higher frequency of people who use alcohol and/or other drugs (49.6%) and men who have sex with men (38.1%), while transgender people (2.2%) and sex workers (4.8%) used PEP less. **Conclusion:** The use of PEP was not homogeneous among the vulnerable groups evaluated, with low frequency of transgender people and sex workers.

**Keywords:** Post-Exposure Prophylaxis; HIV; Vulnerable Populations; Epidemiology, Descriptive.

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## Introduction

Post-exposure prophylaxis (PEP) is a measure for preventing human immunodeficiency virus (HIV) infection by using a combination of antiretroviral drugs without interruption for 28 days, starting within 72 hours after a situation of exposure to the virus. Such risk situations can be sexual violence, unprotected sex or an occupational accident. PEP is one of the strategies offered by the Ministry of Health, defined from the perspective of combination therapy<sup>1</sup> as a model for addressing the HIV and AIDS (acquired immunodeficiency syndrome) epidemic. This form of prophylaxis seeks to prevent infection through a group of technologies, classified as interventions: biomedical interventions – which include PEP –, behavioral and structural interventions.<sup>2</sup>

*The term ‘vulnerability’ broadens the notion of behavioral risk to include identification of social factors and factors related to access to public services by specific populations, including analysis of individual, social and programmatic dimensions.*

Public health service care actions should always meet the premises of universality and equality, these being doctrinal principles of the Brazilian National Health System (SUS). In order to comply with these principles, special efforts need to be dedicated to certain more vulnerable segments of society.<sup>3</sup> The term ‘vulnerability’ broadens the notion of behavioral risk to include identification of social factors and factors related to access to public services by specific populations, including analysis of individual, social and programmatic dimensions.<sup>4-6</sup>

These dimensions are necessary for rethinking certain HIV prevention actions and policies and for raising issues inherent to the epidemic, such as the fact of infection going beyond aspects inherent to the individual and his/her behavior.<sup>7,8</sup> The dynamics of health-illness, for example, involve expressions of inequality, prejudice, frailty of personal relations and of socioeconomic status, dilemmas of Justice, health system structure and operational conditions, over and above questions of sexuality.<sup>9</sup>

In Brazil, since 2014, the HIV/AIDS epidemic has seen reduction in detection and mortality rates. However, the concentrated nature of infection and subsequent disease affect, more strongly, certain segments of the population.<sup>10</sup> The Health Ministry proposes placing greater attention on groups referred to as ‘key populations’ and ‘priority populations’. These key populations include gay men and other men who have sex with men, sex workers, transgender persons, users of alcohol and/or other drugs and citizens deprived of liberty. In turn, priority populations include young people, the Black population, Indigenous people and people living on the streets.<sup>11</sup>

Providing new forms of HIV prevention has shown itself to be necessary, principally for these populations. In this context, PEP emerges as a last resort for avoiding HIV infection, after all other known measures have failed. Evidence of the efficacy of PEP in reducing the risk of HIV transmission has been and continues to be demonstrated; nevertheless, studies reveal that the population’s lack of knowledge about the possibility of this strategy still represents a large barrier to access to and use of this form of prophylaxis offered by the SUS.<sup>3,12</sup> Authors point to the need to incorporate this new technology into health service routine as an important strategy for humanized, comprehensive and effective care provided to health system users.<sup>13,14</sup>

According to current Health Ministry guidelines, it is the responsibility of the Testing and Counseling Centers (TCC) to provide combination prevention actions for HIV, other sexually transmitted infections (STI) and viral hepatitis, giving preference to key populations and priority populations.<sup>2</sup>

This investigation of access to PEP by vulnerable populations is justified by the high incidence of HIV in the state of Rio Grande do Sul, the concentration of the epidemic in key populations and the effectiveness of PEP as prophylaxis for preventing infection. The objective of this study was to describe the profile of service users who began HIV post-exposure prophylaxis (PEP) in a public service, assessing the use of this technology among key populations, as defined by the Health Ministry.

## Methods

This is a descriptive study using secondary data from the Testing and Counseling Center (TCC) of the

Porto Alegre Sanitary Dermatology Outpatient Clinic (DOC). Porto Alegre is the capital city of the state of Rio Grande do Sul.

The DOC is a SUS service subordinated to the Rio Grande do Sul State Health Department. It is home to the first TCC implemented in Brazil and which has been operating without interruption since 1988.<sup>15</sup> The Porto Alegre TCC/DOC is a reference unit for dermatology, leprosy, HIV/AIDS and STI care.<sup>11</sup> PEP became available at the DOC in April 2015, after the protocol had been updated with recommendations for prophylaxis based on assessment of risk during the exposure situation, and no longer based on exposure category (accident with biological material, sexual violence and consented sexual exposure).<sup>11</sup>

The study included all DOC service users who began PEP between April 2015 and April 2018, following consented sexual exposure (unprotected sexual intercourse, whether totally or partially, due to condoms bursting, coming off or not being used), except for service users with incomplete data and/or who did not agree to answer the questions on the care forms. Two medication regimens were used during the period selected: from 2015 to 2016 the regimen was comprised of the antiretroviral drugs zidovudine, lamivudine and tenofovir; with effect from 2017 it was replaced with a new antiretroviral regimen comprised of lamivudine, tenofovir and dolutegravir.<sup>11</sup>

The following variables were analyzed:

- a) Sociodemographic variables
  - Gender identity (cisgender female; transgender female; cisgender male; transgender male);
  - Age (in years: up to 29; 30-39; 40-59; 60 or over)
  - Race/skin color (self-reported: white; black; brown; yellow; indigenous);
  - Schooling (completed years of study: 1-3; 4-7; 8-11; 12 or more).
- b) Behavioral variables – in the 12 months prior to PEP
  - Sex partner(s) (stable partner, causal partner or multiple partners [with three or more different people] in the last year);
  - Condom use (consistent use [in all sex acts] or inconsistent use [sporadic use or not used]);
  - Presence of STIs.
- c) Variables related to use of PEP
  - Type of sexual exposure (anal sex; vaginal sex; oral sex; other contact with secretions);

- Number of times PEP used (first; second; third);
  - Return to the DOC at 30 to 90 days following prescription, to close the case;
  - Complete treatment reported;
  - Occurrence of side effects;
  - Results of HIV tests before and after using PEP.
- d) Key populations – individuals belonging to population segments with greater vulnerability to HIV, in accordance with the descriptions proposed by the Health Ministry<sup>11</sup>
- Gay men and other men who have sex with men (MSM);
  - People with male gender identity who experience their sexualities with other men;
  - Users of alcohol and/or other drugs (people who use psychoactive substances regardless of route of administration, including substance use, abuse or dependency);
  - Sex workers (adults who consentingly exchange sexual services, activities or favors for money, goods, objects or services of value);
  - Transgender persons (whose gender identity and expression is not in keeping with norms and expectations imposed by society, according to their gender as designated at birth based on their genitalia).
- Data were collected from the Testing and Counseling Forms and from the PEP Referral Forms, both of which are filled in by TCC counselors. They are professionals of the multidisciplinary team who undergo capacity building and training before doing this job. As the DOC is a teaching and research center, the information recorded during the service routine is considered to be accurate, even when used for retrospective studies. The data were collected during 2019, by one of the researchers, and covered all cases of consented sex PEP that began PEP between April 2015 and April 2018.
- When analyzing the variables, absolute and relative frequencies were calculated. Comparison of behavioral variables between the key populations and the general population was performed using Pearson's chi-square test, taking p-values of less than 0.05 to be statistically significant. Data tabulation and analyses were performed with the aid of SPSS 23.0 statistical software.
- The study project was approved by the Rio Grande do Sul State Health Department Public Health School Research Ethics Committee on June 1st 2017: Opinion No. 055273/2018 and Certificate of Submission for Ethical Appraisal No. 90278918.3.0000.5312. The

study was conducted in accordance with National Health Council Resolution No. 466, dated December 12<sup>th</sup> 2012. Only secondary data were used, as recorded on standardized patient care forms, so that signed Free and Informed Consent forms were not required. Furthermore, the database was typed without nominal identification, in order to reduce the risk of breach of confidentiality of the participants' information.

## Results

All 270 service users who started the PEP protocol at the Porto Alegre TCC/DOC, between April 2015 and

April 2018, answered the forms the service uses. None of them were lost to the study. The study population was comprised mostly of cisgender males (74.7%), people aged up to 29 years old (45.4%), of self-reported White race/skin color (76.3%), single marital status (68.4%) and who had studied for 12 years or more (65.7%). Only three young people in the sample analyzed were under 18 years old (Table 1).

The types of sexual exposure, stated at the beginning of prophylaxis, were vaginal sex (50.7%), anal sex (42.2%), oral sex (4.5%) and other contact with secretions (2.6%). 86.3% of the service users were found to have been using the protocol for the first

**Table 1 – Characteristics of service users who began HIV post-exposure prophylaxis<sup>a</sup> at the Sanitary Dermatology Outpatient Clinic (n=270), Porto Alegre, Rio Grande do Sul, 2015-2018**

Characteristics	n	%
<b>Gender identity</b>		
Cisgender male	202	74.7
Cisgender female	63	23.4
Transgender male	-	-
Transgender female	5	1.9
<b>Age group (years)</b>		
≤29	123	45.4
30-39	87	32.3
40-59	55	20.4
≥60	5	1.9
<b>Race/skin color (self-reported)</b>		
White	203	76.3
Black	35	13.2
Brown	28	10.5
Not informed <sup>b</sup>	4	-
<b>Marital status</b>		
Single	185	68.4
Married	53	19.7
Separated	28	10.8
Widowed	4	1.1
<b>Schooling (years of study)</b>		
1-3	-	-
4-7	14	5.2
8-11	78	29.1
≥12	176	65.7
Not informed <sup>b</sup>	2	-
<b>Tipo de exposição sexual para a PEP<sup>c</sup></b>		
Vaginal sex	137	50.7
Anal sex	114	42.2
Oral sex	12	4.5
Other forms of contact with secretions	7	2.6

To be continued

Continuation

**Table 1 – Characteristics of service users who began HIV post-exposure prophylaxis<sup>a</sup> at the Sanitary Dermatology Outpatient Clinic (n=270), Porto Alegre, Rio Grande do Sul, 2015-2018**

Characteristics	n	%
<b>Number of times used PEP<sup>c</sup></b>		
First use	233	86.3
Second use	34	12.6
Third use	3	1.1
<b>Report of side effects</b>		
Yes	41	15.2
No	229	84.8

a) HIV: human immunodeficiency virus; b) Data not included in the calculation of relative frequency; c) PEP: HIV post-exposure prophylaxis.

**Table 2 – Behavioral characteristics in the 12 months prior to beginning PEP<sup>a</sup> (n=270) at the Sanitary Dermatology Outpatient Clinic, Porto Alegre, Rio Grande do Sul, 2015-2018**

Behavioral characteristics	n	%
Presence of STI <sup>b</sup>	40	14.8
Had stable partner(s)	157	58.1
Had casual partner(s)	231	85.6
Multiple sex partners	110	40.7
Consistent condom use	107	39.7
Use of alcohol and/or other drugs	134	49.6

a) PEP: HIV post-exposure prophylaxis; d) STI: sexually transmitted infection.

**Table 3 – Behavioral characteristics in the 12 months prior to beginning PEP<sup>a</sup> according to definition of key population vulnerability to HIV<sup>b</sup>, at the Sanitary Dermatology Outpatient Clinic, Porto Alegre, Rio Grande do Sul, 2015-2018**

Behavioral characteristics	Vulnerable population <sup>c</sup>		p-value <sup>d</sup>
	No (n=86)	Yes (n=184)	
	n (%)	n (%)	
Presence of STI <sup>e</sup>	10 (11.6)	30 (16.3)	0.314
Multiple partners	47 (54.7)	138 (75.0)	0.001
Inconsistent condom use	52 (60.4)	110 (59.8)	0.868
Repeated use of PEP <sup>a</sup>	9 (10.5)	28 (15.2)	0.290

a) PEP: HIV post-exposure prophylaxis; b) HIV: human immunodeficiency virus; c) Vulnerable population: men who have sex with men (MSM), transgender persons, users of alcohol and/or other drugs and/or sex workers; d) Pearson's chi-square test; e) STI: sexually transmitted infection.

**Table 4 – Use of PEP<sup>a</sup> by key populations at the Sanitary Dermatology Outpatient Clinic (n=270), Porto Alegre, Rio Grande do Sul, 2015-2018**

Use of PEP <sup>a</sup>	MSM <sup>b</sup>	Transgender persons	Users of alcohol and/or other drugs	Sex workers	General population	Total <sup>c</sup>
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Began PEP <sup>a</sup>	103 (38.1)	6 (2.2)	134 (49.6)	13 (4.8)	86 (31.9)	270 (100.0)
Returned to the DOC <sup>d</sup> at 30 and 90 days <sup>e</sup>	51 (49.5)	3 (50.0)	64 (47.8)	5 (38.5)	45 (52.3)	133 (49.3)
Reported complete treatment <sup>f</sup>	50 (98.0)	3 (100)	61 (95.3)	5 (100.0)	42 (93.3)	127 (95.5)

a) PEP: HIV post-exposure prophylaxis (human immunodeficiency virus); b) MSM: men who have sex with men; c) The sum of the frequencies is different to the total because of overlapping population types in some service users studied; d) DOC: Sanitary Dermatology Outpatient Clinic, Porto Alegre, RS; e) Relative frequency calculated based on those who began PEP, within each population type. f) Relative frequency calculated based on those who returned to the DOC at 30 and 90 days after PEP was started.

time, 12.6% for the second time and only three people (1.1%) had PEP for the third time. Side effects were reported by 15.2% of the participants, with the most common being fatigue, headache, somnolence, nausea and vomiting, abdominal pain and jaundice (Table 1). It should be highlighted that the study covered both of the medication regimens adopted during the period under analysis.

In relation to the 12 months prior to starting PEP, we found that 14.8% of the service users reported presence of STIs, 49.6% consumed alcohol and/or other drugs and 40.7% had multiple sex partners. During the same one-year period, only 39.7% reported consistent use of condoms when having sex (Table 2). With regard to behaviors characteristics of the key populations, in comparison with those of the general population, we only found that they had more multiple sex partners, with no significant difference in relation to presence of STIs, inconsistent condom use or repeating PEP (Table 3).

38.1% of the service users who started PEP reported being MSM, 49.6% stated they used alcohol and/or other drugs, 4.8% were sex workers, 2.2% were transgender persons and 31.9% identified themselves as belonging to the general population. Despite the recommendation to return to the TCC/DOC after 30 days, to have another test and check the efficacy of prophylaxis, only 49.3% of those who started PEP returned to the service. It was not possible to verify whether the remainder (50.7%) finished the protocol in other places or services, nor whether they adhered entirely to the prescribed treatment. Among the participants who kept to the recommendation to return, good adherence was reported among all the key population types, with less than 5% of unfinished treatments, whereas 6.7% incomplete treatment was reported among the general population (Table 4).

## Discussion

The PEP users in this study were predominantly cisgender males, young adults, of White race/skin color, with high levels of schooling, resident in Porto Alegre and had multiple sex partners. Among the population segments most vulnerable to HIV, young MSM and users of alcohol and/or other drugs, especially those with higher levels of schooling, were the groups who most used prophylaxis. It should be

noted that this study only considered cases of PEP use following consented sexual exposure.

This study has limitations: its retrospective design, generally associated with greater data collection accuracy; and data recording, notwithstanding being based on standardized forms and the professionals involved having been trained, so as to reduce the risk of biases.

The age of the participants portrays a young audience. This age range is similar to that presented in the HIV/AIDS Epidemiological Bulletin (2019) for PEP users in Brazil during 2018 and up to September 2019.<sup>10</sup> This study revealed that 78% of the group were under 40 years old: 27% were aged 15-24; and 51% were aged 25-39.

Few women requested HIV post-exposure prophylaxis. This finding coincides with that of a cross-sectional study with 365 women at four health services in different regions of Brazil between 2012 and 2016.<sup>16</sup> That article highlights sociocultural aspects and aspects related to gender inequalities, which hinder women using prevention measures. Although that study found that women complete PEP, the health services do not retain them during the period of clinical and serologic follow-up, to the detriment of the assessment of the effectiveness of this form of prophylaxis. According to the author of that article, investment should be made in strategies that increase women's autonomy, in order to maintain follow-up.<sup>16</sup>

The high level of schooling of the PEP users may be indicative of access to information, suggesting that people with fewer years of schooling are in a situation of greater vulnerability, including for preventing HIV infection. An exploratory qualitative study interviewed 13 serodiscordant couples whose average age was 40, and identified that information about PEP is only available to people linked to health services.<sup>17</sup> Another study, conducted at a public health service in Rio de Janeiro in 2018, highlighted that this method was unknown to most of the population, with the exception of men who have sex with men and heterosexual women following unprotected receptive anal sex.<sup>3</sup> A narrative review of the literature, conducted in 2015, revealed that the most vulnerable populations end up being excluded and therefore, in order to improve access to this prophylactic method, the reach of PEP for sexual exposure needs to be increased by the health service network.<sup>18</sup>

In this study, the vulnerable populations who most frequently had recourse to PEP were users of alcohol and/or other drugs and MSM. Similar data published by the Ministry of Health about Brazilians who used PEP in 2018 and 2019, indicate that 69% of them used alcohol and/or other drugs and 27% identified themselves as being MSM.<sup>10</sup>

The fact of young gay men and other MSM having sought PEP more appears to reveal a new form of exercising sexuality and, consequently, suggests redefinition of prevention possibilities. Although these populations are described as being more vulnerable to HIV, with growing prevalence – prevalence reached 9.4% in 2016 –,<sup>1</sup> the care provided by the Porto Alegre DOC shows that other vulnerable populations still make less use of this form of prophylaxis and, based on this finding, it is possible to suppose that they could be more susceptible to HIV infection. Lower use of PEP may be indicative of limited information or the existence of other barriers to accessing health services, such as location, opening hours and institutional prejudice, to which transgender persons and sex workers in particular could be subject.<sup>19</sup>

A case study conducted with five health workers and five PEP users at a public health service in Niterói in the state of Rio de Janeiro, found that the spaces of intersubjectivity circumscribed by seeking/indicating PEP for sexual exposure are traversed by distinct forms of reasoning regarding risk, discriminatory moral standards and a physician-centered and prescriptive health care model.<sup>13</sup> Another study adds that “the materialization of health practices oriented towards the perspective of exercising sexuality as the affirmation of a right continues to be a challenge”.<sup>3</sup> The study by Zucchi et al.<sup>19</sup> points in the same direction, although it refers to the PreP protocol (pre-exposure prophylaxis) when it states that because it is a service-dependent method, the efficacy of the intervention (PreP) depends on the

ability of services to organize their work in a way that respects and takes into consideration the needs of those who use them.<sup>19</sup>

Of the 270 people cared for in the period assessed, only one seroconverted, after having been exposed to further sexual risk during prophylaxis. Over half the service users did not return to the Porto Alegre Sanitary Dermatology Outpatient Clinic after 30 days to finalize the PEP protocol. However, among those who did return, there was a good rate of adherence to medication and the majority of them reported complete treatment. Few of them reported side effects, which may have contributed to the good adherence found. In the study by Grangeiro et al.,<sup>18</sup> the authors identified low adherence to PEP, attributed above all to adverse effects of the medication. One of the factors capable of explaining this difference could lie in the change in the protocol/medication regimen in 2017, as this measure minimized medication side effects.<sup>18</sup>

We conclude that use of post-exposure prophylaxis – PEP – for HIV was not homogeneous among the vulnerable groups assessed, and was used more by young adults, of White race/skin color, with high levels of schooling, resident in Porto Alegre and who had multiple sex partners, in addition to being little used by transgender persons and sex workers.

### Authors' contributions

Castoldi L and Berengan MM contributed to the concept and design of the article, data analysis and interpretation and drafting the article. Fortes VS and Both NS contributed to the concept and design of the article and drafting it. Pinheiro TV contributed to the design of the study, data analysis and interpretation and drafting the manuscript. All the authors have approved the final version of the manuscript and are responsible for all aspects thereof, including the guarantee of its accuracy and integrity.

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