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## Cannabis Use and Association with Pain, Anxiety, and Depression Among Emergency Department Patients

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Cannabis Use and Association with Pain, Anxiety, and Depression Among Emergency  
Department Patients

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Dr. Marco

Clinical research

Scholarship in Medicine Final Report

**By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission**

**Abstract**

Introduction:

Cannabis use is increasing nationwide. Many states have legalized medical and recreational use of cannabis. This study was undertaken to identify any association between cannabis use and chronic pain among ED patients.

Methods:

This was a prospective survey study of Emergency Department (ED) patients at Miami Valley Hospital, a level 1 trauma center in Dayton, Ohio conducted during June – August 2018. The survey included data regarding the frequency of cannabis use, chronic pain, and current mental illness.

## Results:

Three hundred and sixty patients participated in this study. The majority of respondents were white (55%) or African American (42%). Participants reported a mean triage pain score of 7. Nearly 50% of participants suffered from chronic pain. Twenty-seven percent of participants reported cannabis use within the past month. Dividing cannabis use into 4 frequency categories (0 days use, 1-2 days use, 3-29 days use, and 30 days use), patients who used cannabis more frequently reported higher rates of depression, anxiety, and suicidal thoughts ( $p < 0.01$ ). Over 40% of daily cannabis users reported experiencing depression and over 50% reported feeling severely anxious. Patients experiencing chronic pain were not more likely to present with substance use. However, patients experiencing chronic pain were more likely to experience higher rates of depression, anxiety, and suicidal thoughts ( $p < 0.001$ ; Mann Whitney Wilcoxon two-tailed test).

## Conclusions:

Cannabis use was commonly reported in this patient population. The prevalence of mental illness was high. Cannabis use was associated with anxiety, depression, and suicidal thoughts. Participants with chronic pain were more likely to experience higher rates of depression, anxiety, and suicidal thoughts.

Keywords: Cannabis, anxiety, depression

## **Introduction/Literature Review**

Medical marijuana use and acceptance have grown in the United States.<sup>1</sup> Clinical studies on the use and efficacy of cannabis in patients with chronic pain have conflicting results. Some studies shows positive effects of cannabis in chronic pain management<sup>2</sup>, while others show no improvement of chronic pain, and do not support its use.<sup>3</sup> Although past research suggests cannabis being commonly used in people with chronic non-cancer pain, our data shows no association between chronic pain and cannabis use in the ED setting. Multiple research studies show strong associations and negative effects between cannabis use and a multitude of psychological disorders, most notably anxiety and depression.<sup>456</sup> A portion of medical providers are now prescribing cannabis use for some of these disorders including anxiety and depression with little evidence to support its use.<sup>7</sup>

## **Hypothesis/Specific Aims/Research Questions**

This study was undertaken to identify any relationship between cannabis use and pain in patients presenting to the Emergency Department, and any association of cannabis use with mental health disorders ,such as anxiety and depression. The null hypothesis was there is no association between pain and cannabis use, and no association between cannabis use and anxiety and depression.

## **Methods**

This was a prospective patient study of ED patients at Miami Valley Hospital, a level 1 trauma center in Dayton, Ohio. Inclusion criteria included patients age 18 or over, with a triage pain score of 1 or greater, who speak English, and not appear in distress. Patients were identified from the ED Tracking Board and approached while in the ED treatment area. Participation did not interfere with medical care. A survey instrument was developed, based on the The Addiction Severity Index (ASI), a validated measurement tool as objectively assess addiction.<sup>8,9</sup> Data collected included frequency of drug and alcohol use, and current mental health illness or problems. Demographics of the patient and interview were recorded, but no identifiable data were collected. Data were entered into an Excel spread sheet. We compared the self-reported pain score to all three categories mentioned above, drugs, alcohol, and psychiatric domains. Drug use frequency was reported as median days of use and was compared to the pain experienced, or psychological problems experienced. Spearman correlation coefficients were used to examine the strength, direction, and statistical significance of the relationships. A power analysis identified that to detect a medium effect size ( $\rho=0.3$  or more) with a two-tailed test, 5% type I error and 80% power, 84 subjects are needed. Statistical analysis included Chi square test to show if the values compared are significant and show association. This research study was approved by the Wright State University IRB.

## **Results**

Among 473 eligible participants, 360 consented to participate (76% participation rate). The majority were either White (54.9%) or African American (42.0%) and the mean age was 40 (range 18 to 85). Participants reported an average triage pain score of 7 (range 1 to 10). The current episode of pain had a mean duration of 2 days. In addition, 49.5% of participants

suffered from chronic pain, including back pain (25%), migraine headache (6%), neck pain (6%), and other types of chronic pain (63%).

The most common substance reported was alcohol. Forty-one percent (N = 146) of participants reported some alcohol use in the past 30 days, with 8% reporting drinking to intoxication (Figure 1). Cannabis use was also commonly reported. Twenty-seven percent (N = 96) of participants reported cannabis use in the past 30 days, with the majority reported use at least 3 times (78%) and a minority reporting daily use (33%) (Figure 2). Other substances reported by participants included cocaine (3%; N = 11), amphetamines (2%; N = 6), heroin (1%; N = 2), other opiates (18%; N = 64), and other substances (11%; N = 40).

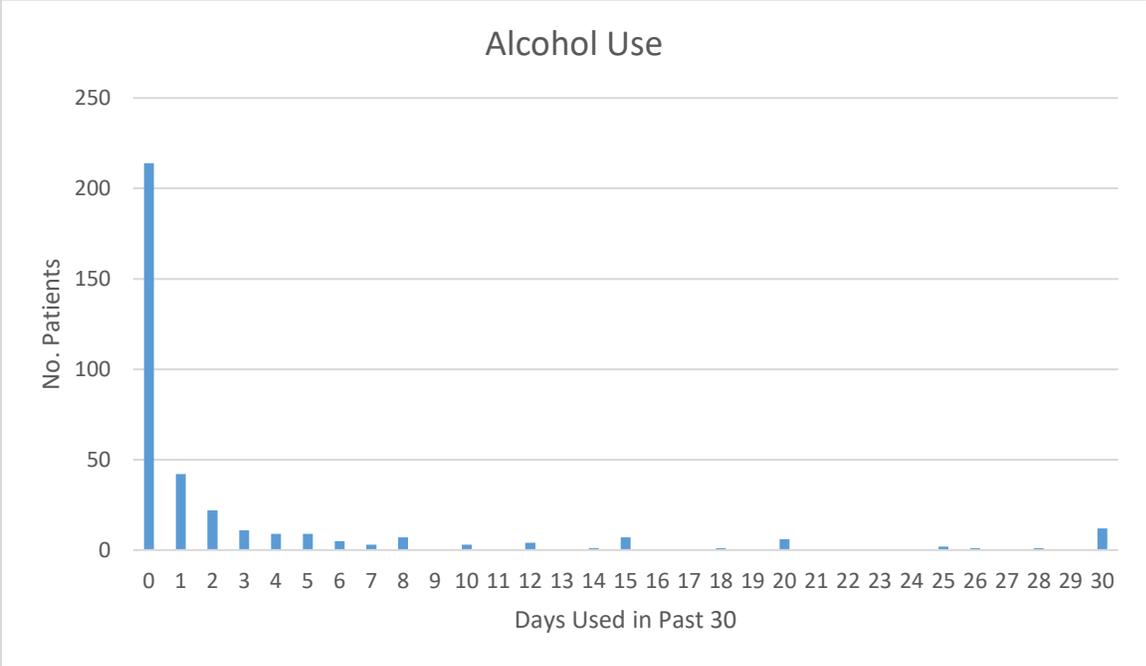
The prevalence of mental illness was high. Within the past 30 days, 34% (N = 122) of patients reported experiencing serious anxiety or tension and 27% (N = 96) reported difficulty understanding, concentrating, or remembering, and 22% (N = 79) reported serious depression. Four percent (N = 11) reported serious thoughts of suicide. A significant number of participants had been treated for mental health as an outpatient (28%; N = 100) or as an inpatient (21%; N = 77).

There was no association between self-reported pain scores and substance use. Anxiety was associated with higher self-reported pain scores (( $p = 0.03$ ). There was no association between chronic pain and triage pain scores.

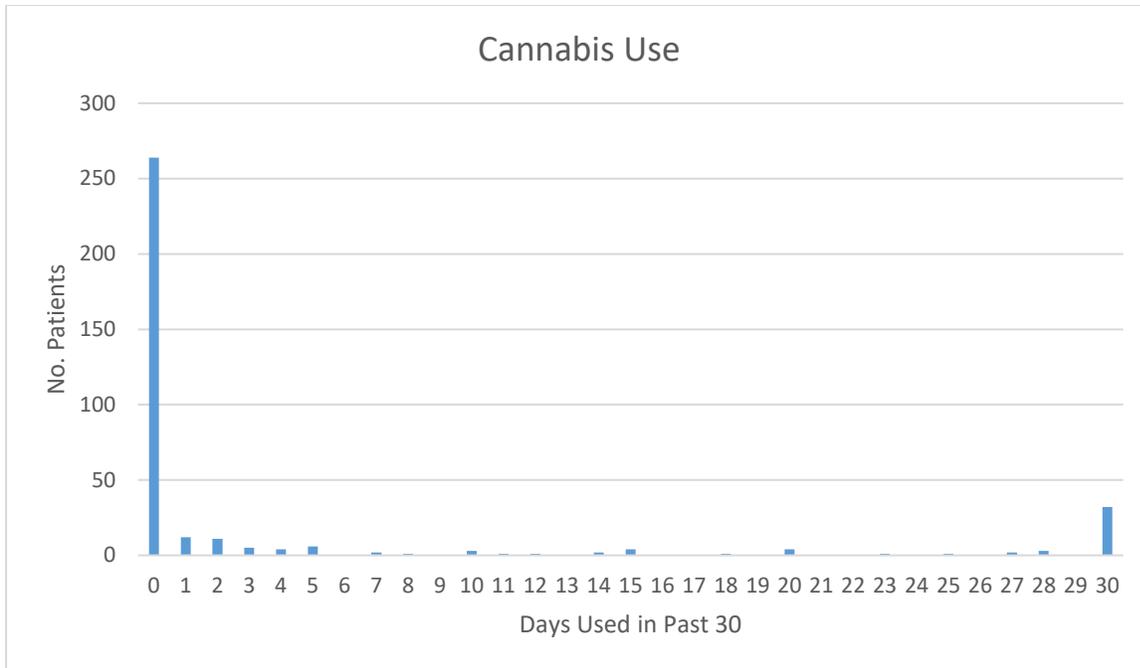
Substance use was associated with mental health disorders. Cocaine and cannabis use were independently associated with depression. Cannabis use was associated with anxiety ( $p < 0.002$ ). Amphetamine use and cannabis use were associated with suicidal thoughts. Patients with depression, anxiety, suicidal thoughts or chronic pain reported significantly more days of

cannabis use than patients without these conditions (all with  $p < 0.01$ ), but this was not found with alcohol use (Table 1).

Participants with chronic pain were more likely to experience higher rates of depression, anxiety, and suicidal thoughts ( $p < 0.001$ ).



**Figure 1**



**Figure 2**

	<b>No. Patients</b>	<b>Median [IQR] Days Used Alcohol</b>	<b>p-value</b>	<b>Median [IQR] Days Used Cannabis</b>	<b>p-value</b>
<b>No depression</b>	281	0 [0 – 2]	0.87	0 [0 – 0]	<0.001
<b>Depression</b>	79	0 [0 – 2]		0 [0 – 18]	
<b>No Anxiety</b>	238	0 [0 – 2]	0.83	0 [0 – 0]	<0.001

<b>Anxiety</b>	122	0 [0 – 2]		0 [0 – 10]	
<b>No suicidal thoughts</b>	346	0 [0 – 2]	0.07	0 [0 – 1]	<0.001
<b>Suicidal thoughts</b>	14	2 [0 – 5]		10 [0 – 23]	
<b>No chronic pain</b>	182	0 [0 – 2]	0.40	0 [0 – 0]	0.01
<b>Chronic pain</b>	178	0 [0 – 2]		0 [0 – 3]	

**Table 1:** Data are presented as median number of days [interquartile range, 25<sup>th</sup> – 75<sup>th</sup> percentile]. P-value from Mann Whitney Wilcoxon two-tailed test. Statistically significant associations were found between marijuana use and depression, anxiety, suicidal thoughts, and chronic pain.

## Discussion

The emergency department is potentially an ideal place to identify and intervene for substance use disorders, which are currently underdiagnosed.<sup>10,11</sup> Two common substances

abused by the general population presenting to the emergency room are cannabis and alcohol, both of which are known to be used for self-medication.<sup>12</sup> The acceptance of medical and recreational use of cannabis has grown in the general American's view, with little evidence to support its medicinal use and adverse effects.<sup>13</sup> A portion of medical providers are now prescribing cannabis use for some of these disorders including anxiety and depression.<sup>14</sup> Limited clinical studies on the use and efficacy of cannabis in chronic pain have demonstrated conflicting results. Some studies show positive results,<sup>15</sup> while others show no benefit, and do not support its use. Although past research suggests Cannabis being commonly used by people with chronic non-cancer pain, our data shows no associations between chronic pain and cannabis use in the ED setting.<sup>16</sup> Multiple research studies show strong associations between cannabis use and a multitude of psychological disorders, most notably anxiety and depression.<sup>17,18,19</sup>

Our data show patients who use cannabis more frequently had higher rates of depression, anxiety, and suicidal thoughts, As with cannabis, alcohol use showed no significant correlation between the triage pain scores, or chronic pain. Binge drinking and acute alcohol intoxication leading to emergency room visits are known to be related to anxiety, depression, and mental health disorders in general.<sup>20,21,22</sup> However, our data suggests there are no relationships between alcohol use and anxiety and depression.

Limitations of the current study include the inability to discern the nature of the relationship between cannabis use and mental health conditions. Although we found an association, this does not prove causation. Additional studies examining whether cannabis use causes anxiety, depression, and suicidal thoughts, or vice versa, is critical before cannabis is prescribed for chronic pain or psychological disorders. Some limitations of this study are that the data collected were self-reported.

In conclusion, cannabis use was associated with anxiety, depression, and suicidal thoughts among ED patients. Our data suggest emergency physicians should be aware of the association of cannabis use and abuse in patients with prior diagnosis of anxiety or depression, and vice versa, but no higher suspicion relating alcohol use with anxiety or depression. Screening for cannabis use in patients presenting to the emergency department may be an important tool used to screen patients for anxiety or depression. Until robust clinical trials on risks and benefits of cannabis and specific compounds isolated from the plant are conducted on the above and other conditions and disorders, it is difficult to endorse use of these agents to treat specific medical conditions.

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