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## LETTER

### Use of Smoking Cessation Aids in a Convenience Sample of PLHIV in a Canadian Tertiary Care Clinic

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#### Abstract:

#### Background:

Tobacco smoking is among the most significant predictors of cardiovascular disease and lung cancer in People Living with HIV (PLHIV). Smoking rates in this population are high, necessitating more effective smoking cessation strategies. We conducted a descriptive analysis of tobacco-related clinical and sociodemographic characteristics of smokers at a tertiary care HIV clinic in Montreal and an exploratory analysis of smoking cessation methods in order to identify potential areas of improvement in the clinic's approach to smoking cessation.

#### Methods:

A convenience sample of patients completed a 10-minute questionnaire on tobacco-related behaviours and outcomes. Use of smoking cessation methods was compared using McNemar's exact test with a Bonferroni correction for multiple testing ( $p < 0.01$  considered significant).

#### Results:

Seventy-two PLHIV participated. Two-thirds of our total participants were interested in quitting within six months, but the use of effective cessation strategies was low, particularly for counseling and oral therapy. Overall, oral therapy (e.g. varenicline) (16.7%) and counseling for cessation (5.6%) were used less than nicotine patches (50.0%) or 'other' methods (50.0%), which included abstinence and nicotine gum ( $p < 0.001$ ).

#### Conclusion:

Despite a small and potentially unrepresentative sample of HIV positive tobacco smokers at our clinic, this study could help guide further research aiming to determine and address barriers to smoking cessation and access to effective smoking cessation aids in PLHIV. Future studies might consider factors that affect motivation to quit, such as co-morbid mental health and substance use disorders, or the attitudes of HIV healthcare providers.

**Keywords:** Tobacco smoking, Tobacco cessation, HIV, Smoking cessation, Co-morbidity, Clinical improvement, PLHIV.

#### Article History

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## 1. INTRODUCTION

Tobacco smoking is among the most significant predictors of cardiovascular disease [1 - 6] and lung cancer [7 - 12] in

People Living with HIV (PLHIV). In fact, in the antiretroviral era, smoking may contribute to a greater loss of life in PLHIV than HIV itself [9, 13]. In a Danish cohort of PLHIV, 12.3 (95%CI, 8.1-16.4) life years were lost in association with smoking compared to only 5.1 (95%CI, 1.6-8.5) life years lost in association with HIV [9]. In addition, smoking rates are high in PLHIV, with studies reporting 21-84% of individuals being

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current smokers (vs. 19% in the general population) and 9-30% being former smokers [14 - 21]. In PLHIV, higher rates of unemployment, substance abuse, low education, loneliness, depression, and food insecurity have all been associated with smoking or not being ready to quit [2, 22 - 24].

Smoking is a major modifiable health risk factor that, if addressed effectively, could drastically improve the health of PLHIV. Smokers living with HIV who abstain from tobacco smoking for more than a year are at lower risk of acquiring AIDS-defining illnesses, cardiovascular events, non-AIDS-defining malignancies, and bacterial pneumonia [12, 25 - 27]. We described the tobacco-related clinical and sociodemographic characteristics of a convenience sample of tobacco smokers at the Chronic Viral Illness Service (CVIS), a tertiary HIV clinic in Montreal. We conducted an exploratory analysis of smoking cessation methods to identify potential areas of improvement in the clinic's approach to smoking cessation.

## 2. METHODS

The CVIS follows approximately 2,000 PLHIV and provides multi-disciplinary care for adult patients with chronic illnesses such as HIV and HCV. The clinic is located within the McGill University Health Centre (MUHC), a large public tertiary care hospital. Inclusion criteria for this study were patients with 1) HIV infection; 2) self-reported current tobacco smoking; 3) appointments at the CVIS for clinical care; and 4) the ability to read and understand French or English. Self-reported non-smokers or former smokers were excluded from this study. This study was approved by the MUHC Research Ethics Board.

### 2.1. Data Collection

A convenience sample of tobacco smoking PLHIV with clinical care appointments at the CVIS was recruited from April to September 2017 to complete a 10-minute questionnaire on tobacco-related behaviours and outcomes. An on-site study coordinator (BL) notified care providers when one of their patients had a history of tobacco smoking (identified in weekly reviews of the clinical database) and encouraged referral of additional patients meeting study criteria.

Questionnaires were self-administered by patients or administered orally by study staff as needed. The questionnaire contained a combination of scales from a Papadakis *et al.* study and additional questions relevant to tobacco smoking in PLHIV [28]. Questions about cigarette use, smoking-related symptomatology, previous cessation attempts, marijuana and e-cigarette use, and readiness to quit were included in the questionnaire. Written informed consent was obtained prior to survey completion. No compensation was provided. Additional information, such as Hepatitis C (HCV) coinfection, HIV-infection risk category, and sociodemographic data were collected through chart review.

## 2.2. Statistical Analysis

Analyses were conducted using R statistical software. Survey responses and participant characteristics are summarized using descriptive statistics. Differences in use of smoking cessation aids are compared using McNemar's exact test, with a Bonferroni correction to account multiple testing ( $p$ -value cut-off of 0.01 for  $n=5$  tests).

## 3. RESULTS

A total of 72 PLHIV participated in this study. The characteristics of the sample are summarized in Table 1. Most participants were men (83.3%) and/or HIV mono-infected (59.7%). The most common HIV transmission risk categories were Men who have Sex with Men (MSM) (40.3%) and People Who Inject Drugs (PWID) (38.9%).

**Table 1. Characteristics of the study population and CVIS population with visits from September 1<sup>st</sup> 2016 to September 1, 2017.**

		Study population	CVIS clinic
N		72	1533
Age, years (median [IQR])		51 [43, 57]	52 [44, 59]
Sex (%)	Female	12 (16.7%)	486 (31.7%)
	Male	60 (83.3%)	1047 (68.3%)
Infection Type (%)	HIV mono-infected	43 (59.7%)	1363 (88.9%)
	HIV/HCV co-infected	29 (40.3%)	170 (11.1%)
HIV transmission risk-factors (%)	MSM	29 (40.3%)	470 (30.7%)
	PWID	28 (38.9%)	104 (6.8%)
	Endemic country	8 (11.1%)	347 (22.6%)
	Heterosexual/Other	12 (16.7%)	419 (27.3%)
Lowest recorded CD4* (median [IQR])		533 [341.5, 702.5]	529 [355, 728]
Highest recorded VL* (median [IQR])		<40 [<40, <40]	<40 [<40, <40]
Detectable VL* (%)		17 (23.6%)	245 (16.0%)

\*From September 1st 2016 to September 1st 2017, inclusive  
HCV=Hepatitis C; VL=viral load

A summary of questionnaire responses is provided in Table 2. Half of the participants (51.4%) were followed by an allied health professional, such as a social worker or psychologist. Participants smoked a median of 330 cigarettes (or about 13 packs) per month and started smoking at a median age of 20 years. About half of the participants (47.3%) reported having their first cigarette of the day within the first 30 minutes of waking. Smoking to reduce stress appeared to be the most common reason for smoking (56.9%), followed by smoking for pleasure (51.4%) and smoking to reduce anxiety (45.8%). Two-thirds of participants (67.6%) reported that they would like to quit within the next six months and a similar number (65.3%) indicated they were interested in a clinical trial on smoking cessation. About half of the participants (55.6%) had smoked marijuana in the previous six months.

Table 2. Questionnaire responses.

Followed by an allied health professional (%)		37 (51.4%)
Age started smoking (median [IQR])		20 [14, 27]
Number of cigarettes per month (median [IQR])		330 [150, 600]
Reasons for smoking tobacco (%)	Reduce stress	41 (56.9%)
	Reduce anxiety	33 (45.8%)
	Social reasons	23 (31.9%)
	Weight control/appetite suppression	8 (11.1%)
	Pleasure	37 (51.4%)
	Other:	22 (30.6%)
	“Habit”	13
“Dependence”	5	
No reason provided	3	
“Pain”	1	
From waking, time to first cigarette (%)	Within 5 minutes	22 (30.6%)
	6-30 minutes	12 (16.7%)
	31-60 minutes	14 (19.4%)
	After 60 minutes	24 (33.3%)
Symptoms (%)	Cough	28 (38.9%)
	Phlegm or mucous	29 (40.3%)
	Wheezing	27 (37.5%)
	Shortness of breath from mild exertion	43 (60.6%)
Ever made a quit attempt (%)		63 (87.5%)
	Number of quit attempts (median [95%CI])	3 [1, 4]
Smoking cessation methods used (%)	Patch	36 (50.0%)
	Oral therapy*	12 (16.7%)
	Counseling	4 (5.6%)
	Other:	36 (50.0%)
	“Abstinence”	23
	“Nicotine gum or tablets”	8
No method provided	5	
Feelings about quitting smoking (%)	I would like to quit in the next 30 days	22 (31.0%)
	I would like to quit in the next six months	26 (36.6%)
	I am not planning on quitting in the next six months	23 (32.4%)
Confidence in ability to quit smoking, 0-10 (median [IQR])		5.5 [3.0, 8.0]
Smoked marijuana in the past six months (%)		40 (55.6%)
	Number of grams of marijuana per month (median [95%CI])	3.5 [1.0, 19.2]
Ever used e-cigarettes (%)		7 (9.7%)
Self-reported smoking-related illnesses (%)	Heart disease, stroke or heart failure	3 (4.2%)
	Cancer	5 (6.9%)
	COPD	4 (5.6%)
	Diabetes	2 (2.8%)
	Depression or anxiety	30 (41.7%)
Interested in a clinical trial on smoking cessation (%)		47 (65.3%)

\* e.g. varenicline or bupropion

† Among people who smoke marijuana

COPD=Chronic Obstructive Pulmonary Disease

The results of each McNemar’s test are summarized in Table 3. Among the 63 participants who had ever made a quit attempt (87.5%), both oral therapy (e.g. varenicline or bupropion) (16.7%) and smoking cessation counseling (5.6%) were used less than either nicotine patches (50.0%) or ‘other’ methods (50.0%), which included abstinence and/or nicotine gum.

#### 4. DISCUSSION

The current study describes the smoking experience in a clinical sample of PLHIV and highlights some potential shortcomings in the CVIS’s strategy to smoking cessation.

Although two-thirds of the participants in our sample expressed an interest in quitting within six months, access to

**Table 3. Comparisons of smoking cessation method use by McNemar's exact test.**

Oral therapy vs. counseling	$p=0.077$
Oral therapy vs. nicotine patches	$p<0.001$
Oral therapy vs. 'other'	$p<0.001$
Counseling vs. nicotine patches	$p<0.001$
Counseling vs. 'other'	$p<0.001$

$p=0.01$  used as cut-off for statistical significance

the majority of effective smoking cessation methods was relatively low. Half of the study participants (50.0%) had ever used nicotine patches to quit smoking, making Nicotine Replacement Therapy (NRT) the most frequently used smoking cessation aid. While this finding indicates that NRT is accessible to many participants, it could also suggest that NRT may not be optimally prescribed or administered to this group. Studies in PLHIV have found that compliance with NRT tends to be poor [29 - 32].

Counseling and oral therapy were underutilized evidence-based smoking cessation strategies in our sample. Only 12 (16.7%) participants had ever tried oral therapy to quit smoking and only 4 (5.6%) had ever received counseling to quit smoking. In the general population, bupropion nearly doubles the odds of abstinence at 12 months compared to placebo (OR 1.85, 95% CI 1.63-2.10) and varenicline nearly triples the odds (OR 2.89, 95% CI 2.40-3.48), whereby the abstinence rate of control participants is about 10% [33]. Few Randomized Controlled Trials (RCTs) have been conducted in PLHIV, but these treatments appear to be efficacious and well-tolerated [29]. Similarly, a recent RCT of 248 PLHIV in France found that quit rates with varenicline were higher than the standard of care alone (OR 2.5, 95% CI: 1.0 to 6.1) [34].

Smoking cessation counselling is another effective intervention used in the general population, with increased relative quit rates of 1.39 (95%CI: 1.24 to 1.57) and 1.98 (95%CI: 1.60 to 2.46) for individual and group counselling, respectively [33]. Studies of smoking cessation counseling in PLHIV have been hindered by methodological issues such as small sample sizes or lack of randomization [29]. However, they appear to demonstrate a positive, albeit modest, effect [29]. In clinics with a multi-disciplinary model of HIV care, such as the CVIS, there is potential for smoking cessation counselling to be delivered along side other types of counselling, in conjunction with optimally dosed NRT or oral therapy. Indeed, combined counselling and pharmacological smoking cessation interventions are effective in PLHIV, with quit rates ranging from 11.8 to 28% [35]. In RCTs involving the general population, quit rates at three to six months ranged from 10% to 36.8% for counselling plus pharmacotherapy compared to 3.3 to 10.3% for pharmacotherapy alone [35]. Early evidence suggests that these rates could be further improved if paired with concurrent treatment for depressive symptoms, which are highly prevalent in our sample [35, 36]. For example, in a recent RCT of PLHIV, combined NRT and cognitive behavioural therapy for smoking cessation and depression/anxiety resulted in a 46% quit rate at six months, significantly higher than the 5% quit rate for NRT alone [36].

Our study had several limitations. Firstly, we were only able to recruit a limited number of participants, which hindered our ability to conduct more in-depth analyses. Secondly, given time and financial constraints, patients were recruited by convenience sampling, with many coming from the Canadian Coinfection Cohort and from the clinic outreach nurse [37]. Thus, our sample is dissimilar from the general pool of HIV positive patients and likely a non-representative subset of smokers at the CVIS, consisting of more HCV-seropositive persons and more individuals followed by an allied health professional who may have more social or psychological needs than the overall pool of smokers in our clinic. This is supported by the descriptive statistics of CVIS patients provided in Table 1. Notably, 39% of our sample was PWID and 40.3% were HCV co-infected, while only 7% and 11.1% of CVIS patients with visits during the study period were PWID or HCV co-infected, respectively. There is currently no systematic identification of tobacco smoking patients at the clinic, which hinders our ability to assess the comparability of our sample with the general pool of tobacco smokers. This may limit the generalizability of our findings. We also did not collect any information about educational or financial characteristics of participants, pain, healthcare provider attitudes and/or practices, or timing of smoking cessation interventions, all of which are important factors for smoking cessation [2, 33, 38 - 43].

## CONCLUSION

Our findings suggest the need for further research to determine and address barriers to smoking cessation and access to effective smoking cessation aids in PLHIV. Future studies might consider factors that affect motivation to quit, such as co-morbid mental health and substance use disorders, or the attitudes of HIV health-care providers.

## FUNDING

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## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Approval was obtained by the Ethics Committee at the McGill University Health Centre (2017-2994), who reviewed and monitored this study.

## HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

## CONSENT FOR PUBLICATION

Written informed consent was obtained prior to survey completion.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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