Original Investigation

Co-use and Mixing Tobacco With Cannabis Among Ontario Adults

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Abstract

Introduction: The legalization of nonmedical cannabis in 2018 may have important implications for tobacco use in Canada. There is a risk of renormalizing tobacco use with co-use of tobacco and cannabis introducing nontobacco users to tobacco. Co-use is the use of both substances by the same individual at the same time or on different occasions, as well as mixed together. This study assessed the prevalence of co-use and mixing of tobacco and cannabis among Ontario adults and the characteristics of the users.

Aims and Methods: Data from the 1996 to 2017 cycles of the Centre for Addiction and Mental Health Monitor ($n = 4481$) were used to examine trends in prevalence and the proportion of Ontario adults co-using and mixing tobacco and cannabis. Logistic regression was used to study associations between user characteristics and co-use and mixing.

Results: Co-use of cigarettes and cannabis among cannabis users declined from 59.8% in 1996 to 41.7% in 2017. Past-year e-cigarette use was the only predictor of co-use. From 2015 to 2017, 31.1% (95% confidence interval 27.0, 35.9) of Ontario adults who used cannabis reported mixing it with tobacco in the past year. Being white, past-year e-cigarette use, having moderate or high nicotine dependence, and having moderate or high risk for cannabis problems were significant predictors of mixing among cannabis users.

Conclusion: Given the well-established negative health effects associated with tobacco use, alongside a growing evidence base for negative health effects of cannabis smoking, co-use and mixing could pose a considerable public health concern in the context of legalization.

Implications: Considerable effort has been expended to reduce tobacco smoking. However, current efforts to reduce tobacco smoking may be diminished since this study found the prevalence of mixing tobacco and cannabis among cannabis users in Ontario to be higher than expected. Mixing tobacco and cannabis may introduce nontobacco smokers to tobacco, exposing them to health risks associated with both cannabis and tobacco smoke. Therefore, there is a need to monitor changes in tobacco use and understanding implications for tobacco control and cessation programs within the changing environment of cannabis legalization in Canada and other jurisdictions.

Introduction

In Canada, the prevalence of adult cigarette smoking has declined by more than 50% since the 1950s.¹ Although this decline has slowed in recent years, the proportion of daily or occasional smokers among Canadians aged 12 and older (15.8% in 2018) is one of the lowest among developed countries.^{2,3} In contrast, the prevalence of cannabis use in Canada is among the highest in the world.⁴ In the first half of 2019, approximately 16.9% of Canadians aged 15 and older reported using cannabis in the last 3 months.⁵ While the popularity of non-smoked forms of cannabis administration (eg, edibles, beverages) is receiving increased attention, according to the Canadian Cannabis Survey 2018, 89% of those who used cannabis in the past year reported smoking as their main method of consumption.⁶

While the health effects of cannabis use are uncertain, the negative health effects of tobacco use are not.⁷ Use of both cannabis and tobacco is troubling, because there may be an additive effect on physical health. Evidence from a systematic review indicates that simultaneous use of tobacco and cannabis is associated with increased risk of cannabis dependence, poor psychological outcomes, and difficulties quitting cannabis.⁸ Evidence also supports a higher risk of respiratory distress among individuals who smoke both tobacco and cannabis compared to cannabis or tobacco alone.⁹ With the risk of additive health effects, understanding the use of both substances has become increasingly important, especially in the context of cannabis legalization.

The co-use of both cannabis and tobacco is relatively common and frequent across the lifespan.⁹ Evidence suggests cannabis use is more common among adults who smoke cigarettes than those who do not.^{10–13} The inverse is also commonly observed, with cigarette smoking being more common among adults who use cannabis.⁸ A nationally representative cross-sectional study found the use of both cannabis and tobacco increased from 2003 to 2012 among American adults.¹² Other recent nationally representative studies in the United States have found increases in nondaily cigarette smoking

among current cannabis users aged 12 years and older¹⁴ and increases in daily cannabis use among current, former, and never-smokers over the past decade, with rapid increases among youth and female cigarette smokers.¹³

Co-use of tobacco and cannabis refers to either the use of both by the same individual but independently, either at the same time or on different occasions, as well as the use of both substances mixed together.¹⁵ Mixes of tobacco and cannabis can be used at the same sitting in what are also known as “blunts” or “spliffs.” Blunts refer to partially or completely hollowed out cigar papers or rolled tobacco leaves filled with cannabis.^{15,16} Spliffs are loose leaf tobacco added to cannabis joints, a process known as mulling or mixing.⁹ Users of spliffs indicate that they add tobacco to cannabis in order to reduce the strength of the cannabis, reduce the cost of use, and improve the burning characteristics.¹⁷

In North America, studies focusing on the use of tobacco and cannabis together mostly report on blunt use or the use of both by the same individual but independently.¹⁸ Studies focusing on broader definitions of mixing cannabis and tobacco are limited to Europe or Australia.^{15,17,19,20–24} In one international study, Canada had the highest frequency of cannabis users who mixed tobacco and cannabis together in North America; however, the study relied on a nonrepresentative convenience internet sample.²⁵

With the use of nonmedical cannabis now legal in Canada, cannabis use may become more visible and socially acceptable. Therefore, cannabis legalization may normalize smoking behavior in general and increase both cannabis and tobacco smoking.²⁶ Mixing poses an additional health risk by introducing nontobacco users to tobacco smoking.²⁶ Also, individuals who add tobacco to their cannabis joints may be at an increased risk of tobacco-related illnesses, as cannabis smokers typically take longer, and deeper, inhalations, exposing themselves to more tar.^{27,28}

There is a gap in research focusing on co-use of and mixing of cannabis and tobacco in North America, and it is unknown how common mixing is in Canada. This paper reports on the prevalence of mixing tobacco with cannabis, and cigarette use among cannabis

*Co-use defined as having used cannabis and smoked a cigarette in the past 12 months among past-year cannabis users.

Figure 1. The percentage reporting co-use in the past 12 months, among adults 18 and older in the CAMH-M survey in Ontario, Canada 1996–2017. Co-use defined as having used cannabis and smoked a cigarette in the past 12 months among past-year cannabis users.

users, in a representative sample of Ontario adults and describes the characteristics of the users.

Methods

Survey Design

Data were derived from the 1996 to 2017 cycles of the Centre for Addiction and Mental Health (CAMH) Monitor, a survey of 59 475 Ontario adults conducted by the CAMH including a subset of data from 2015 to 2017 ($n = 10\,867$).²⁹ The survey is regionally stratified with two-stage (telephone number and respondent) probability sampling. In 2017, a dual-frame sampling strategy was implemented, which included a cell phone sample, in addition to the list-assisted landline sampling frame. The survey was conducted by random digit dialing methods and computer-assisted telephone interviewing. The response rate for the list-assisted sample component ranges from 37% to 69% from 1996 to 2017. Samples were weighted to represent the Ontario adult population.

Population

The survey population is noninstitutionalized adults aged 18 or older in Ontario. Only individuals who are phoneless were excluded from the survey, which includes less than 0.5% of the Ontario population.²⁹ The analytic set restricted the sample to those who reported cannabis use in the past year ($n = 4481$) to examine trends in cigarette use among cannabis users from 2015 to 2017, and the question on using cannabis mixed with tobacco at the same time was asked in survey years 2015–2017.

Variables

All variables were self-reported. Cannabis use was defined as the use of cannabis, marijuana, or hash in the past year and included all different modes of cannabis use (eg, smoking, vaping, and edibles). Past-year cigarette use was defined as daily or occasional cigarette smoking in the previous 12 months. Former smokers were ever-smokers who had not smoked within the past year.

Co-use was defined in two ways. Individuals were coded as *co-users* of cigarettes and cannabis if they responded “yes” to having used cannabis and having smoked a cigarette in the past 12 months. Individuals were defined as *mixers* if they reported having used cannabis, marijuana, or hash mixed with tobacco in the past year.

Nicotine dependence was assessed using the Heaviness of Smoking Index. The variable is derived from two questions: (1) time to the first cigarette in the morning and (2) the number of cigarettes smoked per day. Nicotine dependence was dichotomized to “Low Dependence” (0–2) and “Medium or High Dependence” (3–6).³⁰ The risk for cannabis use problems was assessed using the Cannabis Involvement Score (ASSIST-CIS) (subscale of the WHO ASSIST—Alcohol, Smoking, and Substance Involvement Screening Test). The variable is derived from six items assessing cannabis use and past 3-month cannabis-related problems. The risk for cannabis problems was dichotomized to “Low Risk” (≤ 3) and “Moderate or High Risk” (≥ 4).²⁹ Electronic cigarette use was defined as having used an e-cigarette at least once in the past 12 months.

Demographic variables included in our analyses are sex (male, female), age (18–29, 30–39, 40–49, and ≥ 50), education (<high school, completed high school, some postsecondary, university degree), household income (<\$40 000, \$40 000–69 999, \$70 000–99 999, $\geq$ \$100 000, not stated), marital status (married, previously married, never married), race (white, non-white), recent immigrant status

(recent immigrant, not recent immigrant), and living in a rural area (rural, nonrural area).

Statistical Analyses

Stata 15.0 software was employed to conduct analyses.³¹ The prevalence of (1) mixing and (2) co-use of tobacco and cannabis was assessed for all of Ontario adults and by sex, age, education, income, marital status, race, recent immigrant status, living in a rural area, current cigarette use, past-year cigarette use, and e-cigarette use. Weighted data were used in all percentage calculations to be representative of the population of interest.

Trend analysis for cigarette use among cannabis users was conducted from 1996 to 2017.

Analyses of mixing and co-use of cigarettes and cannabis were restricted to 2015–2017—the period in which the question on mixing was asked. All analyses controlled for the complex survey design using the *svy* procedures in Stata. CAMH guidelines require that an estimate with a coefficient of variation between 16.6 and 33.2 be considered moderate variation and should be interpreted with caution. An estimate with a coefficient of variation greater than 33.3 is considered unstable and should be suppressed. Chi-square tests and confidence intervals (CIs) were used to assess significant differences. All statistical tests were considered significant at $p < .05$.

Logistic regression analysis was used to obtain odds ratios to assess (1) the impact of survey year on use of cigarettes among cannabis users; (2) the impact of sex, age, education, household income, marital status, race, recent immigrant status, living in a rural area, nicotine dependence, cannabis use problems, and past-year e-cigarette use on mixing; and (3) the impact of sex, age, education, household income, marital status, race, recent immigrant status, living in a rural area, nicotine dependence, cannabis use problems, and past-year e-cigarette use on co-use of cigarette and cannabis.

Results

A total of 59 475 participants responded to the survey from 1996 to 2017. The mean age was 51 (SD 17.4, range 18–103). Of these, 57.8% were female. The majority of respondents were white (89.0%), married (61.5%), postsecondary educated (33.4%), and lived in a nonrural area (81.1%).

Co-use of Cigarettes and Cannabis

From 1996 to 2017, there was a significant decrease in cigarette use among Ontario adults who used cannabis (OR: 0.95, 95% CI 0.94, 0.96, $p < .001$) (Figure 1). Use of cigarettes among cannabis users declined from 59.8% in 1996 to 41.7% in 2017. Among past-year cannabis users, there were significant differences in co-use by education, income, marital status, and recent immigrant status (Table 1). The prevalence of co-use was highest among respondents who had not completed high school, made less than \$40 000, were previously married, and were not recent immigrants. No significant differences were found for sex, age, race, and living in an urban/rural area. Among past-year cannabis users, there were significant differences in nicotine dependence, the risk for cannabis problems, and past-year e-cigarette use (Table 2). The prevalence of moderate or high nicotine dependence, moderate or high risk for cannabis problems, and past-year e-cigarette use was higher for co-users of tobacco and cannabis than those who did not co-use.

The logistic regression model predicting co-use of cigarette and cannabis showed that past-year e-cigarette use was a significant

Table 1. Percentage Reporting Co-use and Mixing of Tobacco and Cannabis in the Past 12 Months, Among Adults 18 and Older in the CAMH-M Survey in Ontario, Canada 2015–2017

	Co-use			Mixing		
	N	Yes (n = 461) % (95% CI)	p	N	Yes (n = 208) % (95% CI)	p
Gender			.0591			.0169
Male	277	41.1 (36.3, 46.0)		132	35.0 (29.4, 41.1)	
Female	184	33.8 (28.4, 39.7)		76	24.1 (18.2, 31.1)	
Age			.2371			.0355
18–29	109	35.6 (29.5, 42.1)		71	35.6 (28.3, 43.6)	
30–39	69	45.0 (35.2, 55.2)		33	38.4 (26.6, 51.7)*	
40–49	63	35.1 (26.9, 44.2)		29	28.3 (19.2, 39.6)*	
≥50	220	41.1 (35.8, 46.6)		75	21.8 (16.8, 27.9)	
Education			<.0001			.2145
Less than HS	49	77.0 (59.7, 88.3)		16	41.5 (23.8, 61.7)*	
High school	133	50.0 (42.6, 57.4)		59	33.1 (25.3, 42.0)	
Some postsecondary	188	37.4 (32.0, 43.1)		87	33.9 (27.2, 41.3)	
University degree	89	25.2 (19.2, 32.5)		46	24.5 (17.1, 33.7)*	
Income [‡]			.0066			.5895
<\$40 000	104	50.0 (40.5, 59.5)		43	36.2 (26.1, 47.7)	
\$40 000–69 999	73	42.5 (32.8, 52.8)		31	35.2 (23.7, 48.8)*	
\$70 000–99 999	58	35.9 (26.8, 46.0)		30	32.0 (21.2, 45.1)*	
≥\$100 000	144	32.1 (26.7, 37.9)		73	27.3 (21.1, 34.5)	
Not stated	82	46.2 (37.1, 55.6)		31	34.1 (23.6, 46.3)*	
Marital status			<.0001			.0303
Married	192	35.0 (30.2, 40.2)		85	24.6 (19.2, 30.8)	
Previously married	111	63.5 (53.9, 72.2)		30	39.0 (24.9, 55.3)*	
Never	155	37.3 (31.6, 43.4)		93	36.2 (29.4, 43.5)	
Race			.4930			.0084
White	408	39.3 (35.4, 43.3)		172	28.4 (24.0, 33.2)	
Non-white	50	35.3 (25.5, 46.4)		34	46.3 (33.4, 59.8)	
Recent immigrant			.0197			.5557
Yes	5	**		8	38.1 (18.0, 63.4)*	
No	455	39.3 (35.6, 43.2)		200	31.0 (26.6, 35.7)	
Rural			.3955			.8306
Yes	64	42.8 (33.2, 52.9)		27	32.5 (22.1, 45.0)*	
No	397	38.2 (34.3, 42.2)		181	31.2 (26.6, 36.1)	

Definitions: Co-use defined as having used cannabis and smoked a cigarette in the past 12 months among past-year cannabis users; mixing defined as having used cannabis, marijuana, or hash mixed with tobacco in the past 12 months among past-year cannabis users.

Statistical tests were considered significant at $p < .05$.

*Moderate variation (interpret with caution) (16.6–33.2).

**Estimate is unstable and, therefore, was suppressed (≥33.3).

‡Canadian dollars.

Table 2. Percentage of Moderate or High Nicotine Dependence, Moderate or High Risk for Cannabis Problems, and Past-Year E-Cigarette Use Among Past-Year Co-users or Mixers of Tobacco and Cannabis in the CAMH-M Survey in Ontario, Canada 2015–2017

	Nicotine dependence			Risk for cannabis problems			Past-year e-cigarette use		
	N	Moderate or high (n = 557) % (95% CI)	p	N	Moderate or high (n = 237) % (95% CI)	p	N	Yes (n = 472) % (95% CI)	p
Co-use			<.0001			.0002			<.0001
Yes	163	35.4 (29.5, 41.7)		121	28.7 (23.4, 34.6)		136	43.8 (36.7, 51.3)	
No	0	0		116	16.4 (13.2, 20.1)		89	21.7 (17.0, 27.3)	
Mixing			.0001			.0004			<.0001
Yes	53	23.2 (16.5, 31.4)		83	40.7 (32.3, 49.5)		87	49.0 (40.1, 57.9)	
No	60	9.41 (6.75, 13.0)		153	24.1 (20.0, 28.8)		136	22.3 (18.4, 26.9)	

All statistical tests were considered significant at $p < .05$.

Definitions: Co-use defined as having used cannabis and smoked a cigarette in the past 12 months among past-year cannabis users; mixing defined as having used cannabis, marijuana, or hash mixed with tobacco in the past 12 months among past-year cannabis users; moderate or high nicotine dependence defined as scoring 3 to 6 on Heaviness of Smoking Index; moderate or high risk for cannabis problems defined as scoring 4 or greater on Cannabis Involvement Score—Alcohol, Smoking, and Substance Involvement Screening Test; past-year e-cigarette use defined as having used an e-cigarette at least once in the past 12 months.

predictor of co-use (Table 3). The odds of co-using cigarettes and cannabis was 3.22 (95% CI 1.89, 5.49) among respondents who used e-cigarettes in the past year compared with respondents who had not used an e-cigarette in the past 12 months. Sex, age, education, income, marital status, race, recent immigrant status, living in a rural area, and risk for cannabis problems were not significant predictors of co-use (Table 3).

Mixing

From 2015 to 2017, 31.1% (95% CI 27.0, 35.9) of Ontario adults who used cannabis reported mixing in the past year. Specifically, in 2015, 31.1% (95% CI 23.2, 40.3) of cannabis users reported mixing in the past year compared to 31.7% (95% CI 23.5, 41.2) in 2016 and 31.1% (95% CI 25.2, 37.7) in 2017. The percentage of mixers appears to be stable since 2015. There were significant differences in mixing by sex, age, marital status, race, and past-year e-cigarette use (Table 1). That is, the prevalence of mixing was significantly higher among men, younger adults, previously married people,

white respondents, and past-year e-cigarette users. No significant differences were found for education, income, living in an urban/rural area, and immigrant status. Among respondents who mix tobacco and cannabis, there were significant differences in nicotine dependence, the risk for cannabis problems, and past-year e-cigarette use (Table 2). The prevalence of moderate or high nicotine dependence, moderate or high risk for cannabis problems, and past-year e-cigarette use was higher for mixers of tobacco and cannabis than those who did not.

The logistic regression model predicting mixing showed race, nicotine dependence, the risk for cannabis problems, and past-year e-cigarette use were significant predictors of mixing among cannabis users (Table 3). The odds of mixing were 2.34 (95% CI 1.20, 4.56) higher among white respondents than non-white respondents, 3.13 (95% CI 1.63, 6.00) higher among moderate or high nicotine dependence than low nicotine dependence, 2.11 (95% CI 1.30, 3.42) higher among moderate or high risk for cannabis problems than low risk for cannabis problems, and 2.87 (95% CI 1.78, 4.60) higher

Table 3. Logistic Regression Models Predicting Co-use and Mixing in the Past 12 Months, Among Adults 18 and Older in the CAMH-M Survey in Ontario, Canada 2015–2017

	Co-use (<i>n</i> = 1222) Adjusted OR (95% CI)	<i>p</i>	Mixing (<i>n</i> = 812) Adjusted OR (95% CI)	<i>p</i>
Sex				
Female	1.00 (ref.)		1.00 (ref.)	
Male	0.78 (0.47, 1.30)	.342	1.30 (0.80, 2.10)	.285
Age	1.00 (0.97, 1.02)	.739	0.98 (0.96, 1.00)	.083
Education				
Less than HS	1.00 (ref.)		1.00 (ref.)	
High school	0.40 (0.12, 1.31)	.129	1.17 (0.35, 3.92)	.795
Some postsecondary	0.39 (0.13, 1.22)	.106	1.54 (0.48, 5.01)	.468
University degree	0.32 (0.10, 1.07)	.064	1.43 (0.41, 4.99)	.579
Income [‡]				
<\$40 000	1.00 (ref.)		1.00 (ref.)	
\$40 000–69 999	1.42 (0.55, 3.65)	.464	1.17 (0.53, 2.61)	.683
\$70 000–99 999	0.68 (0.28, 1.66)	.390	0.61 (0.27, 1.39)	.242
≥\$100 000	0.99 (0.46, 2.13)	.972	1.10 (0.53, 2.25)	.814
Not stated	1.46 (0.59, 3.62)	.410	1.16 (0.52, 2.57)	.714
Marital status				
Married	1.00 (ref.)		1.00 (ref.)	
Previously married	1.97 (0.72, 5.36)	.183	1.52 (0.60, 3.89)	.379
Never	0.69 (0.33, 1.46)	.332	0.88 (0.45, 1.70)	.706
Race				
Non-white	1.00 (ref.)		1.00 (ref.)	
White	1.51 (0.73, 3.12)	.244	2.34 (1.20, 4.56)	.012
Recent immigrant				
Yes	0.38 (0.09, 1.67)	.199	0.69 (0.23, 2.05)	.505
Rural				
Yes	0.71 (0.32, 1.56)	.389	0.86 (0.39, 1.90)	.707
HSI				
Moderate or high	1.00	—	3.13 (1.63, 6.00)	.001
Risk for cannabis problems				
Moderate or high	1.22 (0.69, 2.15)	.495	2.11 (1.30, 3.42)	.003
Past-year e-cigarette use				
Yes	3.22 (1.89, 5.49)	<.001	2.87 (1.78, 4.60)	<.001

Definitions: Co-use defined as having used cannabis and smoked a cigarette in the past 12 months among past-year cannabis users; mixing defined as having used cannabis, marijuana, or hash mixed with tobacco in the past 12 months among past-year cannabis users; moderate or high nicotine dependence defined as scoring 3 to 6 on Heaviness of Smoking Index; moderate or high risk for cannabis problems defined as scoring 4 or greater on ASSIST-CIS; past-year e-cigarette use defined as having used an e-cigarette at least once in the past 12 months.

Age is a continuous variable.

Ref. = reference category.

[‡]Canadian dollars.

among past-year e-cigarette users than non-e-cigarette users. Sex, age, education, income, marital status, recent immigrant status, and living in a rural area were not significant predictors of mixing among cannabis users (Table 3).

Among cannabis users, the prevalence of mixing was higher among respondents who reported cigarette use in the past 12 months than respondents who reported no cigarette use (15.5, 95% CI 11.5, 20.7 and 54.5, 95% CI 47.1, 61.6, respectively). Among mixers, 70.6% (95% CI 61.9, 78.1) reported smoking cigarettes in the past year compared to 29.4% (95% CI 21.9, 38.1) who reported not smoking in the past year.

Discussion

There are three main findings in this study. First, almost 40% of adult cannabis users in Ontario report past-year cigarette smoking. Second, these data suggest that the process of mixing tobacco and cannabis is practiced by one-third of adult cannabis users in Ontario. Third, about one-third of cannabis users who mix are not current cigarette smokers. These results indicate that co-use and mixing of tobacco and cannabis are well established in Ontario.

In Ontario, the prevalence of cigarette use (38.5%) among adult cannabis users is statistically greater in comparison to mixing (31.1%) among adult cannabis users. However, the prevalence of cigarette use among adult cannabis users has significantly decreased since 1996. This may be a result of efforts to reduce tobacco rates in Ontario over this period (1996–2017). Finally, one-third of respondents who mix tobacco with their cannabis do not self-identify as tobacco cigarette smokers. This phenomenon of people who smoke tobacco and do not consider themselves smokers was also reported in a qualitative study of adult men who only smoke tobacco when mixing.²² Therefore, the prevalence of past-year tobacco use may be underreported since these individuals are not smoking cigarettes.

The prevalence of mixing tobacco and cannabis among cannabis users in Ontario is higher than expected. In a study by Hindocha et al.,²⁵ only 16% of Canadian respondents reported mixing cannabis with tobacco. However, the Hindocha study used an Internet panel that was not a representative sample and thus needs to be interpreted with caution. Our estimate of mixing also differs from Europe and the United States. In Europe, mixing tobacco with cannabis appears to be the norm among young cannabis users, with a 2007 study showing four out of five students who use cannabis add tobacco to their joints in Switzerland. In the United States, data from the National Survey on Drug Use and Health showed that in 2012, 66% of past-year cannabis users smoked blunts to consume their cannabis.^{23,27} However, these studies were conducted in 2007 and 2012, therefore, the prevalence may have changed in recent years.

Evidence suggests cannabis users who also smoke cigarettes are more dependent on cannabis and have poorer cessation outcomes than cannabis users who do not smoke cigarettes.⁸ Furthermore, cannabis users who smoke cigarettes are more likely to continue using cigarettes.³² Therefore, concurrent use of tobacco and cannabis may increase the frequency of cannabis use and cigarette use. Cannabis smoke has at least 33 known carcinogens, if adding tobacco to cannabis makes cannabis burn more easily and easier to inhale, there is potential for even greater health risks than those associated with the use of either alone.^{22,26} According to a recent review, co-use may pose an additive risk for toxicant exposure among

certain co-users, specifically blunt users. The review found higher breath carbon monoxide levels among blunts and higher levels of some carcinogens in cannabis smoke compared to tobacco smoke.³³ There is also some evidence indicating an increased risk of problematic cannabis use among blunt users.³⁴ However, there is insufficient research that directly assesses mixing or co-use and cannabis addiction, or the long-term health consequences of using blunts, spliffs, or independent co-use.¹⁵ Given that co-occurrence of cigarette and cannabis use may increase the frequency of cannabis use, understanding the additive effects of co-use and mixing on physical and mental health is important. There is a need for more research on the physical and mental health risks associated with mixing and co-use of cannabis and tobacco to inform cannabis policy and public education programming.

Limitations

This study had several limitations. The CAMH Monitor Survey did not differentiate between the different types of mixing of tobacco and cannabis. Therefore, the reported prevalence of mixing tobacco and cannabis does not differentiate between mulling or mixing and blunt use. The average response rate of the survey over the period 2015–2017 is low (38.7%). Therefore, the sample may not be fully representative of all population groups in Ontario, and we cannot predict the mixing behavior of nonrespondents. The study uses a self-reported survey. Therefore, the study is limited by social desirability biases and recall biases. Participants may underreport cannabis use since the survey was administered before nonmedical cannabis was legalized and began 4 years before medical cannabis was legal.

Implications

Over the past several decades, governments have expended considerable effort in implementing tobacco control interventions and policies. As a result, people have become more aware of the risks associated with tobacco smoking. Mixing tobacco and cannabis may introduce nontobacco users to tobacco. Therefore, nontobacco users are exposed to health risks associated with both cannabis and tobacco smoke.^{16,26} These individuals can also become dependent on tobacco through the “reverse gateway process,” which will diminish current efforts to reduce tobacco smoking.^{32,35} A nationally representative longitudinal study found cannabis use was associated with higher initiation of, the persistence of, and relapse to cigarette smoking among American adults.³² Others have suggested mixing as a potential explanation for increased risk among cannabis users to later cigarette initiation and progression to nicotine addiction.^{23,36} To address this concern, policies that prefer other modes of consuming cannabis over smoking (eg, edibles or vaporizing) and discourage smoking in public should be considered. Preliminary research suggests that the use of cannabis–tobacco mixture in vaporizers is rare. Therefore, vaping cannabis alone may be an important harm reduction strategy to reduce tobacco smoking among cannabis users.²⁵ However, further research on the health effects of vaping cannabis is needed. Recent evidence supports a decrease in smoking dried cannabis in Canada. According to the 2018 Canadian Cannabis Survey, smoking cannabis as the main method of consumption decreased from 94% in 2017 to 89% in 2018. Other methods of consumption such as edibles and vaporizing increased.⁶ Therefore, legalization may increase

smoking through normalization; however, the increase in availability and popularity of non-smoked cannabis products may attenuate this change. Nonetheless, with growing evidence suggesting an increased risk of nicotine dependence and cigarette smoking as a result of mixing, there is considerable cause for monitoring changes in tobacco use and understanding implications for tobacco control and cessation programs within the changing environment of cannabis legalization in Canada and other jurisdictions.

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Declaration of Interests

All authors declare that they have no conflicts of interest.

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