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BRIEF REPORT

People with psychotic disorders are the most vulnerable to cannabis adverse health outcomes: a study in WA State, USA

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Abstract

Cannabis use has been shown to negatively impact the management and prognosis of psychotic disorders. Little is known about the broader health impacts of cannabis use in this population. This study compares cannabis-related negative health outcomes among individuals with a diagnosis of a psychotic disorder to those with other mental health (MH) diagnoses or no MH diagnosis. Data came from International Cannabis Policy Study (2020–2023). Respondents were 4,144 Washington State individuals aged 16–65, who consumed cannabis in the last 12 months. Three groups were compared for cannabis use negative health events: lifetime diagnoses of psychotic disorders, other MH and no MH diagnoses. Logistic regressions were used in the analysis. People with psychotic disorders were more likely to report adverse events from their cannabis use and to pursue medical attention than consumers with other MH or no MH diagnoses ($p<.001$.) They had higher likelihood of nausea/vomiting, heart or blood pressure problems, fainting, acute psychosis or hallucinations, flashbacks, Cannabis Hyperemesis Syndrome, and positive screening for high-risk cannabis use than consumers with other MH or no MH diagnoses. Individuals with psychotic disorder experience more adverse health events from cannabis, including events not associated with exacerbation of their disorders. These findings highlight the need to develop focused clinical interventions and awareness campaigns to address elevated risks of cannabis use among this vulnerable population.

Keywords Cannabis use · Mental health · Adverse health events · Psychotic disorders · Cannabis hyperemesis syndrome

Introduction

Individuals living with psychotic disorders are more likely to consume cannabis than those without such conditions (Rup et al., 2021; Petros et al., 2022). This is concerning, as cannabis use has been shown to negatively impact the management and prognosis of psychotic disorders (Sheitman et al., 2024). Clinical studies have found that cannabis use among this population is associated with increased severity of psychotic symptoms, mania, depression, poorer psychosocial functioning (Seddon et al., 2016) and more frequent relapses (Gonzalez-Blanch et al., 2015). In sum, cannabis use exacerbates individual suffering and places additional strain on healthcare systems.

While the clinical consequences of cannabis use in psychotic disorders are well-documented, less is known about the broader health impacts of cannabis use in this population. Hospital-based studies (Ball et al., 2024) and population-based surveys (Marquette et al., 2024) have found that acute adverse event (AEs) such as severe vomiting, cardiovascular issues, and respiratory or blood pressure complications are relatively common among those who consume cannabis in the United States (U.S.). Additionally, diagnoses of Cannabis Hyperemesis Syndrome (Myran et

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al., 2022) and high-risk cannabis use have increased since legalization (Choi et al., 2024).

This study aims to investigate whether individuals with psychotic disorders are more likely to experience negative health outcomes from cannabis use compared to those with other mental health diagnoses (e.g., depression, anxiety, bipolar disorder, PTSD) and those without any mental health diagnosis.

We use data from the 2020–2023 Washington (WA) State cohorts of the International Cannabis Policy Study, an annual survey examining cannabis use, attitudes, risks, and related factors (Corsetti et al., 2022). WA was among the first states to legalize 'adult use' cannabis in 2012, has one of the highest prevalences of cannabis use in the U.S. (Hammond et al., 2024) and has a mature legal market that comes with public health challenges such as wide availability of points of sale, vast choice of product types for purchase, and few regulations in place to prevent cannabis overuse (Carlini et al., 2024).

We hypothesize that individuals reporting a psychotic disorder diagnosis will exhibit higher rates of cannabis-related negative health outcomes than those with other diagnoses or no mental health diagnosis.

Methods

Data Source and Study Design

The data are WA state responses from repeated cross-sectional surveys from the International Cannabis Policy Study (ICPS), in four waves (2020, 2021, 2022, 2023), collected via self-completed web surveys.

Sample and Data Collection Procedures

A non-probability sample of WA respondents, aged 16–65, was recruited through the Nielsen Consumer Insights Global Panel and their partners' panels. For the ICPS surveys, Nielsen draws samples from online panels, with quotas based on age and state of residence. Upon completion, respondents receive remuneration in accordance with their panel's usual incentive structure. The study was reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#31330).

The ICPS estimates post-stratification sample weights using a raking algorithm (Hammond et al. 2020). Post-stratification survey weights were created using age-by-sex-by-state, ethnicity-by-census division, education-by-state, and age-by-smoking status groups. All estimates in this analysis were weighed and rescaled to the original sample size in Washington State. In any given wave, there is a small number of respondents who had participated in a prior wave, but no person indicator is included, and we ignore this small extent of repeated measures. A full description of the sample and collection procedures can be found in Hammond et al. (2020).

Dependent Variables

Adverse effects (AEs) from cannabis use: People who used cannabis in the past 12 months were asked: "In the past 12 months, have you experienced any adverse or negative health effect(s) from marijuana use?" Specific AEs included nausea and/or vomiting, heart or blood pressure problems, feeling faint or dizzy or passing out, panic reactions, hallucinations/psychosis, flashbacks, depression, dissociation/depersonalization (feeling detached or disconnected from yourself), lung or breathing problems, and other. Respondents could select all that apply. A derived binary variable, "experienced any adverse event", was created where 1 = yes to any adverse event experienced in the past 12 months and 0= 'none/don't know'.

Medical attention for cannabis adverse events: If any AE was reported, the next question asked, "In the past 12 months, did you seek medical help for any adverse negative health effect(s) caused by using marijuana?" Analysis of this binary variable was coded 1= 'yes' and 0= 'no' or 'don't know'.

The other adverse health outcomes assessed are separate from the AEs and have different time frames:

Lifetime Cannabis Hyperemesis Syndrome: "Have you ever experienced cannabinoid hyperemesis syndrome (repeated, severe vomiting from marijuana use)?" Analysis of this binary variable coded 1= 'yes' and 0= 'no' or 'don't know'.

High risk cannabis use:Assessed using the Alcohol, Smoking and Substance Involvement Screening Test - ASSIST (Humeniuk et al., 2010) cannabis specific questions. Questions assessed the level of risk in multiple life arenas due to cannabis use in the past 3 months. Possible scores could range from 0 to 39 and were dichotomized to high risk (an ASSIST score > 26) versus not high risk per the WHO ASSIST guidelines.

Independent Variable

Lifetime mental health (MH) diagnoses: "Have you ever been diagnosed with any of the following?" with Yes/No options for the following select diagnoses.

1. Anxiety (including phobia, obsessive-compulsive disorder or panic disorder).
2. Depression (including dysthymia).

3. Post-traumatic stress disorder (PTSD).
4. Bipolar disorder or mania or borderline personality disorder.
5. Psychotic disorder (including schizophrenia or dissociative identity disorder).

Given our focus on cannabis use impact among people with psychotic disorders, we created and analyzed three groups of respondents who reported use of cannabis in the last twelve months:

- Psychotic Disorder Diagnosis: affirmative responses to option 5 even if they indicated "yes" to other MH diagnoses.
- Other MH diagnoses: one or more affirmative responses to options 1–4.
- No lifetime MH Diagnosis: "No" to all options presented.

Covariates and Potential Mediators

Sociodemographic information: Age, sex-at- birth (male, female, intersex), education level, race/ethnicity (select all that apply) and perceived income adequacy (how easy/difficult it is for one's family to make ends meet).

Cannabis use frequency: Reported cannabis use was classified as "never", "used more than 12 months ago" and "used within the past 12 months". The first two options were not included in the analysis. Respondents who reported consuming cannabis in the past 12 months were asked their frequency of cannabis use, with responses categorized as 'daily/near daily', 'weekly', 'monthly' or 'less than monthly'.

Analysis

To tease out multifaceted relationships with MH diagnostic categories, particularly the relatively rare presence of psychosis, we pooled data across the four survey waves (2020–2023). The weights were rescaled within wave by the proportion of the full sample used in the subsequent analysis—those with complete data and in the desired subset, such as past year cannabis use—before pooling: new weight = old weight ÷ (number of cases in analysis ÷ number of cases in wave). For the control variables, missing data was included as a level, as seen in Table 1; only the ASSIST dichotomization had missing data. All estimates were weighted, using the survey package (Lumley, 2023) in R (R Core Team 2024).

To assess significant differences among our three diagnosis groups, we used logistic regressions with the age, sex, race/ethnicity, educational achievement, income adequacy, device, and survey year as control variables. To account for multiple comparisons, we used a Bonferroni correction by dividing the usual α of 0.05 by 13. Statistical testing was only to assess differences, and we present unadjusted survey-weighted estimates.

Results

Most respondents (51.8%) had not received any of the MH diagnoses considered in the study (psychotic disorders, depression, anxiety, bi-polar disorder, and PTSD) in their lifetime. The prevalence of psychotic disorders was 2.6% and of any MH diagnosis other than psychotic disorder was 45.8%.

Table 1 presents the weighted total sample characteristics according to MH diagnosis. As can be seen, people with any mental health diagnosis had higher prevalence of cannabis use in the last 12 months than those with no diagnosis. Also, those who reported a psychotic disorder diagnostic were more likely to engage in weekly/daily use than the two other groups.

Cannabis-related Adverse Health Outcomes According to MH Diagnosis

Table 2 describes the survey-weighted prevalence of cannabis-related adverse health outcomes among individuals who consumed cannabis within the last 12 months ($n = 4144$), according to lifetime MH diagnosis. (Parameter estimates and standard errors for all contrasts are available in Supplemental Table A1.) After controlling for age group, sex, race/ethnicity, income adequacy, device used to participate in the survey and survey year (wave), people who reported Psychotic Disorders were significantly more likely to report adverse events from their cannabis use (61.3% vs. 38.1% and 23.1%) and to pursue medical attention to mitigate them (28.0% vs. 8.1% and 3.8%) than those who had another MH diagnosis or never received a MH diagnosis (all $p < .001$). More specifically, those with psychotic disorders reported significantly higher rates of nausea or vomiting (20.6% vs. 9.4% and 5.5%), heart or blood pressure problems (17.5% vs. 5.4% and 2.0%), feeling dizzy or fainting (26.1% vs. 9.8% and 5.3%), and episodes of psychosis or hallucinations (17.6% vs. 3.2% and 2.8%) or flashbacks (12.1% vs. 2.8% and 1.1%) than the other two groups. Individuals with psychotic disorders also reported much higher percentages of lifetime Cannabis Hyperemesis Syndrome (26.8% vs. 8.7% and 3.8%) and positive screening for high-risk cannabis use in the last 3 months 26.1% vs. 7.8% and 3.8%; all $p < .001$).

Table 1 Weighted sample characteristics of 10,281 survey respondents from WA state, according to lifetime mental health diagnosis, 2020–2023

	Total sample	Psychotic disorder diagnosis *N*=271	MH diagnosis excluding psychotic disorder *N*=4479	No MH Diagnosis *N*=5531
Characteristics	%	%	%	%
Age group				
16 to 25	18.5	13.6	18.8	18.5
26 to 35	23.7	32.1	24.6	22.6
36 to 45	20.5	32.9	21.1	19.5
46 to 55	18.5	14.2	18.9	18.4
56 to 65	18.7	7.2	16.5	21.0
Sex at birth				
Female	48.9	33	59.1	41.5
Male	51.1	67	40.9	58.5
Ethnicity/race				
American Indian or Alaskan Native	1.5	1.9	1.7	1.4
Asian	6	2.9	2.8	8.7
Black	4.2	7.7	4	4.3
Native Hawaiian or Pacific Islander	0.8	0.6	0.4	1.1
Hispanic White	7.9	16.5	8.4	7.1
Non-Hispanic White	72.1	62.2	75.3	70
Other or mixed	5.4	7.2	6.2	4.7
Unknown	2.0	1.0	1.2	2.7
Education				
Less than High School	7.3	14.0	7.1	7.2
High School	18.6	20.3	21.0	16.6
Some college	37.8	32.4	42.6	34.2
Bachelors	35.2	32.9	29.0	40.3
Unknown	1.1	0.4	0.3	1.7
Income adequacy ("…to make ends meet?")				
Very difficult	11.5	23.8	16.5	6.8
Difficult	20.8	20.5	26	16.5
Neither	30.8	20.6	29	32.7
Easy	20.8	17.4	17.9	23.3
Very easy	12.6	15.5	9.2	15.2
Unknown	3.6	2.1	1.4	5.5
Cannabis Use				
Never	30.2	13.3	18.9	40.2
More than 12 months ago	28.7	27.8	30	27.7
Less than monthly in the past 12 months	10.2	8	12.2	8.8
Monthly in the past 12 months	7.4	11.9	9.3	5.6
Weekly in the past 12 months	6.8	11.8	8.6	5.0
Daily/near daily in the past 12 months	16.7	27.3	21	12.7

Frequency of Cannabis Use and Adverse Health Outcomes

While clearly greater use creates more opportunity to experience an AE or other negative health outcome of cannabis use, prior studies of ICPS data have found relatively low rates of AE or of seeking medical attention for an AE (Garrett et al., 2025; Marquette et al., 2024) for daily or near daily users and no relationship between 12-month use category and lifetime CHS diagnosis. This may be due to daily users being more experienced with dosage and effects or may be due to reverse causality, wherein having an AE or getting a CHS diagnosis may have resulted in cutting back of use thereafter and, come survey time, reporting lower use than previous. For example, in the current sample, those reporting at least monthly use were the most likely to report any AE (survey-weighted rate 39.2%), followed by those reporting at least weekly use (36.2%), less than monthly (31.3%), and finally daily/near daily users (29.1%). Because of the potential for reverse causality, we do not examine the moderating effects of use on the relationship between mental health and adverse health effects, but leave such an analysis for data that can establish temporal order.

Table 2 Last year cannabis-related adverse health outcomes among 4,144 people who used cannabis in the last 12 months according to their lifetime mental health diagnosis, WA state, 2020–2023, survey-weighted estimates

Timeframe	Negative health events	MH Diagnostic		
		Psychotic Disorder *N*=157 (%)	MH diagnosis excluding psychotic disorder *N*=2246 (%)	No mental health diagnosis *N*=1741 (%)
Last 12 months	Any Adverse Effect (AE) [1]	**61.3**	38.1 **	23.0 **
	Pursued medical attention for AE[1]	**28.0**	8.1 **	3.8 **
	Type of AE			
	Nausea or vomiting	**20.6**	9.4*	5.5 **
	Heart or BP	**17.5**	5.4 **	2.0 **
	Faint, dizzy, or passing out	**26.1**	9.8 **	5.3 **
	Panic reactions	17.5	5.4	2.0 **
	Hallucination/psychosis	**17.6**	3.2 **	2.8 **
	Flashbacks	**12.1**	2.8 **	1.1 **
	Depression	15.9	6.4	3.3 *
	Dissociation/depersonalization	10.1	6.6	3.6 **
	Lung or breathing problems	10.2	5.6	2.8 **
Last 3 months	Positive screening [2] for high-risk cannabis use	**26.1**	7.8 **	3.8**
Lifetime	Cannabis Hyperemesis Syndrome	**26.8**	8.7 **	3.8 **

Significant differences versus those with a psychotic disorder diagnosis: * = $p<.05\div13$ (Bonferroni correction); ** = $p<.001$. Group differences tested via separate regression models run for each outcome characteristic. Each model controlled for sex, race/ethnicity, age group, education, income adequacy, device, and survey year

(1) AEs do not include Cannabis Hyperemesis Syndrome or High Risk for Cannabis Use Disorder

(2) High risk Screening questions ASSIST score>26. *N*=3383 for this variable due to missing data

Bold denotes statistically significant differences of Psychotic Disorders group with other two groups

Discussion

This study analyzed negative health outcomes associated with cannabis use in a population-based sample from Washington State. Consistent with previous research, our findings indicate that individuals with a history of mental illness are more likely to initiate cannabis use and report higher frequency of use than those without such a history (Rup et al., 2021). Our results also align with studies reporting that adverse events related to cannabis use are relatively common (Marquette et al., 2024) and more likely among individuals with mental health conditions than those without (Meier et al., 2025; Salas-Wright et al., 2019).

Our hypothesis—that individuals reporting a diagnosis of a psychotic disorder would exhibit higher rates of cannabis-related negative health outcomes—was supported. This group was significantly more likely to seek medical attention due to cannabis-related adverse effects than the two other groups and to report exacerbation of psychotic symptoms under the influence of cannabis, including hallucinations, flashbacks, and acute psychotic episodes.

In addition to psychiatric symptoms, individuals with psychotic disorders reported significantly higher rates of physical health symptoms, including fainting, vomiting, cardiovascular issues, and blood pressure problems. They were more frequently diagnosed with Cannabis Hyperemesis Syndrome (CHS) and identified as high-risk for developing cannabis use disorder than individuals with other mental health diagnoses or no diagnosis. To our knowledge, this is the first study to document increased risk of physical adverse events among people living with psychosis who consume cannabis, which may have important implications for public health and healthcare systems.

These findings not only reinforce existing concerns but also highlight underrecognized physical health risks associated with cannabis use in this population. From a systems perspective, the medical needs of individuals with psychotic disorders who use cannabis may impose an additional burden on healthcare services, beyond the demands associated with managing psychotic disorders alone. Colby et al. (2025) found that cannabis-related hospital visits in Arizona were approximately 7 times as likely to involve a psychotic disorder diagnossis than cannabis-unrelated visits.

Training of medical providers in emergency and hospital settings, along with enhanced coordination of care for individuals with psychotic disorders who use cannabis, is recommended. These efforts present a critical opportunity to provide education, brief intervention, and referral to treatment when adverse outcomes manifest in medical settings (Meier et al., 2025).

Individuals living with psychotic disorders may lack awareness of their heightened vulnerability to cannabis-related harms. Public health campaigns and specific warning labels on cannabis products intended for individuals with mental health diagnoses—particularly those with psychotic disorders—could help raise awareness and reduce risky cannabis use. Currently, such initiatives are not in place in Washington State.

These findings should be interpreted considering several limitations, including the study's cross-sectional design, potential selection bias due to the use of online panels, the likelihood of underreporting or misclassification of psychotic diagnoses in self-report surveys, and a relatively small sample size. Future research employing longitudinal designs and more robust measures is needed to further explore these associations and inform effective interventions.

Appendix

Table 3 Parameter estimates (standard errors) and adjusted odds ratios for 3-way diagnosis categories

	Any diagnosis but psychosis v psychosis			No diagnosis v psychosis		
Any AE	−0.931***	(0.196)	0.394	−1.748***	(0.201)	0.174
Medical attention	−1.201***	(0.265)	0.301	−2.468***	(0.288)	0.085
Nausea or vomiting	−0.712**	(0.244)	0.491	−1.375***	(0.259)	0.253
Heart or BP	−1.033***	(0.310)	0.356	−2.326***	(0.364)	0.098
Faint, dizzy, or passing out	−1.249***	(0.233)	0.287	−1.947***	(0.252)	0.143
Panic reactions	−0.483	(0.241)	0.617	−1.145***	(0.255)	0.318
Hallucination/psychosis	−1.747***	(0.297)	0.174	−1.962***	(0.325)	0.141
Flashbacks	−1.293***	(0.358)	0.274	−2.401***	(0.415)	0.091
Depression	−0.598	(0.296)	0.550	−1.472***	(0.316)	0.229
Dissociation/depersonalization	−0.578	(0.304)	0.561	−1.084**	(0.333)	0.338
Lung or breathing problems	−0.653	(0.334)	0.520	−1.253***	(0.360)	0.286
ASSIST high risk	−1.110***	(0.306)	0.330	−2.312***	(0.339)	0.099
Hyperemesis	−1.093***	(0.253)	0.335	−2.265***	(0.282)	0.104

$N=4144$ except for the ASSIST instrument ($N=3683$) due to missing data. Significant differences versus those with a psychosis disorder: *$p<.01$; **$p<.05/13$; ***$p<.001$. Each model controls for sex, race/ethnicity, age group, education, income adequacy, device, and survey wave

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Author Contributions BHC conceived the paper idea, secured funding for data analysis and wrote all the iterations of the manuscript. JRW developed and executed the analysis plan SBG provided critical feedback throughout the manuscript development DH secured funding and led data collection, recruitment and questionnaire development All authors reviewed the manuscript.

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Data Availability Data is available under request - contact Dr. Hammond at +01 519 888 4567 ext. 46462 or email- dhammond@uwaterloo.ca.

Declarations

Competing interests The authors declare no competing interests.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process During the preparation of this work the author(s) used Microsoft CoPilot to improve readability of the Introduction and Discussion of the manuscript. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the published article.

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