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Alcohol Consumption Among Cannabis Users in Vermont

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Abstract:

Objective: To examine the relationship between cannabis and alcohol consumption in Vermont; after the legalization of cannabis in 2018.

Methods: We used Vermont's Behavioral Risk Factor Surveillance System (BRFSS) survey; this data included only participants who had reported alcohol use in the past year (n = 3,781). We used multiple linear regression to compare frequency of cannabis use against days per month of alcohol consumption and binomial logistic to compare regression to the frequency in which cannabis was used against the odds of Heavy Alcohol Consumption (HAC).

Results: We found that low and moderate cannabis users had more days of alcohol consumption on average than non-users. High cannabis users, however, had fewer days on average than non-users of cannabis. Additionally, compared to non-users, low, moderate, and high cannabis use was associated with increased odds of HAC.

Conclusion: Our results suggest that cannabis use may be predictive of alcohol consumption, so individuals, clinicians, and policymakers should be aware of how cannabis use could impact a person's overall health picture.

Cannabis is widely used for both medical, recreational, and therapeutic purposes.¹ Despite its popularity. As cannabis legalization gains popularity nationwide, understanding how it modifies other substances' use is an increasingly important public health issue.

The relationship between cannabis use and subsequent alcohol use has been previously investigated. Previous surveys on a national level, such as the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), have collected data regarding cannabis use, alcohol use disorder (AUD), and other substance use disorders; however, there are discrepancies within the literature on whether the use of cannabis impacts alcohol usage. Some literature suggests that cannabis use may lead to increased alcohol consumption³. This contradicts other literature that proposes cannabis use may reduce the potential for the development of substance use disorders⁴, including AUD. Moreover, other studies found no association between cannabis and alcohol use.⁵

Because the relationship between cannabis use and alcohol consumption can vary, extrapolating current national findings to specific states may not be appropriate, so we aimed to investigate this relationship specifically in the State of Vermont. Our findings will be beneficial in public health as we may be able to extrapolate our results towards other regions in the United States that are demographically similar to Vermont.

Seventeen percent of adults in Vermont reported using cannabis once in the last 30 days in a 2018 survey⁷. Within this portion of Vermont adults historically using cannabis, it would be wise to understand how cannabis may impact other substance use. This research aimed to investigate whether there is an association between cannabis use and alcohol consumption among Vermont adults.

Methods

This cross-sectional study design used deidentified, pre-existing survey response data from the 2018 Vermont Behavioral Risk Factor Surveillance System (BRFSS) survey for adults. BRFSS is a telephone survey of adults, and study data were drawn from cannabis, alcohol, and demographic items. Inclusion criteria were (1) Adults (age ≥ 18) that are classified as residents of Vermont in 2018, who (2) successfully answered the questions of the BRFSS survey and indicated that they used alcohol in the past month were included in this study (N=3781). Some variables included response categories (i.e. don't know/not sure or refused) that were excluded from descriptive, frequency, logistic, and linear regression analyses. These responses were classified as missing, and the different sample sizes for each category were reported (Table 1).

Outcome Variables

Two dependent variables were used to evaluate alcohol use: (1) days that alcohol was consumed in the past 30 days and (2) *heavy alcohol consumption calculated variable* (HAC; defined as men having 14 or more drinks/week and women having 7 or more drinks/week).

Predictor Variable

The independent variable used in this study was the response to the question "In the past 30 days, how many days did you use cannabis?". Data was categorized (0 = "none", 1 to 10 days = "low", 11 to 20 days = "moderate", and 21 to 30 days = "high").

Covariates

Variables relating to study participant's demography were analyzed to assess the impact on alcohol and cannabis use. The variables included were age, sex (reported as male/female), race/ethnicity (reported as white non-Hispanic or people of color), education level (college graduate or not), and employment status (employed or unemployed).

Statistical analyses

Statistical analysis was conducted using IBM SPSS Statistics 27.0 with p -values less than 0.05, reporting statistical significance. Descriptive statistics were used to obtain a preliminary summary of this study population (*Table-1*). The frequencies of the study variables were examined to ensure adequate sample sizes, and primary statistical analyses were conducted to satisfy the assumptions of homogeneity of variance, linearity, and the normality of the distribution of residuals (See *Supplemental Material*).

Results

Study participants had a mean age of 56.1 (SD = 16.14). Participants were 94.7% (n=3627) white non-Hispanic ethnicity and 5.3% (n=203) non-white. 48.2% of the study participants were male (n=1867) and 51.8% were females (n=2003). With respect to education, 53.6% of participants had completed an undergraduate degree, and 46.4% of had not. With respect to employment, 61.9% (n=2386) of participants were employed and, 38.1% (n=1470) were not. 84.5% of the study population indicated that they did not use cannabis in the past month (n=3044), 7.9% indicated that they used cannabis 1-10 times (n=284), 2.6% used cannabis 11-20 times (n=92), and 5% used cannabis 21-30 times. 12.2% (n=475) of individuals displayed HAC and 84.5% (n=3044) did not.

Notice that categories may not sum up to a total N=3879 because of missing values that will be excluded from the analysis. HS= High School, Sd= standard deviation. N=count. C= cannabis.

Multiple Linear Regression

The multiple linear regression ([Table-2-](#)) shows the average number of days alcohol was consumed in the past 30 days predicted by cannabis use, sex, race, education, employment, and age. (among drinkers) After controlling for the confounding effects of age, sex, race, employment, and education, "low" and "moderate" (drinking) cannabis users consumed significantly more alcohol, having 1.799 (95% CI= 0.537, 3.061) and 5.157 (95% CI= 3.026, 7.289) more days of alcohol consumption respectively compared to non-users, respectively. "High" drinker cannabis users, however, did not have significantly higher levels of alcohol consumption.

Table 1-Multivariable linear regression of alcohol consumption days predicted. by covariates, and Cannabis use in the past month.

<i>Multiple linear regression of alcohol consumption days predicted by covariates and cannabis levels of use in the past month.</i>				
Independent Variable	Regression Coefficient	Std. Error	T-Statistic	Significance (Prob.)
Intercept				0.001***
Age in years	0.118	0.013	9.278	0.001***
SEX	-3.497	0.349	-10.026	0.001***
Race	0.540	0.791	0.682	0.495
Employment	-1.204	0.408	-2.951	0.003**
Education	1.438	0.350	4.109	0.001
Low C use	1.799	0.644	2.795	0.005**
Moderate C use	5.157	1.087	4.745	0.001
High C use	0.844	0.802	1.052	0.293

(F(8 , 3452)= 28.632, P < 0.001) with an R² of 0.062

* < 0.05, **<0.01, and *** < 0.001 Significance level is at P< 0.05. C= cannabis.

Binomial Logistic Regression

A logistic regression analysis was conducted ([Table-3-](#)) to evaluate the relationship between the likelihood of Heavy Alcohol Consumption (HAC) among drinkers predicted by cannabis use when controlling for sex, age, race, employment, and education.

Drinkers who used cannabis 1-10 times a month had 1.615 times the odds (95%CI 1.174,2.273) of having HAC compared to drinkers who did not use cannabis in the past month, and drinkers who

used cannabis 11-21 times a month had 2.294 times the odds (95%CI 1.375, 3.826) of HAC compared to drinkers who did not use cannabis. Drinkers who used cannabis 21-30 times in the past month had 1.684 times the odds (95% CI 1.112, 2.549) of HAC compared to those that did not use cannabis

<i>Binomial Logistic Regression</i>					
Characteristic	Estimate	St. Error	Wald	EXP(β)	P-Value
SEX (M=0, F=1)	0.337	0.106	10.007	1.40	0.002**
Employment (UN=1, EM=0)	-0.335	0.125	7.162	0.715	0.007**
Race/ Ethnicity (W=1, POC=0)	-0.036	0.231	0.025	0.964	0.875
Education (CG=1, All others=0)	-0.332	0.105	9.927	0.718	0.002**
Age in Years	0.001	0.004	0.022	1.001	0.883
Low MJ Use	0.479	0.174	7.556	1.615	0.006**
Moderate MJ Use	0.830	0.261	10.110	2.294	0.001***
High MJ Use	0.521	0.212	6.065	1.684	0.014*
Intercept	-1.924	0.302	40.523	0.146	0.001***

$\chi^2(8, N=3418)= 45.893, p = 0.001$

Significance level is at $P < 0.05$, * < 0.05 , ** < 0.01 , and *** < 0.001 , CG=College Grads, C=cannabis.

Discussion

This study aimed to examine the relationship between cannabis and alcohol consumption in Vermont after its legalization. The 2018 BRFSS was conducted during the year that possession and private consumption of cannabis was legalized in Vermont¹¹. This study investigated the frequency of cannabis consumption and its relationship to alcohol consumption. Additionally, we found that cannabis consumption was associated with increased odds of heavy alcohol consumption. Low, moderate, and high cannabis use increased the odds of heavy alcohol use among people who consume alcohol. High cannabis users, however, did not have significantly higher levels of alcohol consumption. Alongside cannabis use, significant predictors of alcohol consumption days were male sex and unemployment status. In contrast, female sex was associated with fewer days of alcohol consumption; but with an increased risk of heavy alcohol consumption. Our findings also confirm a relationship between age and alcohol consumption, denoting an increase in the amount of alcohol consumed for every year increase in age.

Our results are consistent with previous research in college students, which found that heavy cannabis users generally consumed less alcohol. Still, when they did, they were more likely to overdrink compared to low-moderate cannabis users⁸. Additional research supports our results on the odds of higher alcohol consumption for female participants and males having more consecutive days of dual-use^{9,8}. A study on substitution and complementarity of alcohol and cannabis also validates our findings on the association between increased alcohol consumption and age⁵.

Limitations

The primary limitation of this study is data quality. Our data is derived from self-reported surveys, allowing for the possibility of response bias. As mentioned before, Vermont is a somewhat demographically homogenous state. The extent to which our findings can be generalized to other States with different socioeconomic and demographic structures is not clear.

Implications

Legalizing cannabis offers several societal benefits, but it is also essential to consider its risks. Our results suggest that cannabis use may be predictive of alcohol consumption, so individuals, clinicians, and policymakers should be aware of how cannabis use could impact a person's overall picture of health.

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