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Cannabis consumption on a college campus: mental and behavioral health

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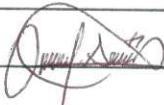
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Cannabis Consumption on a College Campus: Focus on Mental and Behavioral Health

by

Joey Gareis

Undergraduate Honors Thesis
College of Pharmacy and Health Sciences
Butler University
May 2023

Introduction

The perceived impact of cannabis consumption on mental health and behavior has yet to be sufficiently investigated in the college setting. Cannabis legislation and consumption has shifted dramatically in recent years and past-year (43%), past-month (29%), and daily (11%) cannabis use among young adults aged 19-30 is at an all-time high (Patrick et al., 2022).

Cannabis is the second most common substance of abuse in the college population, second only to alcohol. According to the 2021 Indiana College Substance Use Survey (King & Jun, 2021), 21.3% of college students in Indiana (and 24.5% of college students nationwide) admit to consuming marijuana in the past month.

Cannabis use is a growing public health concern. In today's healthcare setting, a lack of clinical documentation and under preparedness of providers may lead to gaps in research and suboptimal healthcare provision surrounding cannabis-related issues. Increased education, improved documentation, and expanded research are necessary to create evidence-based guidelines to better inform policy makers and improve patient care (Sajdeya et al., 2021). The shift towards the decriminalization and legalization of recreational cannabis consumption may impact the incentive for further research. Although this may simplify the process of undertaking research on the medical implications of cannabis, the overall incentive for the pharmaceutical industry to fund research and clinical trials may face a reduction (Hall et al., 2019). Meanwhile, many cannabis users are unaware of some of the risks associated with cannabis use, such as the large number of potential drug interactions that constituents within cannabis can have with prescription medications. For example, these interactions may lead to adverse effects that can compromise the nervous, cardiovascular, and immune systems (Brown, 2020).

Cannabis is an incredibly complex substance. To date, over 560 phytochemicals have been identified in cannabis. The neurophysiology of cannabis has been well documented. The substance acts on the endocannabinoid system which causes the inhibition of GABA and glutamate release in the brain, thereby altering neuromodulation (Urits et al., 2019). Additionally, cannabinoids stimulate the release of dopamine, acetylcholine and norepinephrine neurotransmitters that play important roles in reward, learning and pain. Due to alterations in neurophysiology, cannabis has been shown to impair cognition, notably executive functioning, memory and attention. Furthermore, the current literature suggests impairment of executive functions and memory is heightened in adolescent users when compared with adults.

Despite decades of exploration and the increasing use of cannabis for both medicinal and recreational purposes, cannabis' full risk-to-benefit profile is still unknown as there is relatively only low-quality evidence for the efficacy and adverse effects (Urits et al., 2019). Furthermore, the effects can vary depending on which cannabinoids are consumed, and the amount and frequency of consumption. With the myriad of potential therapeutic uses and adverse effects of cannabis, a lack of clinical documentation and under preparedness of providers may lead to gaps in research and suboptimal healthcare provision surrounding cannabis-related issues. Increased education, improved documentation, and expanded research are necessary to create evidence-based guidelines to better inform policy makers and improve patient care (Sajdeya et al., 2021). There is significant debate, both in the medical and public policy spaces, regarding cannabis use and mental health. Some data suggests consistent cannabis consumption may contribute to cannabis-induced psychoses, cannabis dependence syndrome, cognitive impairment, and other negative outcomes, while other data implies it may improve anxiety, depression, sleep, pain, and other disorders (Hall et al., 2019).

A recent study demonstrated that there has been a significant increase in cannabis use disorder (CUD), yet more individuals reported a decrease in the perceived risk of cannabis consumption. This is best exemplified by cannabis consumption increasing from 4% to 9.5% between 2001-2002 and 2012-2013, while the prevalence of CUD increased from 1.5% to 2.9% in the same timeframe (Zehra et al., 2018). Users often under-appreciate the risks of developing CUD. A disturbing recent study published in 2022 by Lawn and colleagues found adolescent cannabis users had almost 4.5 times greater risk of developing severe CUD compared to adults (OR = 4.462, 95% CI 2.106-9.454), and this significant increased risk persisted after adjustment for potential confounders (OR = 3.474, 95% CI 1.501-8.036, P = 0.004). In this study, 50% of adolescent users experienced six or more CUD symptoms compared to 22% of adults. Lawn and colleagues also found that adolescents had significantly higher scores on the Psychotomimetic States Inventory-Adapted (PSI-A) scale compared to adults (adjusted P = 0.015) and users of any age have greater scores than non-users (adjusted P = 0.014) The PSI-A is a standardized psychological assessment with total scores ranging from 0 to 144, with higher scores indicating greater psychotic-like symptoms. Also, of note in this study, adolescents had significantly higher scores than adults on the Beck Depression Inventory and the Beck Anxiety Inventory; however, neither adolescent nor adult cannabis users had significantly higher depression or anxiety scores than non-user controls.

Other studies have thoroughly documented the association between cannabis consumption and psychoses among young adults demonstrating a substantially higher risk for the development of long-term psychotic disorders (De Faria et al., 2021). In a recent meta-analysis consisting of 11 studies that included 23,317 individuals, the pooled odds ratio (OR) of developing depression for young adults who regularly consume cannabis compared to nonusers was 1.37 (95% CI, 1.16-1.62), thereby demonstrating a statistically significant increase in the

prevalence of depression in those who regularly consumed cannabis (Gobbi et al., 2019). Although the increase in risk for developing psychotic disorders was shown to be moderately low, the high prevalence of young adults regularly consuming cannabis generates a large population that could develop depression or other psychotic disorders attributable to cannabis.

To help address this public health concern, this study aims to explore cannabis use on a college campus by comparing the perceived impact of cannabis consumption on mental and behavioral health based on primary reason for cannabis use. Additionally, we sought to ascertain self-reported relationships between the use of cannabis and other substances.

Methods

Data collection and participants

Data was collected using an anonymous survey created using Qualtrics software. This survey was administered to students, faculty, and staff at a small private university in Indiana. Participants were recruited via university listservs and social media. Distribution methods included the Butler Today newsletter, the News You Can Use newsletter of the College of Pharmacy and Health Sciences (COPHS) and departmental/club/organizational listservs. The survey was administered electronically between December 9, 2022, and February 15, 2023.

The initial portion of the survey consists of three demographic questions, one question about mental health, one question about the terminology associated with cannabis, and one question about cannabis use. Individuals who admitted to ever using cannabis were asked to complete additional questions regarding the route of administration, timeframe of last use, primary and secondary reasons for consumption, and perceived impact of cannabis use on

various mental, behavioral, and academic outcomes. Additionally, participants were asked if they have ever discussed cannabis use with their healthcare provider and were given an open-response question regarding what, if anything, they would like healthcare professionals to know or do differently when working with individuals who are/have been cannabis users.

For the primary data analysis, participants who admitted ever using cannabis were placed into two groups based on self-reported primary reason for use: The health-related group included participants who selected anxiety, depression, adhd/add, insomnia, chronic pain, or stress as their primary reason for cannabis use and the recreational group included participants who reported using cannabis for recreational/celebratory purposes, peer use, because of habit, or boredom, among others.

Additional comparisons on acute and long-term perceived impacts, and timeframe of last use were made based on self-reported orientation/identity. Responses were divided into cisgender/heterosexual participants and participants who identified as members of the LGBTQI+ community. Acute was defined as 0 to 24 hours following the consumption of cannabis. Long-term was defined as > 24 hours. Timeframe of last use of cannabis was divided into four groups: within a week, within a month, within a year, and over a year.

Survey results were analyzed using descriptive and inferential statistical methods. Comparisons were based on demographic factors, recency of use, and primary reason for use. Inferential comparisons of categorical data were made using Pearson chi-square analysis methods. SPSS was used for data analysis and the level of significance was set at a p-value=0.05. Given the sensitivity of survey questions, participants could skip questions they did not feel comfortable answering. Null values were excluded in the data analysis.

Results

268 participants started the survey, and of those, 238 responded to all questions. Approximately 74% of the participants were students and 26% were faculty/staff. Most participants identified as heterosexual females (119), 61 as heterosexual males, 53 as LGBTQ+, and 6 as other. Just under 50% of respondents had been professionally diagnosed with anxiety, and an additional 33% indicated they experience anxiety, but have not been professionally diagnosed. Over 42% had been professionally diagnosed with depression, and an additional 25% indicated they experience depression, but have not been professionally diagnosed. Of the overall sample, 72.5% indicated that had ever consumed cannabis.

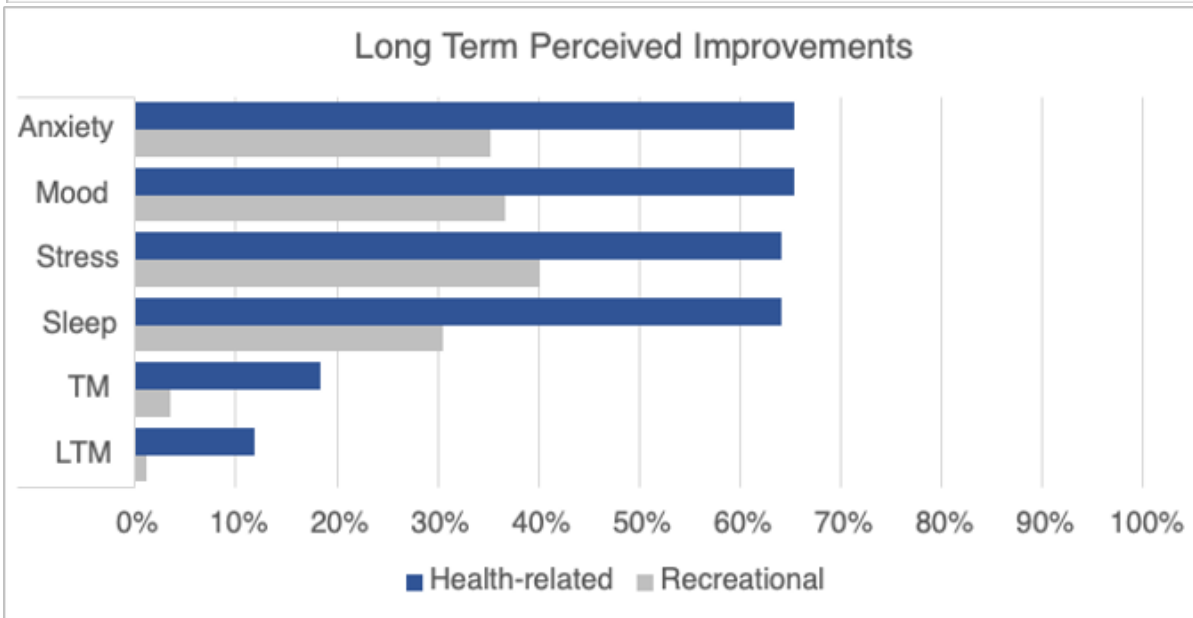
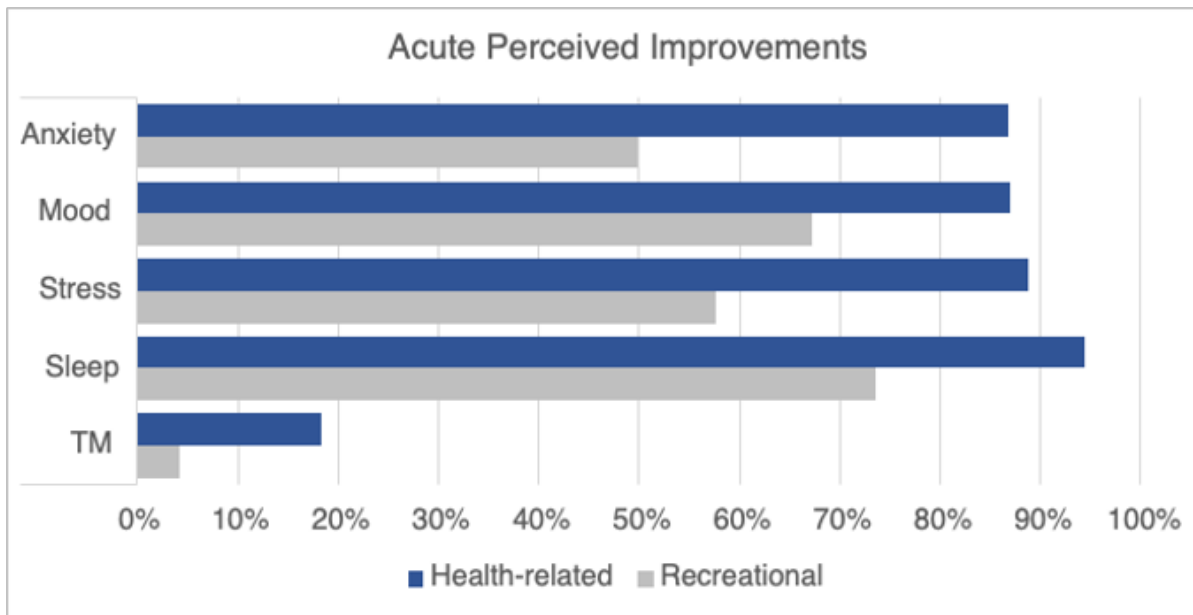
Table 1 describes the characteristics of participants that reported ever using cannabis and the timeframe of their last use. Of those who reported ever using cannabis, 34% indicated their last use to be within a week. When comparing proportion differences between students and faculty/staff, the data revealed that nearly 35% of students used cannabis within the last week and over 50% in the last month. When looking at identity/orientation, 86% of the LGBTQI+ community reported ever using cannabis with 47% of the sample indicating last use to be within a week. Exactly half of all participants reported using cannabis within a week for health-related purposes.

Table 1: Sample characteristics.

Sample characteristic	n	Within a week	Within a month	Within a year	Over a year	P-value
Total	175	33.9%	18.4%	29.3%	18.4%	

Student	127	34.9%	23.0%	30.2%	11.9%	0.001
Faculty/Staff	48	31.3%	6.3%	27.0%	35.4%	
Heterosexual / Cisgender	124	29.0%	18.5%	33.1%	19.4%	0.01
LGBTQI+	50	46.9%	18.4%	20.4%	14.3%	
Health-related	58	50.0%	19.0%	22.4%	8.6%	0.006
Recreational	113	25.7%	18.6%	33.6%	22.1%	

The following figures show the percentage of people who reported that using cannabis improved various mental, social, and behavioral variables both short and long term. Acute was defined as 0 to 24 hours following cannabis use and long-term extending beyond this timeframe. Participants who indicated cannabis use for recreational purposes are shown in gray color and participants who indicated cannabis use for health-related purposes are shown in blue. The proportion difference was statistically significant at P-values < 0.05.



Participants who indicated cannabis use for health-related purposes reported higher improvements (acute and long-term) in anxiety, mood, stress, sleep, time management, and long-term memory (only as a long-term improvement) when compared to those who reported use for recreational purposes ($p < 0.05$). Other variables that were included in the survey that did not reach statistical significance included the ability to drive a car, academic performance, athletic performance, and sociability.

Survey participants were asked to self-report the impact that cannabis use has on the consumption of other substances. The table below shows the perceived impact of cannabis consumption on a variety of other substances and is aggregated data from all users. The most prominent of changes observed were the decrease in alcohol consumption and an increase in nicotine consumption following cannabis use.

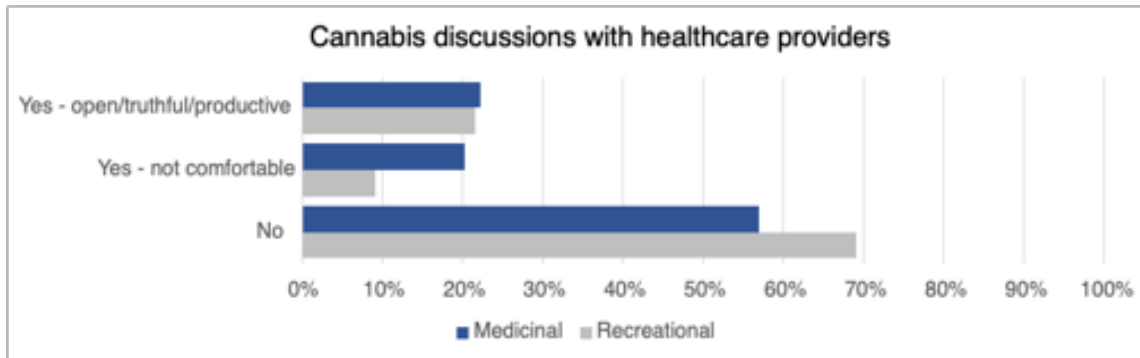
Table 2:

Substance	Decreased	No change	Increased
Illicit drug consumption	6.9%	83.9%	9.2%
Prescribed drug consumption	6.7%	90.5%	2.8%
Alcohol consumption	22.2%	65.1%	12.7%
Nicotine consumption	13.5%	61.8%	24.7%

However, when focusing only on the health-related group, a slightly different picture emerged. Among the health-related users, one third indicated a decrease in nicotine consumption, 29% indicated a decrease in alcohol consumption, 8% indicated a decrease in prescription drugs, and 13% indicated a decrease in illicit drug use.

Participants were also asked if they discussed cannabis use with their healthcare provider. Of those who indicated ever using cannabis, the large majority have not discussed use with their

provider. There is still a noticeable percentage of those who did discuss cannabis use with their provider yet did not feel comfortable being open or truthful.



This survey also included an open-ended question “*What, if anything, would you like healthcare professionals to know or do differently when working with individuals who are/have been cannabis users?*” Forty-six individuals provided responses. Many responses suggested that healthcare professionals should be less judgmental and more knowledgeable of the full benefit/risk profile, including interactions. There were also multiple comments on cannabis for Post-Traumatic Stress Disorder, some in support and some warning against. While there were several comments regarding general support of marijuana use, there were also multiple providing examples of serious problems experienced with use. A few examples of comments are included below.

Open Responses
Most of the individuals I know who use cannabis on a regular basis are very good at not using it in a way there interferes with professional or academic responsibilities
Specify their duties or responsibilities to report to law enforcement. Many would feel much more comfortable if they knew that they would not be reported.
I like to hear guidance directed by research, preferably Evidence Based Medicine. My perception is that any discussion will revert to a lecture or merely an opinion that is not supported by data.
Have more open conversations, it feels weird bringing up cannabis use in a way that isn't seen negatively. I would very willingly converse with a health care provider if asked about it.
If you have an understanding of the strains and effects, you could drastically change and alter someone’s experience with marijuana. If you cater to a specific effect of a strain to their liking or their mental health need, there are extensive benefits.

I've never had any experiences talking about cannabis with professionals, but if I were to have a conversation with someone, I'd hope they'd be completely understanding and respectful and seeing where I'm coming from.

Discussion

Cannabis use and mental health disorders among young adults are significant public health concerns. The results support the need to address these concerns as this study found one-third of the campus community self-reported ever being diagnosed with a mental health condition and 53% of the campus community admitting to cannabis use within the last month. Of the 75% of student survey respondents who admitted ever using cannabis, 85% indicated experiencing or clinically diagnosed with anxiety, 76% with depression, 35% admitting using within the last week when the survey was taken, and one-third reporting their primary reason for cannabis use to be treatment for a health-related condition.

This study found a substantially higher percentage of students who have used cannabis, compared to data published last year, some of which was collected 2 years ago. Nationally, the 2021 National Survey of Drug Use and Health (NSDUH) and the 2022 National College Health Assessment survey both found about 35% of young adults used cannabis within the last year. In contrast, our study found that almost 62% of students had used cannabis within the last year. Studies examining cannabis among colleges in Indiana found only 21% used within the last month. (cite) This study found that over 40% of Butler students used cannabis within the last month. It is not clear if this data, collected between December 2022 and February 2023, reflects a drastic increase in use over the recent months/years, or if this university setting is an outlier compared to state and national norms. It is also possible that the voluntary population of individuals completing this survey may not be a representative sample of the larger population.

However, it is more common for voluntary response bias or non-response bias to result in lower percentages of potentially illegal behavior to be reported, not greater percentages.

Cannabis' full risk-to-benefit profile remains unclear; however, the results from this study suggest those primarily using cannabis for health-related reasons are more likely to perceive improvements in multiple mental, social, and academic variables across time when compared to those using primarily for recreational purposes. Within 0-24 hours following the consumption of cannabis, participants in the health-related group were significantly more likely to report improvement in anxiety, stress, mood, sleep, and time management when compared to recreational group. A similar trend followed when asking patients about the long-term impact in which those in the health-related group were significantly more likely to report improvements in anxiety, stress, mood, sleep, time management, as well as long-term memory.

One very interesting aspect of this study that warrants further and more detailed exploration is the relationship between cannabis and alcohol and nicotine use, especially in those who are using cannabis for health-related reasons. In our study, overall, 22 % cannabis users indicated that cannabis consumption led to a decrease in their alcohol consumption, 65% indicated no change, and 12% indicated an increase in alcohol consumption. When examining the subset of those using cannabis for health-related reasons, 29% reported that cannabis use led to a decrease in alcohol consumption. It is often assumed that cannabis use is associated with an increase in alcohol consumption. Our study did not find that to be true. Additionally, there was a very large difference between health-related users and recreational users regarding the perceived impact of cannabis consumption on nicotine consumption. Over 33% of health-related users reported that cannabis led to a *decrease* in nicotine consumption, 44% indicated no change, and 22% indicated that cannabis use was associated with an increase in nicotine consumption. In stark contrast, less than 5% of recreational users reported a decrease in nicotine use, almost 70 %

reported no change, and over 25% reported an increase in nicotine use. In this study, approximately 65% of cannabis users did not discuss cannabis use with their healthcare professionals; and of those that did, 37% did not feel comfortable being open/truthful with their healthcare providers. The medical community needs to do a much better job initiating and maintaining judgement-free dialog about cannabis use. Users also often felt that their healthcare providers were not sufficiently educated about cannabis risks and benefits. It appears that there is significant opportunity for improvement regarding healthcare professionals' knowledge of and communication skills related to cannabis.

Overall, the results of this study demonstrate the need for continuous assessment and evaluation of healthcare provision to better prepare providers in the clinical setting to adapt to the evolving societal and legal views regarding cannabis.

Strengths & Limitations

There were multiple strengths of this study. The survey was very purposefully designed to be shame-free. Given that nearly three fourths of participants admitted to cannabis use in a state that doing so is illegal, it appears that non-response and volunteer bias was minimized. Additionally, the survey received respectable responses among sub-populations, such as the LGBTQI+ community. Although the study was not focused on the LGBTQI+ community, this population provided 58 respondents, in which 50 admitted using cannabis. Oftentimes study samples do not include a sufficient number of individuals from this community that would allow for researchers to determine if outcomes would differ based on gender identity. This study did show statistically and clinically significant differences in cannabis use and outcomes in the LGBTQI+ community compared to the heterosexual cisgender community.

The study also had limitations due to the relatively small sample size, and study participants being recruited from only one small private university. Survey research has inherent limitations, and causation cannot be determined.

Conclusions

Cannabis consumption has increased drastically in recent years. This study found that over 72% of the campus community had consumed marijuana, and of those that had ever consumed, almost 53% had used within the last month. This study demonstrated statistically and clinically significant differences between health-related and recreational users, with health-related users being significantly more likely to report improvements in anxiety, mood, and stress. Compared to recreational users, health-related users were more likely to indicate that cannabis consumption led to a decrease in alcohol and nicotine consumption. The correlation between cannabis and other substance use needs further exploration, especially in the non-recreational use population. Most users do not discuss cannabis consumption with their healthcare providers. Healthcare professionals should strive to improve their knowledge and communication skills regarding cannabis.

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