Co Occurrence of Anxiety and Depression in Cannabis Use Disorder: A Comparative Study

A thesis submitted in the partial fulfilment of the requirement of the degree of

MASTERS OF ARTS

IN

PSYCHOLOGY

SUBMITTED BY:

Aarshi (862302002)

UNDER THE SUPERVISION AND GUIDANCE OF

Dr. Sarika Alreja

Thapar School of Liberal Arts & Sciences

Thapar Institute of Engineering & Technology

CERTIFICATE

This is to certify that the thesis entitled, 'Co-occurrence of Anxiety and Depression in Cannabis Use Disorder: a Comparative Study ' is being submitted in partial fulfilment of requirements for the award of the degree of **Master of Arts in Psychology, presented in the Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala** is a Bonafide work carried out under the supervision of Dr Sarika Alreja, and that no part of this project has been submitted for the award of any other degree.

(Aarshi)

This is to certify that the above statement made by the student concerned is correct and true to the best of my knowledge.

(Dr. SARIKA ALREJA)

Assistant Professor, TSLAS

Thapar Institute of Engineering and Technology, Patiala

CANDIDATE'S DECLARATION

I hereby declare that the work presented in this thesis submitted in partial fulfilment of requirements for the award the of the degree, entitled 'Co-occurrence of Anxiety and Depression in Cannabis Use Disorder: a Comparative Study ' of Master of Arts in Psychology, presented in the Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala, is an authentic record of my work carried out under the supervision and guidance of Dr. Sarika Alreja, Professor at Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala and refers other researchers' work which are duly listed in the reference section. The matter embodied in this thesis has not formed the basis for awarding any other degree at this or any other university.

Date - May, 2025

Place - Patiala

(Aarshi)

This is to certify that the above statement made by the student concerned is correct and true to the best of my knowledge.

(Dr. SARIKA ALREJA)

Assistant Professor, TSLAS

Thapar Institute of Engineering and Technology, Patiala

ACKNOWLEDGEMENT

This thesis is a product of a labour of a lot of people who are involved directly and indirectly with this. I would firstly like to start out express my heartfelt gratitude to Dr. Sarika Alreja ma'am for allowing me to undertake this line of research and being my guide and supervising me at every step. Your academic expertise and encouragement have been very helpful in shaping this research. Secondly, I would like to thank Dr. Satyavrat Vaidya, posted at the Govt. de- addiction centre at Bhuntar, Kullu, for their invaluable guidance and support throughout my research. Their expertise in the field of psychiatry was instrumental in helping me identify patients dealing with cannabis abuse disorder.

I would also like to thank all the participants who took the time out and took part in this study. I am very grateful to them and this study would not have been possible without them.

I owe a special thanks to my family, my mom and dad for believing in my abilities and their constant encouragement. Your love and support have been my motivation during this whole journey.

Aarshi (862302002)

Table of Contents

Abstract

Background and Aim: The relationship between mental health disorders like anxiety and depression and substance use is a significant area of research, particularly in the context of cannabis use disorder (CUD). This study aims to understand the co-occurrence between the same across both the genders, males and females.

Methodology: Total Participants (N= 160) took part in the study and were divided into two groups including General Population (N= 80, M= 40, F=40) and Cannabis Use Disorder Population (N= 80, M=40, F=40)

Tools: They were administered using the Brief Psychiatric Rating Scale (for CUD patients only), Cannabis Abuse Screening Test (CUD Patients), The Hamilton Anxiety Rating Scale, Beck's Depression Inventory for studying the severity of cannabis abuse and their anxiety and depression scores.

Results & Conclusions: The results indicate that

Keywords: Anxiety; depression; cannabis use disorder; general population; gender

List of Tables

List of Figures

Chapter 1

Introduction

1.1 Cannabis Use Disorder

Cannabis use disorder (CUD), also known as cannabis or marijuana addiction, is classified as a mental health illness and is characterized by a longstanding and compulsive form of cannabis consumption which impedes and causes distress in multiple domains of one's life. In spite of negative effects such as health, social relationships, or occupational/scholastic difficulties, it involves persisting use. The brain experiences euphoric effects of cannabis which produces "highs" that stimulate cravings and may lead to cannabis use disorder in some individuals. Some cannabis users may be under the misconception that cannabis, unlike many other substances, does not foster dependence or withdrawal symptoms. Extensive research has found that regular cannabis use can adversely impact the endocannabinoid system, contributing to these issues (Connor et al., 2021).

The reasons behind cannabis use often vary with demographic factors. Research indicates that college students as well as young adults primarily consume cannabis for social conformity (42%), experimentation (29%), and enjoyment (24%). Notably, 12% of users turn to cannabis mainly for stress management or relaxation, aligning with other studies that link cannabis use to conditions like depression, anxiety, social anxiety, and post-traumatic stress disorder (Patel, 2024).

There's an expanding pool of literature that highlights the effectiveness of various psychological treatments for addressing cannabis-related issues. Cognitive-behavioural

therapy (CBT) and motivational enhancement therapy (MET) are found to be effective in treating CUD, as confirmed by independent research teams (Schluter, 2022).

Cannabis refers to any product derived from the Cannabis sativa plant, including its dried seeds, leaves, stems, and flowers. This plant contains over 500 chemical compounds, among which cannabidiol (CBD) is notable. In contrast, marijuana, a subset of cannabis, is characterized by high levels of tetrahydrocannabinol (THC)—the psychoactive compound responsible for the intoxication. Cannabis use disorder primarily involves THC-rich products (marijuana). CUD can present itself as mild, moderate, or severe. The most extreme type is marijuana addiction, which is defined by persistent cannabis use, with marijuana addiction described as the most severe. The brain's reward system gets dominated by the cannabinoid receptor system, where the individual is compelled to use cannabis. As per the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5), following are the symptoms of cannabis use disorder 1) withdrawal 2) tolerance 3) increasing quantity or frequency of use/longer duration of use 4) persistent desire or unsuccessful attempts to decrease control use 5) considerable time spent in acquiring, using or recuperating from cannabis use 6) social, occupational or recreational activities are given up or reduced because of cannabis 7) persistently using cannabis while knowing it would result in medical complications 8) recurrent failure to meet the socially defined significant role obligations. 9) repeated use in irresponsibly unsafe situations. 10) Cannabis craving is a strong wish for cannabis. 11) Usage despite complications in relationships due to cannabis. An individual is required to meet a CUD criterion of having at least two of these signs for more than a year.

CUD has a severity spectrum with the mild range requiring a significant number of two to three signs,

moderate rest with 4-5 signs and severe, with 6 or more signs.

THC significantly impacts the brain's reward system. Humans naturally seek rewards, engaging in behaviours that are pleasurable, such as spending time with loved ones or enjoying delicious food, which release dopamine, a feel-good chemical.

However, substances like marijuana release intense bursts of dopamine, leading the brain to prioritize cannabis over vital life activities, which can result in detrimental changes in one's thoughts, emotions, and behaviours. Genetic factors also play a role; studies suggest that 40% to 60% of the susceptibility to any substance use disorder can be attributed to genetics. Individuals with a first-degree relative who has a substance use disorder are at increased risk of developing one themselves.

Detoxification is the first crucial step in the treatment of CUD. It involves stopping cannabis use and allowing the body to cleanse itself of the substance. Depending on the severity of CUD, a healthcare professional may recommend a gradual tapering off to minimize withdrawal symptoms. Detoxification can occur within both inpatient and outpatient settings, and researchers are currently exploring medications to assist with cannabis detoxification.

Cognitive and Behavioural Therapies play a valuable role in treating CUD and co-occurring mental health disorders. Such therapies also provide individuals with healthier coping mechanisms. Mental health professionals can deliver these therapies either independently or in conjunction with medications. Some successful therapy options for people above eighteen years with CUD include: Cognitive Behavioural Therapy (CBT) is an approach that includes personal care in a social/ community environment, referring to each person's specific abilities, requirements, as well as aims in the near future. Contingency Management (CM): CM encourages recovery by reinforcing positive behaviours, like restricting the use of cannabis frequently, by providing extra benefits, such as prizes or gift cards, associated with negative drug test reports.

Cannabis can be used as a form of self-medication by patients, which can alleviate the problem. Excessive use of cannabis can lead to the risk of developing psychotic disorders, especially Schizophrenia. It can also lead to early onset of psychotic symptoms in those who might have an underlying predisposition. (Hjrothoj et.al, 2023)

Thus, there is an increased need to find the level of severity and dependence in the patients of Cannabis Use Disorder to deal with such problems and have a good prognosis beforehand, as delaying treatment exacerbates the problem.

1.2 Anxiety and Cannabis Use Disorder

Another disorder in this realm is panic disorder, which is characterized by sudden and unexpected panic attacks. These intense bouts of fear can happen without any clear danger and can trigger severe physical reactions. In the midst of a panic attack, a person might experience heart palpitations, shaking, shortness of breath, dizziness, or even a gripping sense of death. Beyond this, the individuals often find themselves worrying about when the next attack might occur, leading them to change their routines to avoid triggers. Specific Phobia is another form of anxiety disorders, where individuals grapple with an intense and irrational fear of certain objects or situations, be it heights, animals, or medical procedures like injections. This disproportionate fear can severely restrict one's life as they go to far lengths to avoid facing those fears and what scares them.

A type of disorder exists as Social Anxiety Disorder, also known as social phobia. This disorder revolves around a heightened fear of social situations where one might be judged or criticized by others. For those affected, the thought of social interaction can lead to extreme distress or even avoidance of such settings entirely, resulting in isolation and loneliness. Agoraphobia is another anxiety-related disorder characterized by a deep-seated fear of being in situations where escape might be difficult. This can drive individuals to avoid many scenarios, such as being outside alone, using public transport,

or navigating crowded places. Separation Anxiety Disorder is often diagnosed in children, but can be evident in adults as well. This condition causes intense fear or anxiety related to separation from attachment figures, leading to significant distress when anticipating or experiencing that separation. Symptoms may include nightmares, physical complaints, or an aversion to going to school or other places away from home. Finally, there's Selective Mutism, which predominantly affects children. Anxiety is arguably an emotion that predates the evolution of man. Its ubiquity in humans and its presence in a range of anxiety disorders make it an important clinical focus. The word anxiety is derived from the Latin word "anxietas" (to choke, throttle, trouble, and upset) and leads to behavioural, affective as well as cognitive reactions to experience threat. Anxiety, when experienced in moderation, can be helpful—it prepares us to face difficult or stressful situations by triggering an anticipatory and adaptive response. However, when anxiety becomes too intense or persistent, it can have the opposite effect, throwing a person off balance and leading to dysfunction. Anxiety is generally considered excessive or pathological when it occurs without any real threat or stressor, when it's disproportionately intense or long-lasting, or when it causes significant distress. It can also interfere with various aspects of life, including mental health, relationships, work, and physical well-being. (JK Trivedi, 2010)

Reducing the large burden of anxiety disorders in individuals worldwide can be achieved by timely, apt diagnosis and adequate treatment, as well as therapies, when needed. Fear is a conscious feeling evoked by threat or impending danger, whereas anxiety involves anticipation of real or imagined future threat or danger. Both fear and anxiety facilitate survival and are often adaptive. Fears and anxieties can require clinical attention when they are disproportionate to a threat, are severe and enduring, or disrupt normal functioning. Perceived threats include environmental stimuli (e.g., a social situation or

health risk), signalling to the individual that they might be in danger. (Brenda WJH Penninx, 2022)

Cannabis has been noted for use in heightening anxiety. Though, few researches have also shown that it can produce feelings of anxiety, panic, paranoia and psychosis. (Lara Sharpe, 2020)

Cannabis use is associated with reductions in various cognitive functions and the development of several major psychiatric illnesses, with psychosis being the largest body of evidence. Increasing studies also suggest an association between cannabis use and mood disorders, self-harm tendencies, and suicidality. Multiple studies have found that cannabis use and withdrawal can induce acute anxiety symptoms. (Daniel T Myran, 2024) Post alcohol and nicotine, cannabis is the most widely consumed illicit substance, with an estimated 13.1 million dependent users worldwide in 2010. The highest estimated accumulating incidence of cannabis use (42%) was observed in the USA and New Zealand, which had the highest anxiety rates. These outcomes show that there may be some common involvement between anxiety and cannabis use. (Karina Karolina De Santis, 2024).

1.3 Depression and Cannabis Use Disorder

According to the American Psychological Association (APA), studies show a complicated interrelationship between depression and cannabis use, with research that indicates that both increase the risk of depression from cannabis use and vice versa. While other studies show that cannabis use might be linked to more suicidal thoughts and attempts, especially in depressed individuals, there are other people who indicate that cannabis use could serve as a means of coping among depressed individuals, but, in doing so, it may worsen symptoms of depression. Marijuana use over a long period has also been associated with transient hallucinations and paranoia symptoms. Depression has

emerged as one of the most prominent risk factors associated with both the development of progressive substance use behaviours and symptoms of substance dependence, such as marijuana use-related ones.

Here, in this current study, we examine whether depression is linked with symptoms of marijuana use disorder across the entire range of marijuana use frequencies. Following statistical adjustment for sociodemographic factors and drug use behaviours such as marijuana use, alcohol use, smoking, and use of other illicit drugs than marijuana, depression was significantly and positively related to all marijuana use disorder symptoms and the total symptom score. Adults with depression who have used marijuana in the past are said to have a greater tendency to develop symptoms of marijuana use disorder and greater symptom severity, with the magnitude and direction of the relationship generally remaining constant across all degrees of marijuana use ranging from having used it once in the last month to daily use. Adults with depression who have used marijuana are said to have heightened odds of possessing cannabis use disorder symptoms and greater symptom severity, with the strength and direction of the association appearing to be the case across all levels of frequency of use. Depression is a chronic risk factor for marijuana use disorder symptoms, not dependent on marijuana use exposure, meaning that depressed people may constitute a significant subgroup that needs targeted substance use intervention and tailored strategies. The findings of the current study, however, indicate depression to be directly associated with symptoms of marijuana use disorder, regardless of the frequency of use. Thus, it appears that the dependency connected to the use of marijuana poses symptoms of use disorder, which, in one way or another, would need to be tackled.

As discussed earlier, depression and marijuana use disorder symptoms could entail shared neurobiological origins. (Lisa Dierker, 2019) The signal may also represent latent

genetic and environmental confounds shared by the disorders (Bobadilla et al., 2013). Research as early as the 1980s has revealed a significant comorbidity of substance and psychiatric disorders in treated populations. These results were initially thought to be an artifact of Berkson's bias, i.e., that individuals with multiple disorders are more likely to seek treatment than individuals with a single disorder of primary interest. The results indicate more major depressive disorder (MDD), bipolar I, bipolar II, and DSM-IV dysthymia in those with both lifetime and past-year CUD. (Deborah Hasin, 2020).

Diagnosis of depression in subjects with cannabis use disorder is significant as the two disorders tend to co-occur and intensify one another, resulting in poorer outcomes. Depression has been shown to increase substance use because people will use cannabis to medicate themselves, whereas long-term cannabis use can be a causative factor or an aggravating factor of depressive symptoms. Treating both conditions simultaneously increases the likelihood of recovery, optimizes the effectiveness of treatment, and decreases the likelihood of relapse, suicide, and other adverse health as well as social outcomes. Early detection also allows for the creation of more focused, wide and extensive intervention strategies.

Chapter 2

Review of Literature

2.1 Cannabis Use Disorder and Anxiety

Dr. Daniel Feingold (2024) investigated the longitudinal association between cannabis use, cannabis use disorders (CUDs), and anxiety disorders over a three-year period, utilizing data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). It was found that heavy cannabis use appeared to correlate with increased social anxiety and individuals with panic disorder, were more likely to start using cannabis, suggesting potential self-medication. The results indicate that individuals with anxiety disorders have a higher widespreadness of cannabis use. A study led by Ishrat Husain explored the long-term connection between recreational cannabis use and the development of anxiety disorders by reviewing data from 24 longitudinal studies. Out of these, 10 studies provided adjusted odds ratios that allowed for a more precise quantitative analysis. The findings showed a significant link between cannabis use and a higher likelihood of developing an anxiety disorder, with an overall odds ratio of 1.25 (95% CI: 1.01–1.54). However, when the data was further analyzed by specific disorders - such as generalized anxiety disorder, panic disorder, and social anxiety disorder - no significant individual associations were identified. For the remaining studies that didn't report odds ratios, the results were mixed, though many suggested a possible connection between cannabis use and increased severity or occurrence of anxiety symptoms. While this evidence suggests a potential long-term association between cannabis use and anxiety risk, differences in how the studies were designed make it difficult to draw clear conclusions about cause and effect. These insights highlight the need to carefully weigh the mental health risks of cannabis use in both clinical practice and policy-making.

In a related study, Dr. Andrew Bahji and Dr. Arvind Chinna Meyyappan carried out a systematic review and meta-analysis to assess how effective and acceptable cannabinoid treatments are for managing anxiety disorders in adults. Their analysis revealed that cannabinoid-based therapies were associated with a statistically significant reduction in anxiety symptoms, offering some promise in therapeutic contexts. However, after accounting for publication bias, this effect was no longer significant. The study concluded that while cannabinoids might provide short-term relief for anxiety symptoms, the evidence isn't strong enough to recommend them as a first-line treatment. It highlighted the need for further research on different cannabinoid formulations, various dosages, longer treatment periods, and the inclusion of participants with both psychiatric and medical conditions to better understand how cannabinoids may help manage anxiety disorders.

2.2 Cannabis Use Disorder and Depression

Daniel Feingold's research on the connection between cannabis use and depression has uncovered some key insights. There is growing evidence that cannabis use and depression often occur together, but more often, it's depression that leads to increased cannabis use, rather than cannabis use directly causing depression. Long-term studies haven't shown any benefits of cannabis use on the course or outcomes of depression. The link between cannabis use and depression seems stronger in men during adolescence and early adulthood, while in women, it's more noticeable in midlife. Genetic factors are also at play, with serotonin potentially playing a role in linking cannabis dependence and depression, along with specific genetic markers for cannabis addiction. While there's some promise in how changes in the endocannabinoid system might offer therapeutic potential for depression, using cannabis as an antidepressant is still in the early stages, and there's little evidence to back it up. Feingold's

research also points out that selective serotonin reuptake inhibitors (SSRIs) might not be very effective in treating both depression and co-occurring substance use issues.

In a study titled "Cannabis and Mood" by Rafael Faria Sanches (2010) found a high rate of comorbidity between cannabis use, abuse, or dependence and affective disorders, particularly in longitudinal studies and clinical samples. The results indicated that long-term cannabis use is linked with an increased vulnerability of developing bipolar disorder and possibly major depression in individuals who initially did not have any affective disorders. However, no increased risk of cannabis use was found among those who had pre-existing mania or depression without comorbidity. Additionally, the study revealed that substance use in patients with bipolar disorder can lead to a range of negative outcomes, including difficulty recovering from affective symptoms, more frequent hospitalizations, poor treatment loyality, a higher risk of suicide and aggression, and a poor treatment in managing the comorbidity between cannabis use and affective disorders and highlighted that these relationships are observed both in research and clinical settings.

A study by George Mammen (2018) took a deep dive into how cannabis use affects individuals with anxiety or mood disorders over time, looking at research from several longitudinal studies. It found that using cannabis more frequently in the last six months was linked to worse symptoms compared to those who used it less often or not at all. Additionally, people who used cannabis seemed to show less improvement from treatments like medication or therapy for their anxiety or mood disorders. These results were consistent across 12 studies, which included over 11,000 individuals with conditions such as PTSD, panic disorder, bipolar disorder, and depression. While the study emphasized that cannabis use appeared to have negative effects on long-term outcomes, it also pointed out the limitations of the studies, such as potential biases from certain patient groups (like inpatients) and the use of unregulated cannabis. Despite the complexities involved, the study ultimately recommended that healthcare providers take into

account the potential risks associated with cannabis use when treating individuals with anxiety or mood disorders, as it may interfere with their recovery process.

Chapter 3

Research Gaps, Objectives, Hypotheses

3.1 Research Gaps

Studies done in this area mostly examine the comorbidity between CUD, Anxiety, and Depression. Many studies are examining the psychotic symptoms that are induced in patients of CUD. The studies that examine the detailed gender-specific analyses are very few and are based in India. In previous studies, substance use research has overrepresented men, leading to a knowledge gap in understanding how women experience and respond to CUD and co-occurring mental health disorders; thus, underpowered analyses for women may mask many meaningful differences in symptom severity, coping styles, or treatment engagement. Thus, this study bypasses the underrepresentation of females, which makes it possible to gain knowledge and understanding, and even how women experience and respond to CUD and co-occurring mental health disorders. Underpowered analyses for women may lead to masking of meaningful differences in symptom severity, coping styles, or treatment engagement, thus developing gender-responsive interventions**.**

3.2 Objectives

To find out if there is a relationship between Cannabis Use Disorder and anxiety, depression.

To find out if there is a relationship between Cannabis Use Disorder and anxiety and depression on the basis of gender.

3.3 Hypotheses

H1= There will be a significant difference between the anxiety and depression scores of Cannabis Use disorder patients and normal population.

H2= There will be a significant difference in the anxiety and depression scores of the Male Cannabis Use Disorder patients as compared to the Female Cannabis Disorder patients.

H3 = There will be no significant difference in the scores of anxiety and depression between the Cannabis Use Disorder patients and the general population.

H4 There will be no significant difference in the scores of anxiety and depression in the male Cannabis Use Disorder patients and the female Cannabis Use Disorder patients.

Chapter 4

Methodology

4.1 Sample

The total sample consisted of 160 participants. It included 80 participants, including both males and females, who were patients of CUD, and 80 participants from the non-CUD category. The participants were equally divided into the same two groups- CUD (a clinical use disorder) and the non-CUD group (the general participants). The CUD group consisted of 40 males and 40 females, whereas the non-CUD group also consisted of 40 males and 40 females. The age group for all the participants was 18-45 years. The mean age for CUD males, CUD females, non-CUD males, and non-CUD females was 20, 18, 23, and 22, respectively.

4.2 Research Design

A between-subjects design was used in this study.

A 2(Group: CUD, Non-CUD) x 2(Gender: Male, Female) factorial ANOVA was employed.

Independent Variable: CUD v/s non-CUD group and Gender

Dependent Variable: Anxiety and Depression Scores

4.3. Statistical Analysis

Microsoft Excel and SPSS were used for data analysis. A two-way MANOVA was computed for the data.

4.4. Tools used

1. Brief Psychiatric Rating Scale (BPRS**):** The Brief Psychiatric Rating Scale (BPRS) was developed by John E. Overall and Donald R. Gorham. It is used to assess a patient's psychiatric symptoms, such as Somatic Concern, Anxiety, Emotional Withdrawal, Suspiciousness, Hallucinatory behaviour, etc. In this study, it was specifically used to rule out other confounding disorders.

2. Cannabis Abuse Screening Test (CAST): The Cannabis Abuse Screening Test comprises of six questions about morning or solitary use—that is, use that is allegedly not during a festive occasion—possible memory issues, being advised to limit or stop using cannabis, unsuccessful attempts to stop using it, and issues like fights or accidents involving cannabis use. It can be self-scored and was created in France in 2003 by Beck and Legleye.

3. Hamilton Anxiety Rating Scale (HAM-A): One of the first rating scales created to gauge the intensity of anxiety symptoms was the HAM-A, which is frequently used in clinical and research contexts. The 14-item scale measures both somatic anxiety (physical complaints associated with anxiety) and psychic anxiety (mental agitation and psychological distress), each of which is defined by a set of symptoms. Max Hamilton created the Hamilton Anxiety Rating Scale (HAM-A) in 1959.

4. Beck's Depression Inventory: A self-report rating tool consisting of 21 items, the Beck's Depression Inventory (BDI) gauges the typical attitudes and symptoms of depression (Beck et al., 1961). By evaluating important symptoms like mood, pessimism, and self-dissatisfaction, it gauges the severity of depression. The BDI is widely used in a variety of contexts, such as research, medicine, and mental health. The purpose of the BDI is to evaluate adults for the existence and intensity of depression. Aaron T. Beck and his associates created the Beck Depression Inventory (BDI) in 1961.

4.5 Procedure

The study was conducted in a Rehabilitation Centre to collect responses from the CUD Group. The patients were called out one by one and seated well in a room. After taking their consent, they were given instructions to mark their responses for the respective questionnaires. Firstly, BPRS was employed to rule out other confounding disorders. CAST was employed to mark their levels of Cannabis Use, followed by the Hamilton Anxiety Rating Scale and Beck's Depression Inventory to calculate their anxiety and depression scores.

For the non-CUD group, responses were collected after taking their consent, making them sit comfortably in a room, and giving the required instructions. Hamilton Anxiety Rating Scale and Beck's Depression Inventory to calculate their anxiety and depression scores.

The responses were collected, and scoring was done for both groups manually. The results were then computed using SPSS.

4.6 Instructions and Precautions

When the participants were seated, it was ensured that they understood the instructions required to give the responses to fill out the questionnaire. The researcher was present at all times to answer the participants' doubts in case there was any confusion. The researcher made sure that the participant understood the question and asked if he/she encountered such symptoms.

4.7 Data Analysis:

We first computed the descriptive statistics, followed by a MANOVA (multivariate analysis of variance), which gives us the test of between-subject effects in terms of all the variables involved in the study. Pillai's trace and Wilks' Lambda were also computed, followed by pairwise comparisons across gender and CUD/Non-CUD Groups.

Chapter 5

Results

Descriptive Statistics were computed to find out the mean and SD

Table no. 1. Descriptive Statistics (Depression)

Descriptive Statistics

BDI Item	Gender	Substance	Mean	Standard Deviation	N
Mood	Male	Cannabis User	2.00	0.88	40
	Male	Non-Cannabis User	0.87	0.76	40
	Female	Cannabis User	1.95	0.87	40
	Female	Non-Cannabis User	0.87	0.76	40
Sense of Failure	Male	Cannabis User	1.85	0.80	40
	Male	Non-Cannabis User	0.78	0.60	40
	Female	Cannabis User	1.61	0.82	40
	Female	Non-Cannabis User	0.70	0.58	40
Self-Punitive Urges	Male	Cannabis User	1.62	0.92	40
	Male	Non-Cannabis User	0.50	0.68	40
	Female	Cannabis User	1.54	0.90	40
	Female	Non-Cannabis User	0.42	0.65	40
Social Withdrawal	Male	Cannabis User	1.55	1.05	40
	Male	Non-Cannabis User	0.53	0.63	40
	Female	Cannabis User	1.51	1.07	40
	Female	Non-Cannabis User	0.49	0.65	40

BDI Item	Gender	Substance	Mean	Standard Deviation	N
Fatiguability	Male	Cannabis User	2.20	0.72	40
	Male	Non-Cannabis User	0.66	0.59	40
	Female	Cannabis User	2.08	0.74	40
	Female	Non-Cannabis User	0.58	0.57	40
Loss of Appetite	Male	Cannabis User	1.30	0.95	40
	Male	Non-Cannabis User	0.68	0.63	40
	Female	Cannabis User	1.20	0.93	40
	Female	Non-Cannabis User	0.60	0.61	40
Weight Loss	Male	Cannabis User	1.55	1.12	40
	Male	Non-Cannabis User	0.53	0.58	40
	Female	Cannabis User	1.47	1.08	40
	Female	Non-Cannabis User	0.49	0.56	40
BDI Total Score	Male	Cannabis User	34.03	9.81	40
	Male	Non-Cannabis User	12.50	5.41	40
	Female	Cannabis User	29.60	9.71	40
	Female	Non-Cannabis User	9.73	3.12	40

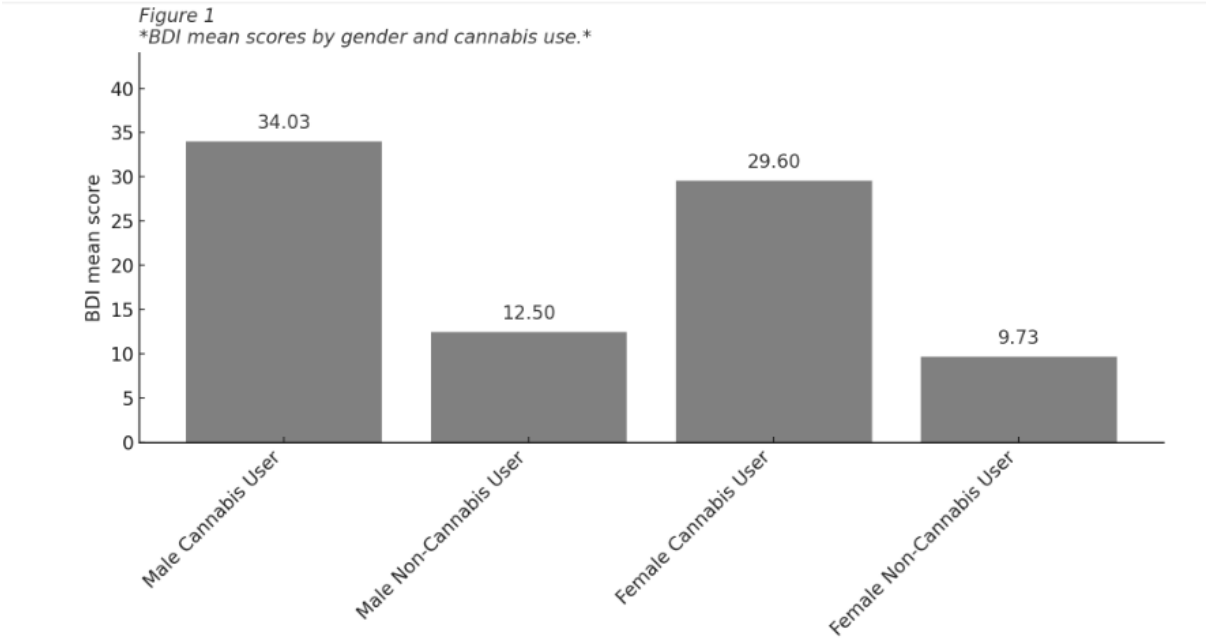


Fig. 1. BDI mean score by gender and cannabis use

The descriptive statistics for Depression levels can be seen under Table 1, and from there it can be seen that for male Cannabis Users (N= 40), the mean is 34.03, standard deviation is 9.810, which indicates that there is a wide range of difference in the depression scores. For Male Non-Cannabis Users(N=40), the Mean for BDI scores = 12.50, whereas the Standard Deviation = 5.41, indicating that Male cannabis users report much higher depression scores than male non-users, with a mean difference of 21.53 points. Female Cannabis Users(N=40), the Mean for BDI scores = 29.60 and the standard deviation= 9.71 whereas in Female Non- Cannabis Users (N = 40), Mean= 9.73, standard deviation = 3.12, indicating that female cannabis users also show significantly high depression levels than female non- Cannabis users, with a mean difference of 19.87 points. When we compare the total differences by gender, specifically, Males show higher depression levels than females, but the difference is not as wide as the cannabis-related differences as for Total Male Participants (N= 80), the Mean = 23.26, SD = 13.39, whereas for Total Female Participants(N=80), Mean = 19.66 and SD = 12.30.

When we compare Overall Cannabis Use vs Non-Use(N=80), the mean for all Cannabis Users= 31.81, SD = 9.95 whereas all Non-Cannabis Users(N=80) show Mean= 11.11, SD = 4.61, indicating that across both genders, cannabis user report significantly high depression scores (almost 3 times) than non- Cannabis users.

Table no. 2 **Descriptive Statistics (Anxiety)**

Descriptive Statistics

Anxiety Item	Gender	Substance	Mean	Standard Deviation	N
Tension	Male	Cannabis User	2.53	0.68	40
	Male	Non-Cannabis User	2.38	0.59	40
	Female	Cannabis User	1.58	0.87	40
	Female	Non-Cannabis User	1.38	0.90	40
Fears	Male	Cannabis User	0.73	1.01	40
	Male	Non-Cannabis User	0.65	0.70	40
	Female	Cannabis User	0.25	0.44	40
	Female	Non-Cannabis User	0.68	0.53	40
Insomnia	Male	Cannabis User	2.48	0.55	40
	Male	Non-Cannabis User	2.25	0.63	40
	Female	Cannabis User	1.35	0.74	40

Anxiety Item	Gender	Substance	Mean	Standard Deviation	N
	Female	Non-Cannabis User	1.13	0.99	40
Intellectual (Cognitive Impairment)	Male	Cannabis User	2.23	0.62	40
	Male	Non-Cannabis User	2.05	0.60	40
	Female	Cannabis User	1.13	0.72	40
	Female	Non-Cannabis User	0.85	0.77	40
Depressed Mood	Male	Cannabis User	2.25	0.71	40
	Male	Non-Cannabis User	2.35	0.48	40
	Female	Cannabis User	1.10	0.63	40
	Female	Non-Cannabis User	1.03	0.80	40
Somatic Muscular	Male	Cannabis User	1.48	1.01	40
	Male	Non-Cannabis User	0.98	0.80	40
	Female	Cannabis User	0.25	0.44	40
	Female	Non-Cannabis User	0.63	0.63	40
Somatic Sensory	Male	Cannabis User	1.60	1.01	40
	Male	Non-Cannabis User	1.13	0.72	40
	Female	Cannabis User	0.20	0.41	40

Anxiety Item	Gender	Substance	Mean	Standard Deviation	N
	Female	Non-Cannabis User	0.58	0.71	40
Cardiovascular Symptoms	Male	Cannabis User	1.75	0.87	40
	Male	Non-Cannabis User	1.43	0.59	40
	Female	Cannabis User	0.05	0.22	40
	Female	Non-Cannabis User	0.25	0.54	40
Respiratory Symptoms	Male	Cannabis User	1.85	1.15	40
	Male	Non-Cannabis User	1.15	0.70	40
	Female	Cannabis User	0.70	0.72	40
	Female	Non-Cannabis User	0.35	0.48	40
Gastrointestinal Symptoms	Male	Cannabis User	2.58	0.75	40
	Male	Non-Cannabis User	1.80	0.72	40
	Female	Cannabis User	1.50	0.93	40
	Female	Non-Cannabis User	0.70	0.72	40
Autonomic Symptoms	Male	Cannabis User	1.52	0.75	40
	Male	Non-Cannabis User	1.72	0.55	40
	Female	Cannabis User	0.70	0.65	40

Anxiety Item	Gender	Substance	Mean	Standard Deviation	N
	Female	Non-Cannabis User	0.60	0.67	40
Anxiety Total Score	Male	Cannabis User	26.03	5.89	40
	Male	Non-Cannabis User	21.60	3.71	40
	Female	Cannabis User	11.30	2.76	40
	Female	Non-Cannabis User	9.67	4.12	40

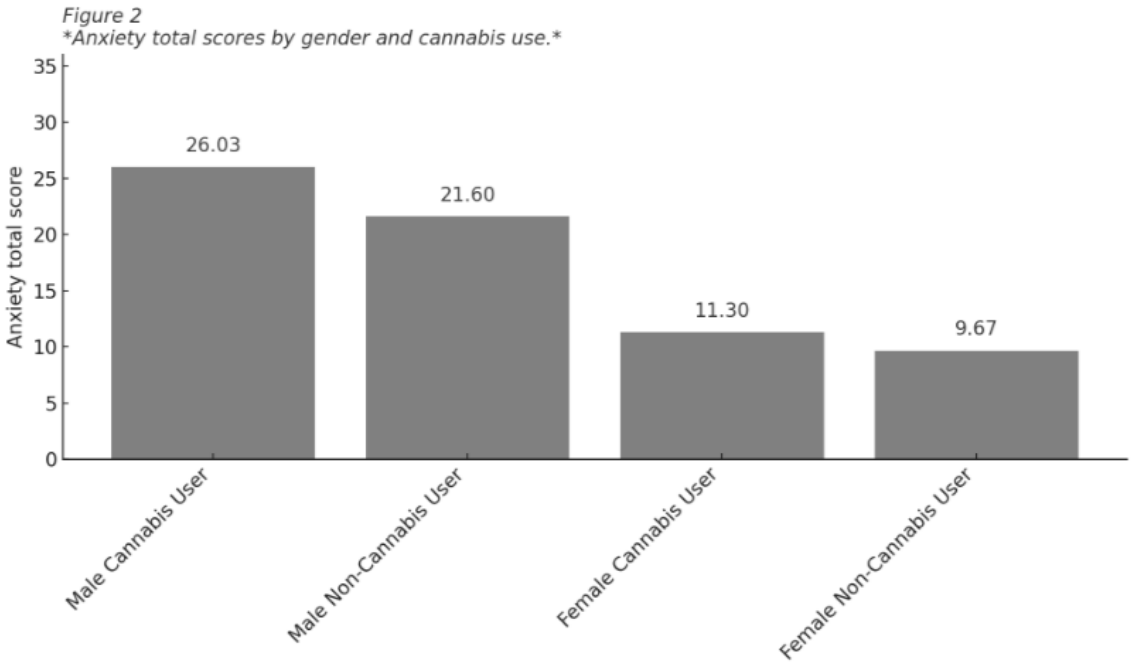


Fig. 2. Anxiety mean score by gender and cannabis use

The descriptive statistics for Anxiety levels can be seen under table 2 and from there it can be seen that for male Cannabis Users (N= 40), the mean is 26.03, standard deviation is 5.89 whereas for Male Non- Cannabis Users(N=40), Mean for anxiety scores = 21.60 whereas the

Standard Deviation = 3.71. The mean for Total Males(N=80) = 23.81 with a standard deviation of 5.37. It suggests that Male cannabis users show higher anxiety levels than non-users (mean difference = 4.43). This suggests that among male participants, there is a positive association between cannabis use and anxiety. In Female Cannabis Users(N=40), mean=11.30, standard deviation=2.76 whereas in Female Non-Cannabis Users(N=40), mean= 9.67 and standard deviation= 4.12. The mean for Total Females(N=80) = 10.49, SD = 3.58, suggesting that Female cannabis users also report higher anxiety than non-cannabis users, as the mean difference = 1.63, but the difference is much smaller compared to males. If we compare the total anxiety scores by substance use, Cannabis Users(N=80) report a mean of 18.66 and SD = 8.71, whereas all Non- Cannabis Users(N=80) have a Mean = 15.64 and SD = 7.15.

Total participants across both genders(N=160) report a mean = 17.15 and an SD = 8.08. Across all the participants, cannabis users have higher anxiety scores than non- cannabis users with a mean difference of 3.02 points. This indicates a moderate association between cannabis use and anxiety levels. If we look out for the Gender Differences in Anxiety, Males show a Total Mean score = 23.81, whereas Females show a Total Mean score = 10.49, indicating that males report much higher anxiety levels than females. This also suggests that the cannabis- anxiety gap is more pronounced in males as compared to females.

Table no. 3 Multivariate Tests

Multivariate Tests

Effect	Test	Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.985	228.043	35	122	.000
	Wilks' Lambda	.015	228.043	35	122	.000

Gender	Pillai's Trace	.880	25.679	35	122	.000
	Wilks' Lambda	.120	25.679	35	122	.000
Substance	Pillai's Trace	.908	34.266	35	122	.000
	Wilks' Lambda	.092	34.266	35	122	.000
Gender * Substance	Pillai's Trace	.466	3.038	35	122	.000
	Wilks' Lambda	.534	3.038	35	122	.000

a. Design: Intercept + Gender + Substance + Gender * Substance

b. Exact statistic

The multivariate test was conducted, and the results show that both gender and substance use have a significant influence on the variables measured. Gender showed a strong multivariate effect, with Pillai's Trace at .880 and Wilks' Lambda at .120, $F(35,122) = 25.68$, $p < .001$, indicating that gender differences play an important role in sculpting these mental health indicators. Substance use showed a more pronounced finding, reflected in a Pillai's Trace of .908 and Wilks' Lambda of .092, $F(35,122) = 34.27$, $p < .001$, indicating a powerful relationship between substance use and the other variables. Additionally, the interaction between gender and substance use was statistically significant (Pillai's Trace = .466, Wilks' Lambda = .534, $F(35,122) = 3.04$, $p < .001$), signifying that the effect of substance use on depression and anxiety varies depending on gender. These results show us the importance of understanding how gender and substance use interact when studying mental health issues.

Table No 4 Test of Between-Subjects Effects

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	BDI Total	17685.23	3	5895.08	102.74	.000	.66
Corrected Model	Anxiety total	7546.650	3	2515.550	137.89	.000	.73

Intercept	BDI Total	73702.22	1	73702.22	1284.56	.000	.89
Intercept	Anxiety total	47059.600	1	47059.600	2579.74	.000	.94
Gender	BDI total	518.40	1	518.40	9.03	.003	.05
Gender	Mood	5.256	1	5.256	8.243	.005	.05
Gender	Anxiety total	7102.225	1	7102.225	389.33	.000	.71
Substance	BDI total	17139.60	1	17139.60	298.72	.000	.65
Substance	Mood	51.756	1	51.756	81.166	.000	.342
Substance	Anxiety Total	366.02	1	366.02	20.06	.000	.11
Gender * Substance	BDI total	27.22	1	27.22	.47	.49	.40
Gender * Substance	Anxiety Total	78.40	1	78.40	4.29	.04	.02
Gender* Substance	Social Withdrawal	3.30	1	3.30	4.77	.03	.03
Error	BDI total	8950.55	156	57.37			
Error	Anxiety Total	2845.75	156	18.24			
Total	BDI Total	100338.00	160				
Total	Anxiety Total	57452,00	160				
Corrected Total	BDI Total	26635.77	159				
Corrected Total	Anxiety Total	10392.40	159				

Tests of between-subject effects were computed, and they indicate significant main effects of the independent variables (gender, substance) on the dependent variables (depression, anxiety). For depression levels, measured by the BDI Total, both gender ($F = 9.03$, $p = .003$, partial $\eta^2 =$

.05) and substance use (F = 298.72, p < .001, partial η^2 = .65) had significant effects, with substance use showcasing a large effect size. But there was no significant interaction between gender and substance use on the dependent variable depression (F = 0.47, p = .49), showing that the result of substance use on depression does not differ significantly between genders. In contrast, anxiety scores were significantly and highly influenced by gender (F = 389.33, p < .001, partial η^2 = .71) and substance use (F = 20.06, p < .001, partial η^2 = .11), with gender showing a particularly large effect. Additionally, there was a small but significant interaction between gender and substance use on anxiety (F = 4.29, p = .04, partial η^2 = .02), indicating that the effect of substance use on anxiety may differ slightly by gender. Overall, the model explained a substantial proportion of variance in both depression (66%) and anxiety (73%) scores, highlighting the importance of taking into consideration both gender and substance use when diagnosing mood-related disorders and anxiety.

Table No. 5. Pairwise Comparisons

Pairwise Comparisons (Gender)

Dependent Variable	(I) Gender	(J) Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
BDI Total	Male	Female	3.600*	1.198	.003	1.234	5.966
	Female	Male	-3.600*	1.198	.003	-5.966	-1.234
Anxiety Total	Male	Female	13.325*	.675	.000	11.991	14.659
	Female	Male	-13.325*	.675	.000	-14.659	-11.991

Based on estimated marginal means

a. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

The pairwise comparisons in Table 5 reveal that there are significant gender differences in both dependent variables, including depression and anxiety. Males reported significantly higher scores than females on both the Beck Depression Inventory (BDI) Total and the Hamilton Anxiety Rating, total scales.

For the depression level, the mean difference between males and females was 3.60 (p = .003), with a 95% confidence interval ranging from 1.23 to 5.97. For anxiety level, the mean difference was even more considerable at 13.33 (p < .001), with a 95%

confidence interval ranging from 11.99 to 14.66. These results indicate that, on average, males experience significantly greater levels of the symptoms of depression as well as anxiety as compared to females in this sample.

Table No. 6 **Pairwise Comparisons (Substance)**

Pairwise Comparisons

Dependent Variable	(I) Substance	(J) Substance	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference Lower Bound	Upper Bound
BDI Total	Cannabis Male	Cannabis Female	20.700*	1.198	.000	18.334	23.066
	Cannabis Female	Cannabis Male	-20.700*	1.198	.000	-23.066	-18.334
Anxiety total	Cannabis Male	Cannabis Female	3.025*	.675	.000	1.691	4.359
	Cannabis Female	Cannabis Male	-3.025*	.675	.000	-4.359	-1.691

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 6 presents the results of pairwise comparisons between Cannabis-using males and females on the two variables: BDI Total (depression) and Anxiety Total scores. Cannabis-using males show significantly higher depression scores than cannabis-using females. The mean difference was 20.70 points, with a standard error of 1.198 and a p-value < .001, representing a statistically significant difference. The 95% confidence interval for this difference

ranged from 18.33 to 23.07, meaning we can be more confident that the true difference lies within this range. Likewise, cannabis-using males reported significantly higher levels of anxiety than cannabis-using females. The mean difference was 3.03 points, with a standard error of 0.675 and a p-value < .001, leading to statistical significance. The 95% confidence interval ranges from 1.69 to 4.36.

Chapter 6

Discussion

The objective of this study was to understand the co-occurrence of anxiety and depression between individuals diagnosed with Cannabis Use Disorder and to compare their findings with the sample of the general population. The findings revealed significant depression and anxiety scores among the cannabis users. Gender differences between males and females further justified the results, thus highlighting the issue of mental health problems with substance use (Cannabis).

Considering the results from the Beck's Depression Inventory, it can be seen that the differences in findings between cannabis users and non-users were quite significant. Typically, the F-value was 298.73 with a $p < .001$, and a partial eta squared of .657, signifying that cannabis users had markedly higher depression levels as compared to the non-users. This finding strongly supports our Hypothesis 1 and contradicts Hypothesis 3, proving a meaningful relationship between the use of cannabis and the depression levels. The Male cannabis users had a mean depression score of 34.03 (SD = 9.81) as compared to 12.50 (SD = 5.41) for male non- cannabis users, a striking difference of 21.53 points. Female users, too, showed significantly high depression scores (M = 29.60, SD = 9.71) as compared to their non-cannabis user female participants (M = 9.73, SD = 3.12), with a difference of mean difference of 19.87 points. The results thus prove that both genders within the cannabis user group have heightened depressive symptoms, with male participants scoring high, overall. Other sub- variables in the BDI leading to the differences are as- Mood ($F = 81.17$, $p < .001$), Lack of Satisfaction ($F = 160.76$, $p < .001$), Self-Accusation ($F = 83.70$, $p<.001$), Fatiguability ($F = 216.86$, $p < .001$).

These findings are also consistent with a previous research paper, which suggests that there is a strong comorbidity between cannabis and depression. (Dierker, 2019; Hasin, 2020). Self-medication is also a common practice among patients of CUD, creating a feedback loop and

worsening depressive as well as physical symptoms. Thus, dual screening intervention strategies shall be adopted by the clinical diagnosticians with regular routine checkups so that relapse in these patients can be prevented, and also, the affective symptoms can be reduced.

Now, considering the results from the Hamilton Anxiety Rating Scale (HAM-A), it can be seen that the findings were quite significant. Cannabis Use Disorder patients scored significantly higher than the non- cannabis users ($F = 20.07$, $p < .001$, $\eta^2 = .114$), thus supporting the positive relationship between cannabis and anxiety use. Cannabis may provide a temporary feeling of euphoria, but in the long run, it hampers mental health functions. In terms of gender differences, male cannabis users had an average score of 26.03, as compared to 21.60 for male cannabis non-users. Female users scored 11.30, as compared to 9.67 among female cannabis non-users. Though both groups experienced heightened symptoms, the gap between users and non-users was more evident in males, suggesting that cannabis use may lead to differences in anxiety symptomatology across both genders. Other sub- variables of the Hamilton Anxiety Rating Scale, that prove significant findings are as: Tension ($F = 64.13$, $p < .001$), Insomnia ($F = 90.83$, $p < .001$), Intellectual Functioning ($F = 114.06$, $p < .001$), Depressed Mood ($F = 138.14$, $p < .001$).

These results can be supported through a previous literature study that found Cannabis (THC) to be Anxiogenic during the withdrawal phase or in the phases of high dosage. (Myran, 2024; De Santis) Thus, these findings suggest that intervention programs should be targeting to reduce panic as well as general anxiety symptoms that arise with the co-morbid diagnosis of CUD and anxiety. Cognitive and Dialectical Behaviour Therapy can help in managing the somatic as well as general behaviour symptoms with the dual diagnosis.

Talking about the Gender Effects, it can be seen that MANOVA results showed that gender independently showed significant effects on various depression and anxiety symptoms. BDI total was significantly influenced by the independent variable gender, ($F = 9.04$, $p = .003$, $\eta^2 =$

.055), Sense of Failure (F = 6.78, p = .010), Self-Punitive Urges (F = 10.08, p = .002), Social Withdrawal (F=12.35, p = .001).

Similarly, in anxiety domains, gender effects were found in insomnia, somatic symptoms, and cardiovascular symptoms. These results show that men and women respond quite differently to cannabis.

Although women in the general population often have a high prevalence of depression and anxiety, this study found that men with Cannabis Use Disorder (CUD) had greater symptom severity, particularly in areas like social withdrawal and self-punitive behaviour. This unexpected trend may be influenced by both biological factors—such as hormonal and neurochemical differences between males and females as well as social influences, like the stigma men face when expressing emotions, which may lead them to display distress through more external or behavioural symptoms and the expression may take the form of substance use. These observations highlight the importance of developing mental health interventions that are sensitive to gender-specific needs. As per the research conducted by Feingold (2024) suggests that the impact of CUD in men and women can be effectively treated with personalised approaches.

Talking about the Substance Use Effects (Cannabis), cannabis use was proven to be a strong predictor for nearly all dependent variables in this study. In the case of depression, a significant impact was found in 18 out of 21 subscales of the Beck Depression Inventory (BDI), with effect sizes ranging from moderate to strong. Areas most affected by cannabis use included mood disturbances, feelings of guilt, crying episodes, reduced work motivation, and notably, a marked decrease in libido ($F = 325.68$, $p < .001$, $\eta^2 = .676$), indicating the widespread emotional and physiological toll of cannabis use.

Likewise, cannabis users also showed higher levels of anxiety, with an evident increase in symptoms such as general anxiousness (F = 153.62, p < .001), respiratory discomfort (F =

17.25, $p < .001$), and gastrointestinal issues ($F = 40.07$, $p < .001$). These results suggest that long-term use of cannabis can interfere with both emotional regulation and physical stress tolerance, which can be due to its impact on brain and body systems involved in both anxiety and arousal.

Talking about the interaction effects, the study showed various significant interaction effects between gender and cannabis use, indicating that there are notable differences in the mental health impacts of cannabis use. Differences were found in areas such as the sense of punishment ($F = 7.63$, $p = .006$), social withdrawal ($F = 4.77$, $p = .030$), somatic muscular symptoms ($F = 13.60$, $p < .001$), somatic sensory experiences ($F = 13.08$, $p < .001$), and overall anxiety levels ($F = 4.30$, $p = .040$). Male participants were more likely to have physical symptoms like muscular tension and social withdrawal, while female participants may be more inclined to experience internalized or emotionally focused symptoms of depression and anxiety. Thus, there is a need to adopt a biopsychosocial approach towards the treatment of cannabis use disorder, one that focuses on not just the symptomatology but also takes the gender of the person into consideration.

Thus, it is very important that mental health screenings become a routine part of care in substance use treatment programs. Identifying co-existing psychological conditions early, such as anxiety or depression, could lead to more accurate diagnoses, better treatment plans, and a lower risk of relapse. Moving forward, research should adopt long-term, in-depth approaches, including tools like brain imaging (e.g., fMRI) and genetic analysis, to gain deeper, biological insights into how cannabis affects mental health. It's equally important to consider the widened context of each individual that includes factors like past trauma, economic challenges, and the availability of a support system, like family or friends, that could all influence outcomes directly or indirectly.

This research highlights a clear relationship between cannabis use disorder and heightened levels of anxiety and depression. It also draws attention to how these effects differ across genders and interact with each other. These findings have very meaningful implications not only for therapeutic practices but also for shaping policies, strategic interventions, and guiding future investigations that aim at reducing the psychological impact of cannabis use.

Chapter 7

Conclusions, Implications, Limitations, and Future Directions

7.1 Conclusions

This study found the co-occurrence of anxiety and depression in male and female cannabis users as well as non-users. The results found that cannabis users reported the highest levels of anxiety and depression as compared to non-users. Similarly, male cannabis users showed the highest scores of anxiety and depression, followed by cannabis use females, non-cannabis-using males, and non-cannabis-using females. It supported the conclusion that gender moderates the impact of cannabis use on one's mental health.

7.2 Implications

These findings have different practical as well as clinical implications, such as the need for dual diagnosis, as there is a strong association between Cannabis Use Disorder and high scores of anxiety and depression. Gender specific strategies should be made, as the results showed that males are more vulnerable to anxiety and depression, followed by cannabis use. Routine mental health screenings should be implemented in public health centres for treatment purposes as well as early detection.

7.3 Limitations

The statistical analysis shows significant results, but the study can hold several limitations, such as sample bias, due to the recruitment of patients from a specific clinical setting/ geographical area, leading to less generalizability towards broader populations. Lack of longitudinal data limits our understanding of how anxiety and depression evolve in cannabis users over time. The study sample ranges from 18–45, with an average age skewed towards

young adults. This may lead to a specific age concentration limiting generalizability towards adolescents as well as old age people. Culture as well as social norms affect how males and females report psychological symptoms by either masking or exaggerating them.

7.4 Future Directions

This study can include longitudinal designs to understand the relationship between cannabis use and mental health outcomes over time. It can also include more heterogeneous samples from different cultures, geographic areas, as well as different age groups to enhance the external validity. Control for external variables such as trauma history, family support, as well as peer influence should also be considered**.**

References

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). *An inventory for measuring depression*. Archives of General Psychiatry, 4(6), 561–571.

Connor, J. P., Stjepanović, D., Le Foll, B., Hoch, E., Budney, A. J., & Hall, W. D. (2021). *Cannabis use and cannabis use disorder*. Nature Reviews Disease Primers, 7(1), 1–24.

Feingold, D. (2024). *The longitudinal relationship between cannabis use and anxiety disorders: Evidence from the NESARC study*. Journal of Substance Abuse Treatment, 157, 1–10.

Hamilton, M. (1959). *The assessment of anxiety states by rating*. British Journal of Medical Psychology, 32(1), 50–55.

Husain, I. (2024). *Cannabis use and the risk of anxiety: A meta-review of longitudinal studies*. Journal of Affective Disorders, 337, 12–24.

Patel, R. (2024). *Reasons behind cannabis consumption in youth: A qualitative survey*. Indian Journal of Psychological Medicine, 46(2), 110–116.

Schluter, M. (2022). *Effectiveness of cognitive-behavioral therapy and motivational enhancement therapy in cannabis use disorder treatment*. Addiction Research & Theory, 30(5), 420–430.

Baker, A. L., Hides, L., Lubman, D. I., & Hall, W. D. (2010). *Treatment of cannabis use among people with psychotic or depressive disorders: A systematic review*. Journal of Clinical Psychiatry, 71(2), 247–254.

Sanches, R. F. (2010). *Cannabis and mood: Comorbidity patterns in psychiatric populations*. Psychiatric Clinics of North America, 33(2), 249–259.

Overall, J. E., & Gorham, D. R. (1962). *The Brief Psychiatric Rating Scale (BPRS)*. Psychological Reports, 10(3), 799–812.

Bahji, A., & Meyyappan, A. C. (2023). *Cannabinoids for the treatment of anxiety disorders: A meta-analysis*. Journal of Anxiety Disorders, 93, 102656.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. American Psychiatric Publishing.

Feingold, D., & Weinstein, A. (2020). *Cannabis use and depression: A longitudinal analysis*. Journal of Affective Disorders, 277, 486–493.

World Health Organization. (2016). *The health and social effects of nonmedical cannabis use*. Geneva: WHO Press.

Legleye, S., Karila, L., Beck, F., & Reynaud, M. (2007). *Validation of the Cannabis Abuse Screening Test in a sample of French adolescents and young adults*. Drug and Alcohol Dependence, 88(2–3), 234–242.

Volkow, N. D., Baler, R. D., Compton, W. M., & Weiss, S. R. (2014). *Adverse health effects of marijuana use*. New England Journal of Medicine, 370(23), 2219–2227.

Lev-Ran, S., Roerecke, M., Le Foll, B., George, T. P., McKenzie, K., & Rehm, J. (2014). *The association between cannabis use and depression: A systematic review and meta-analysis of longitudinal studies*. Psychological Medicine, 44(4), 797–810.

Hasin, D. S., Kerridge, B. T., Saha, T. D., Huang, B., Pickering, R., Smith, S. M., ... & Grant, B. F. (2016). *Prevalence and correlates of DSM-5 cannabis use disorder, 2012–2013*. JAMA Psychiatry, 72(12), 1235–1242.

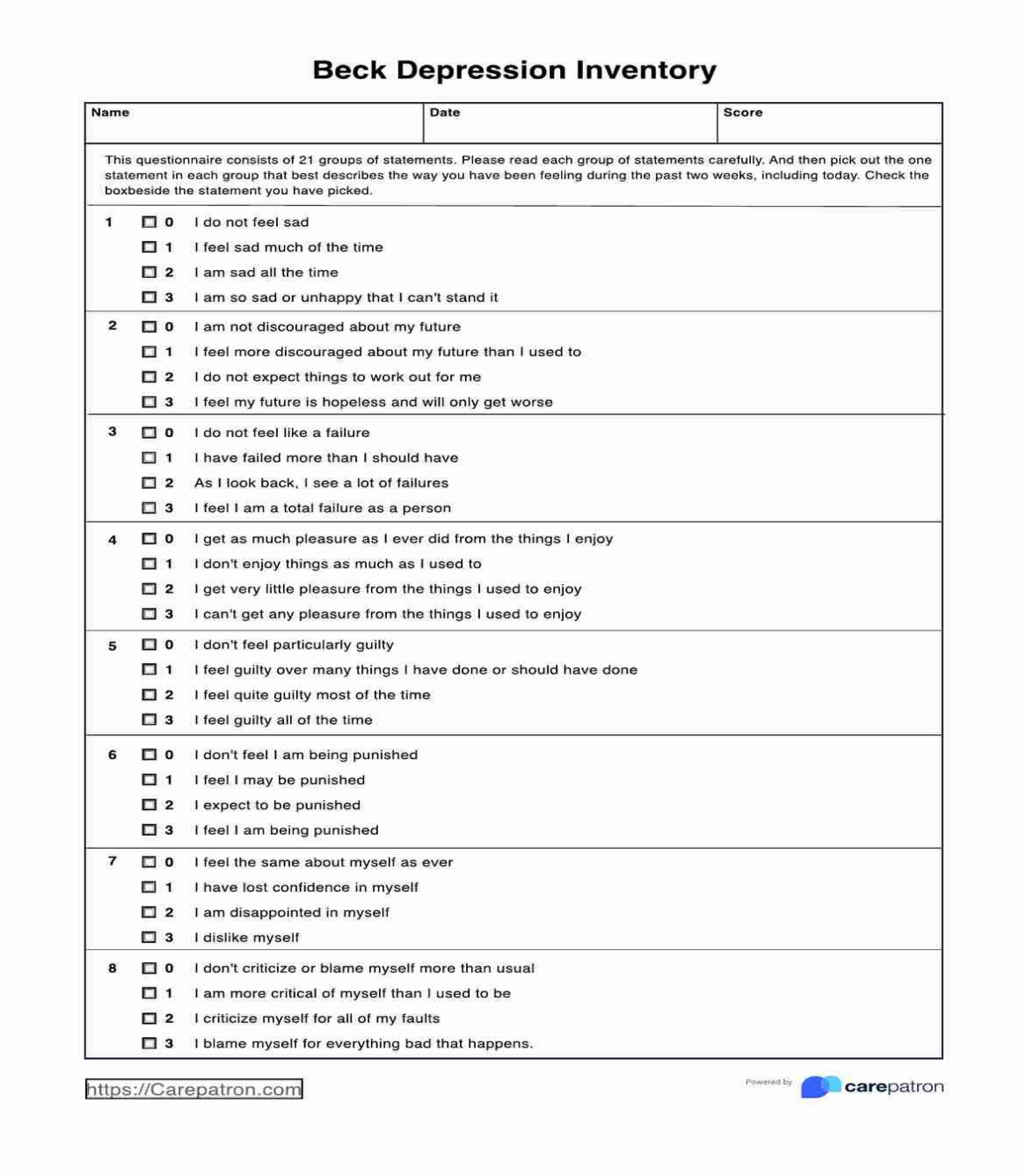
Crippa, J. A. S., Zuardi, A. W., Martín-Santos, R., Bhattacharyya, S., Atakan, Z., McGuire, P., & Fusar-Poli, P. (2009). *Cannabis and anxiety: A critical review of the evidence*. Human Psychopharmacology: Clinical and Experimental, 24(7), 515–523.

Green, B., Kavanagh, D., & Young, R. (2003). *Being stoned: A review of self-reported cannabis effects*. Drug and Alcohol Review, 22(4), 453–460.

Appendix

Beck's Depression Inventory

This depression inventory can be self-scored. The scoring scale is at the end of the questionnaire.



Beck Depression Inventory

Name	Date	Score

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully. And then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Check the boxbeside the statement you have picked.

1	☐ 0	I do not feel sad
	☐ 1	I feel sad much of the time
	☐ 2	I am sad all the time
	☐ 3	I am so sad or unhappy that I can't stand it
2	☐ 0	I am not discouraged about my future
	☐ 1	I feel more discouraged about my future than I used to
	☐ 2	I do not expect things to work out for me
	☐ 3	I feel my future is hopeless and will only get worse
3	☐ 0	I do not feel like a failure
	☐ 1	I have failed more than I should have
	☐ 2	As I look back, I see a lot of failures
	☐ 3	I feel I am a total failure as a person
4	☐ 0	I get as much pleasure as I ever did from the things I enjoy
	☐ 1	I don't enjoy things as much as I used to
	☐ 2	I get very little pleasure from the things I used to enjoy
	☐ 3	I can't get any pleasure from the things I used to enjoy
5	☐ 0	I don't feel particularly guilty
	☐ 1	I feel guilty over many things I have done or should have done
	☐ 2	I feel quite guilty most of the time
	☐ 3	I feel guilty all of the time
6	☐ 0	I don't feel I am being punished
	☐ 1	I feel I may be punished
	☐ 2	I expect to be punished
	☐ 3	I feel I am being punished
7	☐ 0	I feel the same about myself as ever
	☐ 1	I have lost confidence in myself
	☐ 2	I am disappointed in myself
	☐ 3	I dislike myself
8	☐ 0	I don't criticize or blame myself more than usual
	☐ 1	I am more critical of myself than I used to be
	☐ 2	I criticize myself for all of my faults
	☐ 3	I blame myself for everything bad that happens.

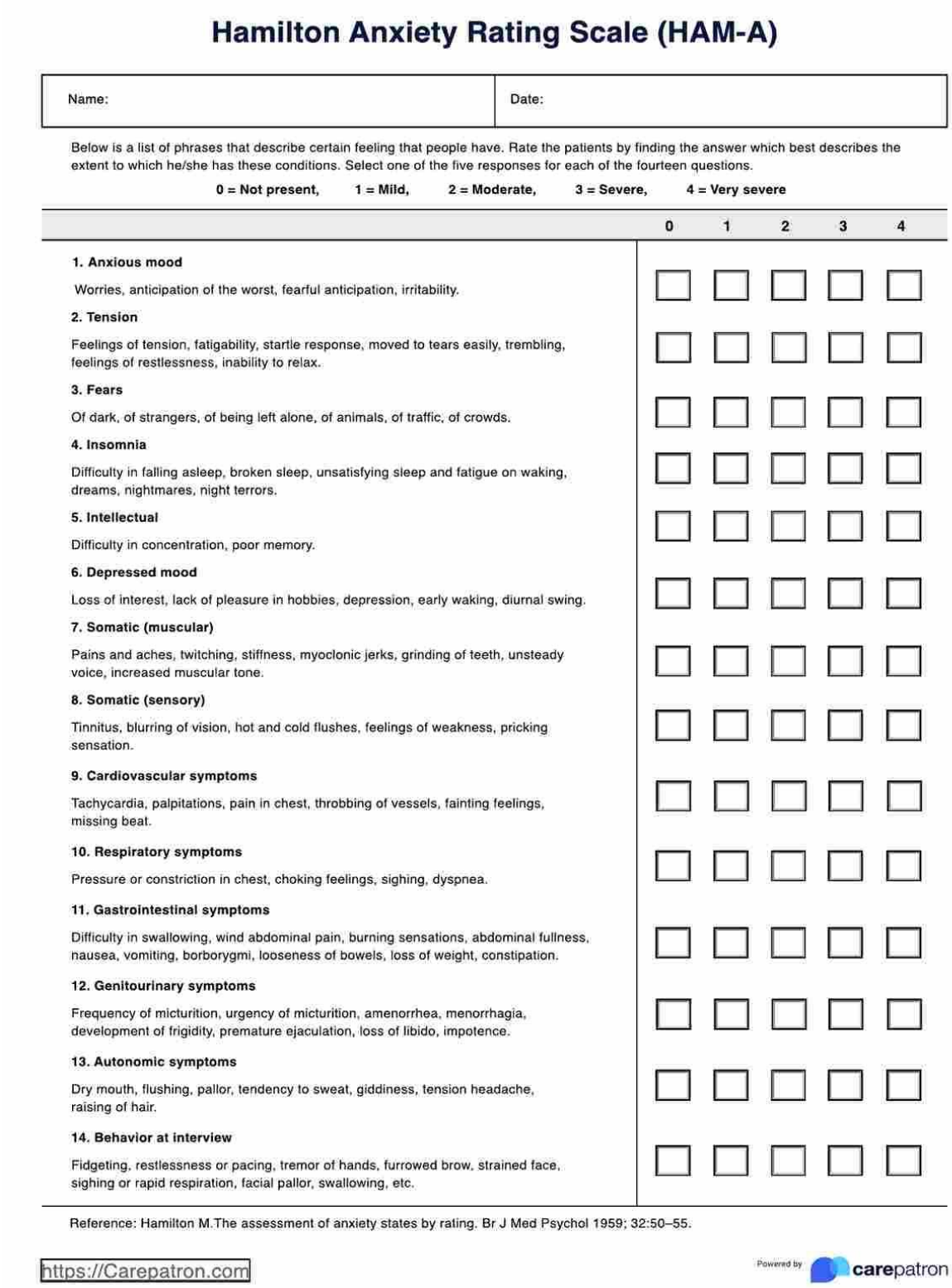
https://Carepatron.com

Powered by carepatron

Fig. 3. Beck's Depression Inventory

Hamilton Anxiety Rating Scale (HAM-A)

This inventory consists of 14 items and can be self-scored.



Hamilton Anxiety Rating Scale (HAM-A)

Name:	Date:

Below is a list of phrases that describe certain feeling that people have. Rate the patients by finding the answer which best describes the extent to which he/she has these conditions. Select one of the five responses for each of the fourteen questions.

0 = Not present, 1 = Mild, 2 = Moderate, 3 = Severe, 4 = Very severe

	0	1	2	3	4
1. Anxious mood Worries, anticipation of the worst, fearful anticipation, irritability.	☐	☐	☐	☐	☐
2. Tension Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax.	☐	☐	☐	☐	☐
3. Fears Of dark, of strangers, of being left alone, of animals, of traffic, of crowds.	☐	☐	☐	☐	☐
4. Insomnia Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors.	☐	☐	☐	☐	☐
5. Intellectual Difficulty in concentration, poor memory.	☐	☐	☐	☐	☐
6. Depressed mood Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing.	☐	☐	☐	☐	☐
7. Somatic (muscular) Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone.	☐	☐	☐	☐	☐
8. Somatic (sensory) Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation.	☐	☐	☐	☐	☐
9. Cardiovascular symptoms Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat.	☐	☐	☐	☐	☐
10. Respiratory symptoms Pressure or constriction in chest, choking feelings, sighing, dyspnea.	☐	☐	☐	☐	☐
11. Gastrointestinal symptoms Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation.	☐	☐	☐	☐	☐
12. Genitourinary symptoms Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence.	☐	☐	☐	☐	☐
13. Autonomic symptoms Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair.	☐	☐	☐	☐	☐
14. Behavior at interview Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.	☐	☐	☐	☐	☐

Reference: Hamilton M.The assessment of anxiety states by rating. Br J Med Psychol 1959; 32:50–55.

https://Carepatron.com

Powered by carepatron

Fig. 4. Hamilton Anxiety Rating Scale