An Examination of Marijuana Use Among a Vulnerable Population in Canada

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Abstract

Objectives Although the perceived risk of cannabis has decreased over the last few years, the contribution of marijuana use to the burden of disease on society is significant. Globally, Indigenous peoples have rates of marijuana use that are significantly higher than that of the general population. Understanding patterns of use is fundamental to developing appropriate policy and programming strategies to improve health and well-being.

Methods This study examined the characteristics of respondents who had ever been frequent marijuana users (used more than once a week), among a cross-sectional sample of 340 people, aged 18 and over, from Kettle and Stony Point First Nation in Ontario, Canada. The research incorporated Aboriginal-specific measures, examining issues related to colonialism and racism. Logistic regression models were used to assess the extent that sociodemographic variables, body mass index, mental health (depression, anxiety), licit substance use (alcohol and tobacco), Historical Loss Scale, Childhood Trauma Scale, and Measure of Indigenous Racism Experience (MIRE) Interpersonal Racism Scale predicted ever having been a frequent marijuana user.

Results Aboriginal-specific issues were not associated with marijuana use nor was marijuana use related to depression or anxiety. However, ever engaging in frequent marijuana use was reported by more than half of the sample and associated with being younger, male, and a smoker.

Conclusions The high prevalence of frequent marijuana use (53.2 %) suggests normalization of the substance that may indicate a potentially large public health problem.

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Introduction

Marijuana use continues to be a key issue for policy makers, clinicians, and researchers across the globe. It is the most commonly used illicit drug in the majority of developed countries [1, 2]. At the global level, the annual prevalence rate among 15- to 64-year-olds in 2010 was estimated at 2.6–5.0 % or 119 to 224 million people [2]. There is, however, variance in past year prevalence rates by geographic area as follows: Oceania (10.9 %), Africa (7.8 %), the Americas (6.6 %), Europe (5.2 %), and Asia (1.9 %). Within the context of the Americas, North America had a prevalence rate of 10.8 %, with higher rates in the USA (14.1 %) than in Canada (10.7 %) [2, 3]. Lifetime use in Canada was 41.5 % in 2010 among those 15 years and over [3].

Marijuana is not an innocuous substance. It has been documented that about one tenth of marijuana users and about 50 % of frequent users (i.e., people who consume cannabis on a daily basis) become dependent [4]. Consumption is associated with subsequent use of other licit and illicit drugs [5–8] and poor educational outcomes [6, 9]. The research literature has also identified a host of health risk behaviors and outcomes linked to marijuana use, including obesity [10], injuries [11], and automobile accidents [12–14]. There is also some evidence linking marijuana use to poor respiratory health [15], psychosis, and other mental health disorders [16–19]. Evidence is not definitive in terms of cancer risk [20, 21] and all-cause mortality [22]. Overall, although the perceived risk of cannabis use has decreased over the last few years [2], the contribution of marijuana use to the burden of disease on society is significant [23]. Thus, understanding risk factors for use, especially frequent use, is fundamental to developing appropriate policy and programming strategies.

This public health issue is particularly important in the context of subpopulations with markedly high use. Evidence
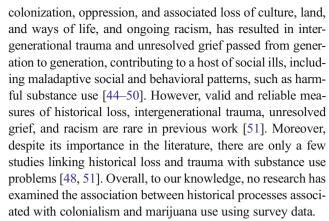
from studies conducted in countries around the world indicates that Indigenous peoples have rates of marijuana use that are significantly higher than that of the general population [24, 25]. Coupled with the well-documented international evidence of their poor well-being across a range of social, economic, and health indicators [26–28], this potentially large-scale public health issue among Indigenous peoples requires greater understanding. Indeed, there is a paucity of work in the area, with some international research on cannabis use among Indigenous peoples from the USA [25, 29–31], Australia [30, 32, 33], New Zealand [34], and Russia [35]. However, very little research has been done on the topic in Canada on the Indigenous population, which is also known as the Aboriginal population, with subgroups including First Nations, Métis, and Inuit.[1] This is particularly the case among First Nations [37], with some tangential work focused on the issue in relation to suicide [38], general mental health, and substance abuse disorders [39], and these works tend to focus on a narrow subset of users, such as youth.

This is partly a product of insufficient data, as most national surveys that are amendable to prevalence rate estimation and correlation analysis have either excluded First Nation communities and/or the number of First Nations participants in such surveys has often been too small to perform any meaningful analyses [40]. Given the demographic profile of First Nations in Canada, greater understanding of marijuana use in this relatively young and rapidly growing population and their communities would be beneficial for improving their health and well-being, including appropriate resource allocation and service provision.[2]

The social determinants of Aboriginal health and well-being have been underscored [43]. In particular, the historical legacy of Aboriginal peoples, broadly characterized by colonization, oppression, and associated loss of culture, land, and ways of life, and ongoing racism, has resulted in intergenerational trauma and unresolved grief passed from generation to generation, contributing to a host of social ills, including maladaptive social and behavioral patterns, such as harmful substance use [44–50]. However, valid and reliable measures of historical loss, intergenerational trauma, unresolved grief, and racism are rare in previous work [51]. Moreover, despite its importance in the literature, there are only a few studies linking historical loss and trauma with substance use problems [48, 51]. Overall, to our knowledge, no research has examined the association between historical processes associated with colonialism and marijuana use using survey data.

Other research has identified a number of factors associated with marijuana use in the general population, including sociodemographic factors, particularly age, sex, and gender [1, 52–58]; cigarette smoking [59, 60]; and prior experience with legal drugs [61]. Therefore, in addition to considering Aboriginal-specific factors, it is also important to examine whether these variables are relevant to marijuana use among First Nations.

The objective of the present research is to identify factors associated with ever being a frequent user of marijuana (i.e., more than once per week at any point during one's life) among a representative sample from one First Nations community, including issues of particular importance to Aboriginal peoples, such as historical loss and racism. This work has direct implications for planning and development of appropriate programming and service delivery. Finally, it highlights important gaps and directions for future research.

Methods

Sample

The sample was collected as part of Researching Health in Ontario Communities (RHOC), a multidisciplinary project, funded by the Canadian Institutes of Health Research, seeking to improve understanding of mental health, substance use, and violence (MSV) problems in Ontario communities. It used novel techniques, including a mobile research laboratory, to gather data in diverse communities across the province, including remote, disadvantaged, urban, and First Nations [62].

The data used in the present analyses were collected between October 2012 and February 2013 ($N=340$) from adult (aged 18 and over) members of the Kettle and Stony Point First Nation community. The sampling involved an inclusionary approach by including volunteers as well as randomly selected respondents, including 229 who were recruited from a random sample of names drawn from the band list, an additional 88 who volunteered to participate in the research without being actively recruited, and an additional 23 who

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[1] The term "Aboriginal peoples" or "Indigenous peoples" refers to the original peoples of Canada and their descendants. There are three subgroups recognized by the constitution of Canada, including Indian (First Nations), Métis, and Inuit, who are diverse across language, culture, and history. There are two different categories of Indians, Registered or Treaty, which are sometimes referred to as "Status Indians," and non-Registered or non-Status Indians. Registered Indians are registered under the Indian Act and are entitled to specific rights and benefits, and Treaty Indians are individuals who are part of a First Nation or Indian band that signed a treaty with the Crown. Non-Status or non-Registered Indians are people who self-identify as Indians, but they are not entitled to register under the Indian Act. Métis refers to individuals of mixed ancestry (First Nations and European), and Inuit are a people of the circumpolar region in Arctic Canada [36].

[2] In 2011, according to Canada's National Household Survey, 4.3 % of Canadians (or 1.4 million people) reported having an Aboriginal identity [41]. Between 2006 and 2011, the Aboriginal population (20.1 %) grew at a much faster rate than the non-Aboriginal population (5.2 %), which is reflected by higher fertility and lower median age; for example, the median age of the Aboriginal population is 28 years versus 41 years for the non-Aboriginal population. Of particular interest for this study, First Nations people accounted for 60.8 % of the total Aboriginal population, with a median age of 26 years and almost half under 25 compared to 29.5 % in the non-Aboriginal population [41]. Finally, the proportion of First Nations who are Registered Indians living on-reserve is projected to increase from an estimated 60 % in 2001 to 75 % in 2021 [42].

completed the survey as part of participating in an interview study of experiences accessing and receiving care for mental health, substance use, and/or violence issues. For the random sample, 400 names were randomly selected from the band membership list of members 18 years and older who either lived on or near the reserve. Members living off-reserve but close to the reserve community typically have family and community ties with the reserve and often access a variety of services. Thus, they are in many key respects part of the on-reserve community.

Recruitment of the random sample consisted of the following stages. First, an advance letter and information pamphlet was sent by mail to people's homes. The advance letter briefly described the research and informed the individual that researchers would be contacting them by telephone and/or by visiting their homes. Second, within a week's time, the researchers began telephoning individuals' homes, with up to six callbacks, varying the times of day and days of the week that the calls were made. Third, the researchers went to people's homes to explain face-to-face the purpose of the study. During these contacts, appointments were scheduled at convenient times for participants to visit the mobile lab and complete the survey. If needed, transportation to and from the mobile lab was provided where possible. Of the initial 400 randomly selected band members, 229 individuals completed the survey at the mobile lab (response rate of 57.3 %).

In addition, as noted above, 88 community members who were not randomly selected but were interested in the survey participated in the study, thereby allowing all members of the community a chance to participate. In Indigenous community research, this is a common practice, as it is often stipulated in memorandums of understanding with communities that members coming forward to participate are not to be turned away.

The sample of individuals who participated in an interview about their experiences with mental health, substance use/addiction, and violence services comprised the following: individuals who self-identified as having mental health and/or substance use/addiction problems and had sought help for one or both issues and family members of individuals with mental health and/or substance use/addiction problems. They were recruited through posters that were placed in community agencies. Ten persons with problems and 13 family members were recruited through this method.

There were no significant differences between the random sample and those individuals who were not randomly selected with respect to the variables used in this analysis. Thus, to maximize the total number of cases for analyses, all samples were pooled together.

All participants (from all samples) completed a core questionnaire that contained standard questions regarding mental health, substance use, and violence problems, and all were given gift cards to compensate them for their time.

The study was approved by the Research Ethics Board of the Centre for Addiction and Mental Health and the Band Chief and Council. The research protocols address the Tri-Council Policy Statement on Ethics of Research Involving the First Nations, Inuit, and Métis Peoples of Canada [63]. They also take into account the principles of ownership, control, access, and possession [64]. Aggregate data produced through this project is owned jointly by the RHOC investigators and participating community. Consistent with the research protocols, Kettle and Stony Point First Nation screened this research paper for potential impact on the community and the interests of its members.

Measures

Marijuana use was measured using the following question: Did you ever use marijuana (also known as cannabis, "weed," "grass," "pot," "hashish, "hash," hash oil, etc.) more than once a week? The response categories were "yes" and "no."

Other variables measured in the questionnaire included age (years); gender (male, female); education (categorized as less than high school, completed high school, any post-secondary education); marital status (married or living with partner; widowed, divorced, separated; single); household income (less than $20,000, $20,000–$39,999, $40,000–$59,999, $60,000 and over); height (meters) and weight (kilograms), which were used to create the body mass index (BMI), by dividing the weight by the square of height [65]; tobacco use (lifetime cigarette use at any time—yes or no); alcohol consumption (lifetime alcohol use at any time—yes or no); the World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF) which measured whether the participant met the criteria for major depression or anxiety disorder in the past 12 months [66]; and the Childhood Trauma Scale, using eight items related to a cross section of experiences as a child or teenager, such as physical abuse and family relations, scored as no (0) or yes (1), ranging from 0 to 8 [67]. Internal consistency of the Childhood Trauma Scale was moderate (Cronbach's $\alpha=0.67$). In addition, given the unique cultural and historical experiences of Aboriginal peoples, the study included the Historical Loss Scale (Cronbach's $\alpha=0.92$), using 12 items addressing the frequency of respondents identifying with losses related to colonialism, such as land, language, traditional and spiritual ways, family, and culture, scored as never (0), yearly (1), monthly (2), weekly (3), and daily (4), ranging from 0 to 48 [51], and the Measure of Indigenous Racism Experience (MIRE) Interpersonal Racism Scale (Cronbach's $\alpha=0.89$), using 10 items addressing respondent perceptions about the frequency of experiencing racism across different contexts, scored as never (0), almost never (1), sometimes (2), fairly often (3), and very often (4), ranging from 0 to 40 [68].

Analysis

All analyses were conducted using SPSS Statistics 21. Missing data were handled using the multiple imputation method, which is considered to be the method of choice of most statisticians in principle [69–71]. Descriptive statistics are provided followed by bivariate and multivariate analyses using logistic regression, with marijuana use regressed onto the explanatory variables.

Results

As shown in Table 1, the lifetime prevalence of reported use of marijuana more than once per week was 53.2 %. The sample included more females than males, the average age was 41,

Table 1 Descriptive statistics of the sample

Variables	Mean (standard deviation)
Ever used marijuana more than once a week	
Yes	53.2 %
Age	41.2 (14.4)
Gender	
Male	45.1 %
Education	
Less than high school	34.6 %
Completed high school	16.9 %
Any post-secondary education	48.4 %
Marital status	
Married or living with partner	50.6 %
Divorced, separated, or widowed	22.6 %
Single	26.7 %
Income	
<$20,000	36.1 %
$20,000–$39,999	29.5 %
$40,000–$59,999	12.4 %
$60,000+	22.0 %
Body mass index (BMI)	30.7 (6.2)
Cigarettes (ever smoker)	
Yes	86.4 %
Alcohol (ever drank)	
Yes	94.0 %
Historical Loss Scale (0–48)	22.4 (13.5)
Childhood Trauma Scale (0–8)	2.6 (2.0)
MIRE Interpersonal Racism Scale (0–40)	15.2 (8.7)
Met the criteria for major depression or anxiety disorder in the past 12 months	
Yes	27.5 %

N=340

about half had at least some post-secondary education, about half were married or living with a partner, income was distributed fairly evenly across the income categories, average BMI was in the obese range, 86 % had ever smoked, 94 % had ever consumed alcohol, and 27 % met the criteria for depression, anxiety, or both. The average score for the Historical Loss Scale was 22.4; Childhood Trauma Scale, 2.6; and the MIRE Interpersonal Racism Scale, 15.2.

Table 2 presents the bivariate relationships between the explanatory variables and frequent marijuana use (i.e., yes, responded has ever used marijuana more than once a week) as well as a multivariate logistic regression model showing the unique effects of each independent variable controlling for all other variables. As shown in the bivariate analysis (unadjusted odds ratios), age, gender, BMI, and cigarette use were the only variables significantly associated with ever having been a frequent marijuana user. Those who had ever engaged in frequent marijuana use were more likely to be younger, male, have a lower BMI, and have ever been a cigarette smoker than those who had never used marijuana frequently in their lifetime. The multivariate analysis, which accounted for the effects of all other variables, identified the same significant predictors, with the exception that BMI was no longer statistically significant.

Discussion

Age, Gender, and Smoking

This work is congruent with studies on non-Indigenous populations [1, 52–60], which have identified age, gender, and previous experience with smoking cigarettes as associated with marijuana use. These findings were consistent across the bivariate and multivariate analyses.

The current finding of First Nations males reporting greater marijuana use than females supports calls for a gendered approach to understanding and preventing marijuana use. Initiatives centered on the context of initiation and use must be developed in a manner consistent with the elevated risk among males. While this study provides insight into lifetime prevalence use and the role of gender, gendered issues pertaining to other aspects of the addiction cycle, including dependence, treatment, and relapse, require further study for appropriate programming, given the growing body of work on male and female differences in this area from both physiological and social approaches [32, 54, 58].

The higher lifetime use by younger people is of particular concern for Canada's First Nations because nearly half of the First Nations population in Canada is 24 years and under. Importantly, prevention can play a major role in the addiction cycle given the links between initial experience with marijuana use and lifetime dependence [72], as well as the evidence

Table 2 Bivariate (unadjusted) and multivariate (adjusted) associations with frequent marijuana use

Variables	Unadjusted OR (95 %CI)	Adjusted OR (95% CI)
Age	0.96* (0.95, 0.98)	0.96* (0.93. 0.98)
Gender		
Female (reference)	1.00	1.00
Male	2.86* (1.76, 4.64)	3.34* (1.87, 5.95)
Education		
Less than high school (reference)	1.00	1.00
Completed high school	0.928 (0.44, 1.98)	0.69 (0.27, 1.74)
Any post-secondary education	0.81 (0.47, 1.40)	1.24 (0.62, 2.47)
Marital status		
Married (reference)	1.00	1.00
Divorced, separated, widowed	0.71 (0.41, 1.24)	0.89 (0.45, 1.76)
Single	1.39 (0.80, 2.41)	0.72 (0.36, 1.45)
Income		
<$20,000 (reference)	1.00	1.00
$20,000–$39,999	0.79 (0.46, 1.35)	1.06 (0.55, 2.04)
$40,000–$59,999	0.81 (0.39, 1.68)	1.22 (0.51, 2.90)
$60,000+	0.57 (0.26, 1.29)	0.72 (0.33, 1.54)
Body mass index (BMI)	0.96* (0.92, 0.99)	0.96 (0.92, 1.01)
Cigarettes (ever smoker)		
No (reference)	1.00	1.00
Yes	4.90* (2.21, 10.88)	5.50* (2.17, 13.97)
Alcohol (ever drank)		
No (reference)	1.00	1.00
Yes	2.89 (0.91, 9.1)	1.27 (0.22, 7.36)
Historical Loss Scale	1.00 (0.99, 1.02)	1.00 (0.98, 1.02)
Childhood Trauma Scale	1.05 (0.94, 1.17)	1.09 (0.95, 1.26)
MIRE Interpersonal Racism Scale	1.01 (0.98, 1.04)	0.99 (0.95, 1.03)
Mental health (depression and/or GAD)		
No (reference)	1.00	1.00
Yes	1.02 (0.59, 1.78)	0.84 (0.40, 1.77)

N=340

OR odds ratio

*p<0.05

supporting marijuana use as a gateway drug for other licit and illicit drug use [5–8]. Also, this work reinforces findings from a previous study, which highlighted the high prevalence rate of marijuana use among First Nations youth and proposed interventions for adolescents in light of the evidence of significant use among students in grades 5 through 8 [37].

Cigarette smoking was associated with a greater likelihood of lifetime frequent marijuana use, which, again, is a consistent finding in the literature [59, 60]. Cigarette smoking is an ongoing public health concern in the First Nations population, with rates more than triple those found for the rest of Canada [73]. Of particular concern is evidence showing that co-occurring tobacco and cannabis use poses a greater risk for cannabis use disorders as well as psychosocial problems, and it is associated with poorer cannabis cessation outcomes [60]. Similar to marijuana use, it has been estimated that just over half of First Nation smokers who live on reserve began smoking between the ages of 13 and 16 [73]. Given these findings, comprehensive approaches incorporating public health strategies focused on concurrent tobacco and cannabis use may be useful, particularly if they incorporate both a gender and age perspective.[3]

Aboriginal-Specific Measures

The present analysis included important determinants of health and well-being with particular relevance to Aboriginal peoples, including colonialism and racism. This is the first

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[3] Across numerous Aboriginal cultures, tobacco is considered part of a rubric of sacred elements; in fact, tobacco use is widespread in many ceremonies. Thus, suppression of tobacco consumption purely on health grounds may be difficult. In this respect, public health strategies may best be developed in the context of education on over consumption and misuse rather than abstinence from any activities related to its use.

study to examine these variables in the context of marijuana use among Canada's First Nations. While it has been proposed that these social factors may lead to destructive coping mechanisms, such as substance use [44, 46, 48–50, 74], there was no evidence that they played a role in ever having been a frequent marijuana user in the present sample. It is, however, possible that other substances of abuse, such as alcohol or other illicit drug use, are related to historical loss, intergenerational trauma, and racism; therefore, other research examining the association between historically important issues for Aboriginal peoples and other substance use and addiction is needed. This echoes Wesley-Esquimaux and Smolewski [46] who warn that there is no "single" historic trauma response.

The absence of an effect of the social processes of key importance to Aboriginal peoples is worth pursuing further. It has been well documented that there are significant intra-Aboriginal differences across a range of socially relevant factors, including cultural, spiritual, historical, geographic, and economic [26, 40]. Despite this diversity, there are also common experiences of First Nations people, including what Wesley-Esquimaux and Smolewski [46] refer to as the "universalization" of the historic experience of colonialism, historical loss, intergenerational trauma, and racism. What is more, within First Nations reserves, there is a distinct set of social networks, norms, and attitudes which form within these geographical spaces [40]. All of this may result in homogeneity of experience within a community; in other words, because the entire community is exposed to historical loss, intergenerational trauma, and racism, the experience of these social processes is not perceived as unique, but a way of life, and so pervasive that it is difficult to find an effect. This issue has been raised by Rose [75], who comments that if everyone is exposed to a potential cause, studies such as these will fail to detect an effect, as the search for potential causes assumes heterogeneity of exposure, resulting in different outcomes. It is also possible that individuals have not had the opportunity to fully reflect on the issues associated with the Aboriginal-specific measures, capturing aspects of the colonization process, historical losses, racism, behavioral consequences, etc. Even though a main goal of this work is to provide quantifiable analyses of the relationship between marijuana and issues associated with colonialism, it may be that qualitative research would better capture the lived experience and perspectives of individuals with respect to these issues.

Methodologically, despite the internal consistency of Aboriginal-specific measures used in this work, including Historical Loss Scale and MIRE Interpersonal Racism Scale, their validity across Indigenous populations has yet to be demonstrated, given the diversity of histories, cultures, and socioeconomic circumstances. Whether these finding are consistent across other First Nations will be determined through future analysis. At this point, stakeholders may choose to prioritize issues surrounding age, gender, and cigarette

smoking in designing public health initiatives targeting use of marijuana.

Normalization of Marijuana Use

Although age, gender, and smoking behavior were important and there was no association between theoretically relevant, Aboriginal-specific, social processes and marijuana use, a shockingly large percentage of people (53.2 %) reported ever using marijuana more than once a week. The high prevalence rate of frequent use of the community signals a potentially significant public health problem, in light of the risk of dependence and a host of social and health effects, particularly among frequent marijuana users [4, 6–8, 11, 13, 22, 23].[4]

In addition to the potentially large social and health consequences, the high prevalence rate suggests a normalization of frequent marijuana use in this community. Let us examine this point further. Social norms set strict limits on diversity in society; indeed, behavioral decisions tend to be governed by the range of what is acceptable within our social environment [75, 77]. In the case of drug use, this point is evident in work examining the changes in drug use patterns of emigrating populations from low-consumption nations to higher-consumption nations [78]; that is, migrants are more likely to "acquire" the drug rates of their country of destination. An explanation for the normalization of cannabis use in this case may be the recent decline in perceived risk of this illicit substance in recent years [2], which may directly affect relative risk perception when substance use, both licit and illicit, is being considered. Availability issues such as cost, supply lines, and potency, which may influence dependency, are other considerations and are discussed in detail below in the context of future research endeavors. Overall, the driver of marijuana use among First Nations communities of Canada, including issues surrounding normalization, requires a systematic analysis across communities as well as case studies within individual communities.

Program and Policy Implications

In light of the apparent normalization of marijuana use, the implications for community services, such as law enforcement (e.g., police, corrections officer), education (e.g., teacher, principal), community groups (e.g., community health centre, shelter or transition house), health professionals, as well as mental health and addiction service provision, are potentially significant. From a community perspective, service priorities may largely ignore marijuana use by being centered on

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[4] Statistically, even low effect sizes can have dramatic effects given the large segment of the population engaged in marijuana use [76]. In other words, a large number of people carrying a small risk of dependence can yield more cases of dependence than a small number who are at high risk [75].

substances perceived as "more dangerous" or traditionally problematic, including tobacco, alcohol, and prescription drugs [43, 79]. Thus, if the pervasive sentiment in a community is that marijuana use is normal, acceptable, and less dangerous than other substance use, it may be necessary for community services to target the entire population rather than simply focusing on the most extreme, high-risk, individual consumers of marijuana.

Public health campaigns and prevention initiatives may require an approach that highlights the harmful consequences of use, such as potential dependence, poor educational outcomes, or the link between marijuana use and motor vehicle collisions.

In terms of treatment, if frequent marijuana use is normalized, users may delay or be less inclined to seek out help from professionals except under extreme circumstances when the consequences of use may be severe. Therefore, special educational and health promotion measures may need to be taken to make people aware of signs of dependence.

The development of initiatives must be timely and responsive to the consumers of information and services in First Nation communities. Indeed, a key criticism of public health campaigns dealing with cannabis use is the lack of response to the changing face of individual users; for example, the stereotypical profile of a user, including male youth, dysfunctional, disadvantaged, delinquent, and antisocial, does not reflect the changing social norms and associated differences in potential users in Western culture [80]. This inability to identify with public initiatives reflects a template approach, which fails to take into account the vast differences within subgroups of users across key socially relevant factors, such as racialized identity, ethnicity, age, gender, socioeconomic status, culture, etc., with various experiences, outcomes, and contexts of use. The result is less than optimal public health approaches and service provision.

Finally, the availability of relevant programs and services dealing with substance use issues surrounding marijuana is of particular importance for Aboriginal stakeholders; it has been well documented that access to formal and appropriate health care, substance use, and wellness services is a long-standing point of major concern [43, 81, 82]. This will involve advocacy efforts rooted in empirical evidence to demonstrate a need for programs and services to leverage appropriate capital and resources for appropriate training and physical and human infrastructure.

Limitations and Future Research

In terms of research limitations and future research, this work did not use a measure of marijuana dependence, such as the World Health Organization's International Statistical Classification of Diseases and Related Health Problems (ICD) or the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM) although use of these measures in the context of marijuana has serious shortcomings [80]. The measure of marijuana use in this study focused on distinguishing people who have ever been "high risk or frequent" users from "low risk/nonusers." Unfortunately, the question did not allow us to distinguish nonusers and casual use from dependence and harmful or problematic use or current from former users. Also, frequency of use and potency of the cannabis consumed were not addressed [29, 80].

This research has shed light on Canada's Aboriginal population generally, but the focus of this study is on one First Nation, which is also distinct in important ways from other First Nation communities. In other words, this study is based on a sample from one community and is not generalizable to all First Nations or Aboriginal peoples. It is a major point, as intra-Aboriginal differences have been underscored across a number of indicators and outcomes for Inuit, Métis, and First Nations [26]. This diversity may be particularly relevant given the evidence documenting the different prevalence rates and determinants of drug use for biethnic and monoethnic individuals across the social determinants of health [83].

There has been a rise in the cultivation of cannabis, associated with an increase in potency, which may be a contributing factor in terms of dependence and treatment demand among cannabis users, and shorter supply lines making it more accessible and affordable, with implications for initiation [2]. Since First Nation communities are characterized by different sizes, as well as a host of unique cultural, historical, economic, social forces, and varying degrees of isolation from other non-Aboriginal communities, the notable lack of research in this regard of the illicit drug in question, including the potency, quantity, and origins of supply and networks of distribution, as well as the demand and context of consumption, must be addressed.
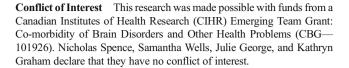
Interdisciplinary approaches to studying substance use generally, and marijuana use specifically, among Aboriginal peoples are warranted. For example, while social and individual factors largely influence exposure and the initial experimentation with substances, genetic factors may determine the transition from substance use to substance dependence [84]. From the international literature, genetic heritability of substance dependence and associated symptoms has been found in a sample of Southwest California (Mission) Indians [31], which may indicate the salience of addressing both biological and social vulnerability to marijuana use across the life course. Currently, there is a gap in all regards with respect to marijuana use and Aboriginal peoples in Canada, including the importance of potential normalization documented in this study. Future research must develop a framework for understanding all stages of marijuana use, taking these factors into account.

Conclusion

In sum, these findings have implications for understanding marijuana use in the Aboriginal population. First, the high prevalence of frequent marijuana use shows that this is an issue deserving of much more attention from both a research and policy perspective. Second, research must examine further the effects of gender and age in this population; undoubtedly, a gendered and life course approach, mindful of the multiple social determinants of health and well-being and unique challenges facing Aboriginal peoples, is warranted to understand the drivers of use within these analytically important social factors. Third, the general link between licit and illicit substance use, particularly the link between cigarette smoking and marijuana, warrants attention in light of the dearth of such work in the context of First Nations. Fourth, these findings signal that public health programs, ranging from prevention to service provision, must incorporate approaches that take social factors, including social norms, gender, and age, as well as lifestyle behaviors, such as cigarette smoking, into account. Finally, variables that theoretically play a prominent role in the literature specific to Aboriginal well-being (colonialism, intergenerational trauma, historical loss, and racism) must continue to be developed in a manner that recognizes the methodological issues surrounding the development and use of such measures, including the homogeneity or universalization of certain historic experiences and intra-Aboriginal or heterogeneity among this group; and relationships should be examined empirically across the realm of mental health and substance use issues, disproportionately plaguing this group in society.

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