Substance Use, General Health, and Mental Health Outcomes in States with and without Medical Marijuana Laws

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Introduction

Background

- Since 1996, many states within the US have enacted medical marijuana laws (MML)[1]
- However, how MMLs may impact the prevalence of marijuana and other substance use, and mental health conditions remains unclear[2]

Purpose

- The aim of this study was to examine differences in substance use, general health, and mental health between states with and without MML

Hypothesis

- Based on prior research, we hypothesized that individuals living in states with MMLs would report significantly more substance use and poorer general and mental health

Methods

Participants

- This was a secondary data analysis of a publicly available, de-identified Behavioral Risk Factor Surveillance System (BRFSS) data set[3]
- In 2020, of the 22 states that completed the marijuana use module
  - 14 states had passed MML (*n* = 143,151)
  - 8 states had not (*n* = 67,744)

Measures

- **Marijuana use**
  - Number of days of marijuana use in the past 30 days
  - Method of use (e.g., smoke, eat, drink, vaporize, dab, other ways)
  - Reasons for using (e.g., medical, non-medical, or both)
- **Alcohol use**
  - Number of days of drinking and binge drinking in the past 30 days
  - Driving at least once after having too much to drink
- **Tobacco use**
  - Smoking at least 100 cigarettes in life
  - Current use of cigarettes
- **e-cigarette use**
  - Lifetime use of e-cigarettes
  - Current use of e-cigarettes or other electronic vaping products
- **General health**
  - 5-point Likert-type scale (1: excellent - 5: poor)
- **Mental health quality**
  - Number of days their mental health (including stress, depression, and problems with emotions) was not good in the past 30 days
- **Depressive disorder**, including depression, major depression, dysthymia, or minor depression
- **Average sleep:** number of hours of sleep in a 24-hour period
- **Demographic characteristics and covariates:**
  - Participant-level variables: sex, age, marital status, educational level, employment status, veteran status, number of children in household, annual household income, owning a home, having health care coverage, and not being able to see a doctor because of cost
  - State-level variables: State's rankings on health care quality, quality of education, and economy

Data analysis

- **Ordinary least squares (OLS) multiple regression analyses** for continuous outcome variables
- **Logistic regression analyses** for the binary outcomes
- **Generalized linear modeling with zero-inflated negative binomial distribution** in SAS for count data outcome variables (e.g., the number of days using marijuana)

Results

Differences between the states with and without medical marijuana law adjusted for individual- and state-level covariates.

Outcomes		B (SE)	OR (95% CI)
Days of marijuana use (past 30 days)[a]	Frequency of marijuana use	0.083 (0.034)*	–[d]
	Probability to use marijuana	0.271 (0.033)***	1.311 (1.229, 1.399)
Days of drinking (past 30 days)[a]	Probability to drink	-0.441 (0.030)***	0.643 (0.607, 0.682)
Days of binge drinking (past 30 days)[a]	Probability to binge drink	-0.158 (0.055)**	0.854 (0.766, 0.951)
Driving under influence of alcohol[b]		-0.354 (0.066)***	0.702 (0.617, 0.798)
Lifetime smoking (100+ cigarettes during lifetime)[b]		0.043 (0.015)**	1.044 (1.014, 1.074)
Current smoking status[b]		0.093 (0.020)***	1.098 (1.056, 1.142)
Lifetime e-cigarette use[b]		0.107 (0.022)***	1.113 (1.067, 1.161)
General health[c]		-0.043 (0.007)***	–[d]
Days of mental health not good[a]	Frequency of mental health not good	0.069 (0.013)***	–[d]
	Probability of mental health not good	0.236 (0.017)***	1.266 (1.225, 1.309)
Having a depressive disorder[b]		0.314 (0.018)***	1.369 (1.322, 1.417)
Average sleep time[c]		-0.055 (0.010)***	–[d]

[a]Results from the analyses for zero-inflated count outcomes using PROC GENMOD. [b]Results from logistic regression analyses. [c]Results from ordinary least squares (OLS) regression analyses. [d]OR (Odds Ratio) not applicable.

Results

- **Residents of states with MML were more likely:**
  - to be marijuana users ($p < .05$)
  - have higher levels of marijuana use ($p < .05$)
  - to be cigarette smokers ($p < .01$)
  - have used e-cigarettes ($p < .01$)
  - to be non-drinkers and non-binge drinkers ($ps < .01$)
- **Residents of states with MML were less likely:**
  - to drive under the influence ($p < .01$)
- **Those in MML states reported significantly:**
  - better general health ($p < .001$)
  - worse mental health, including more days feeling stressed, depressed ($p < .001$)
  - having depressive disorder ($p < .001$)
  - sleeping fewer hours ($p < .001$)

Conclusions

- Residents of MML states may be at increased risk
  - to use marijuana, cigarettes, and e-cigarettes
  - experience more mental health symptoms
- It's unclear if MML directly influenced the outcomes or if those who use these substances and experience more mental health symptoms are more likely to live in MML states
- MML states should ensure adequate access to substance use and mental health treatment
- Marijuana users may benefit from substance use interventions that also target physical and mental health strategies

References

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