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Substance use, self-rated health and HIV status in Brazil

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ABSTRACT

We compared the prevalence of non-injecting drug use (NIDU) and Self-Rated Health (SRH) among individuals self-reporting as HIV-positive (PLWHA), HIV-negative and unknown at the III Brazilian Household Survey on Substance Use. Overall, 16,273 individuals, 12–65 years old, were interviewed in 2015. Prevalence and Standard Error (SE) were estimated considering the complex sample design and weight calibration. Chi-square tests with Rao-Scott adjustment were used to test independence between NIDU, SRH and HIV status. PLWHA presented higher frequencies of 12-month use for most substances than those reporting to be HIV-negative: alcohol use prevalence was 49.5% (SE 12.8) vs. 43.1% (SE 0.7), $p = 0.34$; tobacco 45.3% (SE 12.7) vs. 15.3% (SE 0.4), $p < 0.01$; amphetamines 1.7% (SE 1.7) vs. 0.3% (SE 0.1), $p = 0.51$; cannabis 10.5% (SE 6.7) vs. 2.5% (SE 0.2), $p = 0.06$; powder cocaine 3.6% (SE 3.0) vs. 0.9% (SE 0.1), $p = 0.45$; crack-cocaine 5.3% (SE 3.2) vs. 0.3% (SE 0.1), $p < 0.01$; inhalants 3.6% (SE 3.0) vs. 0.2% (SE 0), $p = 0.03$; ketamine 1.7% (SE 1.7) vs. 0.1% (SE 0), $p = 0.23$; and opioids 1.7% (SE 1.7) vs. 1.4% (SE 0.2), $p = 0.93$. PLWHA also reported worse SRH. Our results and the scarcity of integrated substance use and HIV treatments call for innovative, cost-effective approaches to tackle these public health challenges.

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HIV/AIDS; probability surveys; alcohol and drug use; low and middle-income countries; Brazil

Introduction

A recent study compared non-injection drug use (NIDU) patterns among people living with HIV/AIDS (PLWHA) and HIV-negative individuals using data collected in the National Survey on Drug Use and Health – a probability sample from the U.S. general population. Results show that lifetime, 12-month and 30-day use of tobacco, marijuana, cocaine, heroin, hallucinogens, inhalants, and psychotherapeutics were higher among PLWHA (Shiau et al., 2017). Such findings expanded the previous literature, mostly focused on injecting drug users (IDU) (Muga et al., 2007) and HIV cohorts (McGowan et al., 2011). NIDU is believed to mediate the increased HIV incidence among substance users by fostering unprotected intercourse and other risky sexual behaviors (Shoptaw et al., 2013).

Data from Brazilian clinical settings suggest NIDU prevalence is also higher among PLWHA than among general population, and NIDU was associated with lack of adherence and loss to follow-up in a Latin American cohort (De Boni et al., 2016, 2018). Specifically, cocaine use has been associated with poor self-rated health (SRH) (Machado et al., 2017), which has also been associated with increased mortality (Jylhä, 2009). However, there are no estimates comparing NIDU and SRH

across HIV status based on data from probability samples obtained from the general population in low and middle-income countries. Thus, we aimed to compare NIDU and SRH prevalence among individuals reporting to be HIV-positive, HIV-negative and with unknown serostatus who were interviewed at the III Brazilian Household Survey on Substance Use (BHSU-III).

Methods

The BHSU-III is a nationwide representative survey that interviewed 16,273 individuals, aged 12–65 years old, selected by multi-stage probability sampling in 2015, as previously described elsewhere (Bertoni et al., 2019; De Boni et al., 2019; Krawczyk et al., 2019; Silva et al., 2018). Individuals were asked whether a health professional ever told them they had HIV/AIDS and possible answers were categorized as “Positive” – for the sake of conciseness, PLWHA (despite the fact we cannot demonstrate they are actually living with HIV, in the absence of HIV testing), “Negative” and “Unknown” (the last including those who did not know and those who did not want to answer). Twelve-month use and DSM-IV dependency criteria were evaluated for tobacco, alcohol, benzodiazepines, amphetamines, opioids,

inhalants, ketamine, LSD, ecstasy, cannabis, powder and crack cocaine. SRH was measured using a single question “Overall, how is your health?”. Possible answers were provided using a Likert scale ranging from “Very bad” to “Very Good”.

Prevalence and corresponding standard error (SE) were estimated considering the complex sample design, and weight calibration to each one of the three groups (PLWHA, HIV-negative and Unknown). Chi-square tests with Rao-Scott adjustment were used to test independence across the three groups and significance level was set at 5%. Analyses were performed using R v 3.5.1 (survey and srvyr libraries).

A sensitivity analysis was performed grouping individuals reporting they did not want to answer with PLWHA to explore if social desirability bias and/or stigma could be precluding people to disclose their HIV-status.

The BHSU-III was approved by the Escola Politécnica de Saúde Joaquim Venâncio – FIOCRUZ IRB (CAAE # 35283814.4.0000. 5241). Individuals ≥ 18 years old signed an informed consent form. For those under 18 years, the informed consent form was signed by a parent or guardian while the individual signed an assent form.

Results

Twenty-three individuals reported to have received an HIV-positive diagnosis, 84 did not know and 4 did not want to answer, representing 196,639, 690,999 and 26,980 Brazilians (respectively). HIV prevalence was estimated at 0.13% (95% CI: 0.05–0.20). PLWHA were more likely to self-report as being homosexual (16%) and bisexual (1.5%), compared to HIV-negative (0.8% and 0.1%, respectively, $p < 0.01$), as well as to have lower schooling (57% had less than fundamental education vs. 36% of HIV-negative and 54% of those with unknown serostatus, $p < 0.01$). Twelve month use of tobacco (45%), inhalants (3.6%) and crack-cocaine (5.3%) among PLWHA was higher than among HIV-negatives (15.0%, 0.2%, 0.3%, respectively) and those with unknown serostatus (19.0%, 0%, 0%, respectively; $p < 0.01$). Substantial differences were also found regarding 12-month use of cannabis, amphetamines, powder cocaine, and ketamine, as well as 30-day binge drinking. Prevalence was at least 1.7 times higher among PLWHA compared to HIV-negatives (Table 1). Considering the low sample size of PLWHA, we were only able to find positive cases for alcohol dependency in this group, and it was twice as high than prevalence of HIV-negatives (3.0% vs. 1.5%, respectively; $p = 0.47$). None of those results changed in the sensitivity analysis (data not shown) where those who did not want to answer were grouped with PLWHA.

Regarding SRH, PLWHA more frequently reported Regular (73.6%) and Bad health (9.9%) than those reporting HIV-negative (22.8% and 3.2%) and Unknown serostatus (25.9% and 6.5%; Table 1).

Discussion

This is the first study to compare NIDU among PLWHA, HIV-negative and those who don't want to share/don't know their HIV status using data collected by a national probability sample survey from a middle-income country. HIV prevalence was estimated at 0.13% and PLWHA presented substantially higher prevalence of 12-month use of tobacco, cannabis, amphetamines, powder cocaine, crack-cocaine, inhalants, and ketamine. In addition, they more frequently reported Regular or Bad health.

HIV prevalence among people between 15 and 49 years, in Brazil, is estimated at 0.6% (CI 95%:0.4-0.8), but is much higher among key and vulnerable populations, such as men who have sex with men (19.0%) and crack-cocaine users (7.0%) (Ministério da Saúde do Brasil, 2017). It is possible that the prevalence found in the present study is underestimated due to internalized stigma related to HIV and sexual orientation. In addition, household surveys may not be effective to find hard-to-reach/hidden populations, for which other sampling methods (like respondent-driven sampling) are better suited. Nevertheless, our findings show that PLWHA were more likely to self-report as homosexual and bisexual in accordance with country's epidemiological data.

The prevalence of tobacco use in the previous 12 months was 3 times higher among PLWHA compared to HIV-negative, similar to a Brazilian HIV clinical cohort (Torres et al., 2014). This result is puzzling since Brazil is a successful public health case in curbing tobacco use among general population (despite some persistent hot spots). It is possible that the decrease in smoking prevalence is related more to public health policies than to treatment of smoking itself, and PLWHA who already smoke may face difficulties in finding integrated treatment at HIV services. Notwithstanding, to screen and treat tobacco should be considered a health priority as it was shown that among PLWHA who smoke in Denmark the number of years lost due to tobacco use may be twice the number of years lost by HIV (Helleberg et al., 2013). On the other hand, we did not find substantial difference on the 12-month prevalence of alcohol use among the groups, which was similar to the U.S. results (Shiau et al., 2017). However, PLWHA may have worse consequences of alcohol use, because it was already shown that alcohol use was

Table 1. Selected demographic characteristics, 12-month substance use and self-rated health by HIV status ($n = 16,273$) Brazil, 2015.

Variables	n N (x1000) Estimated population (x1000)	HIV			p-value
		Yes 23 196 %(SE)	No 16,162 152,180 %(SE)	Don't know 88 718 %(SE)	
Sex					0.63
Male	74,179	60.1 (13.7)	48.4 (0)	51.6 (7.2)	
Female	78,916	39.9 (13.7)	51.6 (0)	48.4 (7.2)	
Gender					<0.01
Heterosexual	147,277	80.4 (12.8)	96.2 (0.3)	97.5 (1.6)	
Homosexual	1,251	15.7 (12.7)	0.8 (0.1)	0	
Bisexual	176	1.5 (1.6)	0.1 (0)	0	
Other or don't know	4,391	2.4 (2.4)	2.9 (0.3)	2.5 (1.6)	
Steady partner					0.79
Yes	93,660	53.5 (11.0)	61.2 (0.6)	62.5 (6.8)	
No	59,436	46.5 (11.0)	38.8 (0.6)	37.5 (6.8)	
Age					0.88
12–17 years	20,276	0	13.3 (0)	11.9 (5.5)	
18–24 years	22,327	16.2 (9.5)	14.6 (0)	11.8 (5.6)	
25–34 years	31,646	31.3 (15.4)	20.7 (0)	20.2 (4.1)	
35–44 years	31,646	23.6 (9.2)	19.8 (0)	20.4 (5.4)	
45–54 years	26,465	13.6 (6.4)	17.3 (0)	15.9 (4.3)	
55 or more	21,980	15.3 (9.3)	14.3 (0)	19.9 (4.4)	
Race/color					0.85
White	67,778	42.4 (13.7)	44.2 (0.9)	52.2 (5.8)	
Black	15,497	16.4 (10.2)	10.1 (0.4)	7.0 (2.8)	
Mixed	68,083	41.3 (13.0)	44.5 (0.9)	40.8 (5.6)	
Other	1,737	0	1.1 (0.1)	0	
Schooling					<0.01
Up to incomplete fundamental	55,390	57.2 (11.5)	36.1 (0.7)	54.0 (6.7)	
Fundamental/incomplete high school	34,744	8.5 (6.3)	22.7 (0.5)	26.8 (6.0)	
High School/incomplete college	47,581	31.9 (11.3)	31.1 (0.5)	18.7 (5.3)	
College or higher	15,380	2.4 (2.5)	10.1 (0.5)	0.5 (0.5)	
Substance use and treatment					
Alcohol (12 months)	23,496	49.5 (12.8)	43.1 (0.7)	34.4 (5.9)	0.34
Binge drinking (30 days)	25,311	28.7 (12.5)	16.5 (0.5)	13.4 (3.5)	0.31
Tobacco (12 months)	65,943	45.3 (12.7)	15.3 (0.4)	19.1 (4.4)	<0.01
Amphetamines (12 months)	429	1.7 (1.7)	0.3 (0.1)	0	0.51
Benzodiazepines (12 months)	2,107	1.7 (1.7)	1.4 (0.1)	0.7 (0.7)	0.73
Cannabis (12 months)	3,865	10.5 (6.7)	2.5 (0.2)	4.7 (2.9)	0.06
Powder Cocaine (12 months)	1,340	3.6 (3.0)	0.9 (0.1)	0	0.45
Crack-cocaine (12 months)	451	5.3 (3.2)	0.3 (0.1)	0	<0.01
Ecstasy (12 months)	235	0	0.2 (0)	0	0.95
Inhalants (12 months)	318	3.6 (3.0)	0.2 (0)	0	0.03
Ketamine (12 months)	184	1.7 (1.7)	0.1 (0)	0	0.23
LSD (12 months)	289	0	0.2 (0)	0	0.95
Opioids (12 months)	2,152	1.7 (1.7)	1.4 (0.2)	1.1 (0.8)	0.93
Injected drug use (lifetime)	591	15.3 (12.7)	0.4 (0.1)	0	<0.01
Treatment (lifetime)	1,602	5.3 (3.2)	1.0 (0.1)	0	0.29
Substance dependence (12 months)					
Alcohol	2,328,062	3.0 (3.1)	1.5 (0.2)	0.5 (0.5)	0.47
Benzodiazepines	299,149	0	0.2 (0.1)	0	0.96
Amphetamine	18,335	0	0	0	-
Cannabis	438,121	0	0.3 (0.1)	0	0.95
Powder cocaine	276,815	0	0.2 (0.0)	0	0.96
Crack cocaine	134,214	0	0.1 (0.0)	0	0.98
Self rated health					<0.01
Very good	31,428	2.8 (2.9)	20.5 (0.7)	27.2 (6.3)	
Good	80,425	13.7 (7.2)	52.7 (0.7)	37.6 (7.7)	
Regular	35,072	73.6 (8.9)	22.8 (0.6)	25.9 (4.6)	
Bad	4,976	9.9 (5.7)	3.2 (0.2)	6.5 (2.5)	
Very bad	1,194	0	0.8 (0.1)	2.9 (2.3)	

associated with worst outcomes among PLWHA, mostly related to increased non-adherence and loss to follow-up (Azar et al., 2010).

Overall, the prevalence of illicit NIDU was higher among PLWHA, even though p -values were not lower than 0.05 for all drugs (probably due to the small number

of PLWHA in the sample). This finding was already suggested in many international and national cohorts, as well as in studies using administrative records (Larsen et al., 2010; Weber et al., 2015).

One important issue regarding Latin American countries is related to the Epidemiology of substance

use – where cocaine ranks second (after cannabis) in the overall prevalence of illicit substance use (UNODC, 2018). This is particularly challenging as there are no effective medications for treatment and harm reduction, such as methadone for opioid use. Thus, new interventions targeting cocaine and crack-cocaine are needed in the region. A possible way forward was suggested in a qualitative study showing PLWHA did not relate their substance use with worst HIV outcomes (Oliveira Serra et al., 2017). Authors suggested that it is necessary to develop new strategies to better inform these individuals, but the effectiveness of information remains to be tested. In addition, note that the prevalence of crack-cocaine and cannabis was higher than found at an HIV clinical cohort (De Boni et al., 2018), which may indicate those users may have difficulty accessing HIV care-supporting “seek-test-treat-retain” strategies.

Finally, PLWHA self-reported a worst general health, contrary to our previous findings (Machado et al., 2017). It is possible our findings from a specific cohort do not reflect overall SRH from Brazilian PLWHA due to differentiated care and specific characteristics of individuals able to receive care at reference services.

The present study is not free of limitations. The major one is the small number of individuals reporting to have received an HIV-positive diagnosis. The BHSU-III has limited statistical power respecting prevalence below 1.5% and HIV prevalence may be underestimated. This shortcoming precluded multivariable analysis to estimate the adjusted odds of substance use. Considering most demographic variables did not present different distribution across the groups, the single confounder that should be evaluated in future studies is sexual orientation. As sexual minorities may be prone to minority stress – which was already associated with increased substance use (Schuler et al., 2018) a syndemic approach may be useful to disentangle the associations.

Apart from the above mentioned limitations, our results, showing the higher prevalence of substance use among PLWHA in Brazil, and the scarcity of overall and integrated substance use disorders treatment in the country, call for new strategies to prevent and treat substance use disorders in the context of HIV services, as supported by the latest International AIDS Association-Lancet Commission (Bekker et al., 2018). For instance, the Commission advocates for integrated, patient-centered, health systems that can address multiple health challenges at the same time, as well as renewed efforts to address sociostructural factors and stigma that are associated with both HIV and substance use. In the post COVID-19 era, we believe that eHealth and mobile technology, Data Science and highly integrated digital systems will be fundamental tools to

reach these goals in the HIV and behavioral fields (Balanzá-Martínez et al., 2020).

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Disclosure statement

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