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Maria Peña Kumpf

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the review committee have been made.

Review Committee
Dr. Magy Martin, Committee Chairperson, Psychology Faculty
Dr. Megan Corley, Committee Member, Psychology Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

Relationship Between Demographic Factors and Prevalence of Cannabis Use Disorder Among Adults Holding a Medical Marijuana Card in a Rural Community

by

Maria I Peña Kumpf

MA, University of Phoenix, 2019

BS, University of Phoenix, 2018

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Clinical Psychology

Walden University

September 2024

Abstract

Despite the widespread use of cannabis and the prevalence of cannabis use disorder (CUD) in Ohio, information was limited on the effectiveness of medical marijuana and CUD treatment success, particularly within specific populations and counties. The purpose of this quantitative study was to examine the prevalence of CUD among adults from rural communities who had received medical marijuana cards for chronic conditions. The study examined the demographic factors of age, gender, and education level as independent variables influencing the development of CUD in this population. The biopsychosocial theory model provided the framework for the study. Data was collected through structured surveys, including the CUDIT-R, with 146 participants. Findings from correlation analysis indicated that age and gender were significant predictors of cannabis use severity, with younger individuals and women at higher risk. These results underscore the need for targeted public health efforts addressing younger populations and considering gender differences. Additionally, the study highlights the complex factors influencing medical cannabis use, advocating for careful regulation and clinical approaches.

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Dedication

First and foremost, I thank God for the inspiration to live a purposeful life. I dedicate this project to my wonderful children, Karisa and Kalan, who have inspired and encouraged me every step of the way, never letting me give up and always celebrating the milestones. I want to dedicate this to my best friend and sister in Christ, Patty, who laughed, cried, and prayed with me when the journey became ungearing and rough. To my Pastor Joe, who exemplified compassion and love for the needful and inspired my work for our community. You are a daily inspiration. Moreover, thank you to my dearest sister, Veronica, who talked with me daily and kept me focused on why I chose this path in my life. Finally, I dedicate this to my grandbabies who reenergized me on the days I experienced the worst of burnout. My Lyric, keep singing to me, sweetheart. Keep my sunshine going.

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I thank my committee members, Dr. Martin and Dr. Corley, for their patience and feedback. I thank my field supervisors for their encouragement, support, and guidance. I also thank my colleagues who shared their input and sacrificed their time and efforts during course discussions. I hope you reach your journey, which is fulfilling, and you reach your life goals.

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Chapter 1: Introduction to the Study

This study investigated the prevalence of high-risk cannabis use among adults with medical marijuana cards in rural areas, aiming to explore how demographic factors influence the likelihood of developing cannabis use disorder (CUD). With the expansion of medical cannabis programs leading to increased accessibility, understanding the potential risks associated with cannabis use is essential for shaping health care policies and interventions (Casarett & Abrams, 2019). Employing the Cannabis Use Disorder Identification Test-Revised (CUDIT-R) and demographic questionnaires, I examined the correlation between medical marijuana card possession and CUD, providing a detailed analysis of the factors that contribute to high-risk use (see Budney, Borodovsky, & Knapp, 2019). Moreover, by analyzing motivations for cannabis use and perceptions of its harm, the study aimed to offer insights critical for developing targeted interventions in rural settings (see Bachhuber et al., 2019). This approach addressed a significant gap in existing literature, with the potential to inform and refine health care practices, clinical guidelines, and public health strategies, ensuring the responsible use of medical cannabis and mitigating its associated risks (see Gilman et al., 2022).

The sections of this chapter lay the foundation for this study by addressing the existing literature on the prevalence of high-risk cannabis use among adults in rural areas. Moreover, this chapter outlines the core components of the study, including the problem statement, purpose, theoretical framework, scope, limitations, significance, and potential to effect transformative social change.

Background

Research has explored the popularity of cannabis use and its potential to lead to CUD. However, data linking CUD development to the acquisition of a medical marijuana card remains limited. Since the legalization of cannabis, self-medication for sleep disorders has emerged as one of the most common uses, alongside conditions such as pain, mood disorders, post-traumatic stress, and anxiety (Boehnke et al., 2022; Suraev et al., 2020). Moderate evidence supported the effectiveness of cannabis in alleviating symptoms of sleep disturbances related to pain conditions such as multiple sclerosis and fibromyalgia (Suraev et al., 2020). Socioeconomic stress is another significant factor driving cannabis use, particularly among populations facing financial barriers to accessing medical treatments. Individuals from disadvantaged backgrounds, including those experiencing poverty, low parental education, academic struggles, and substance abuse, may turn to cannabis as a form of self-medication, especially in areas where these stressors are prevalent (Suraev et al., 2020). Due to cannabis's classification as a Schedule I substance, insurance companies comply with federal regulations, leaving patients to pay out of pocket, further motivating the use of cannabis for symptom relief (Casarett & Abrams, 2019).

The success of medical cannabis in treating chronic conditions has influenced policy considerations for its broader use. However, concerns arise regarding the potential for dependency, particularly with daily use in rural settings. For instance, Manning and Bouchard (2021) found that older adults use cannabis to manage chronic pain, improve sleep quality, and treat other medical conditions, especially when other pharmaceuticals

have failed. Some older adults also reported using cannabis recreationally and found it effective in reducing symptoms (Manning & Bouchard, 2021). Additionally, many older adults chose cannabis for its cost-effectiveness compared to other treatments, even with medical insurance (Manning & Bouchard, 2021). Despite the growing use of medical marijuana, there was no standardized assessment or screening by prescribing professionals to evaluate the risks of developing CUD. Further research was needed to assess the benefits of cannabis for chronic conditions while simultaneously addressing the potential risks of developing use disorders, ensuring that public health policies can balance these factors effectively.

Problem Statement

The potential social issue of cannabis use leading to CUD has been underscored in prior research (Grigsby, Lunde, & Keller, 2020). Adults, particularly those with medical marijuana cards, may use cannabis to self-treat perceived stressors, which can escalate into recreational use and increase the risk of developing CUD (Gilman et al., 2022). This necessitates a deeper investigation into various aspects of cannabis use, including tolerance, withdrawal symptoms, failed attempts to quit, neglect of other activities, and interpersonal conflicts (Gilman et al., 2022). Understanding the motivations behind cannabis use is essential, especially among older adults who often rely on cannabis to manage chronic pain and improve sleep quality despite the heightened risk of CUD (Manning & Bouchard, 2021). Economic factors further complicate the issue because many older adults find cannabis more affordable than other treatments, even with medical insurance (Manning & Bouchard, 2021). Despite the widespread use of cannabis

and the prevalence of CUD in Ohio, there is limited information on the effectiveness of medical marijuana and CUD treatment success, particularly within specific populations and counties (Substance Abuse and Mental Health Services Administration, 2020). This gap highlighted the need to identify the underlying reasons for the increase in recreational cannabis use among demographics predisposed to CUD. Addressing these factors was crucial for informing targeted interventions and policy decisions aimed at mitigating the adverse consequences of cannabis use.

Purpose of the Study

The purpose of this quantitative study was to investigate the patterns, frequency, and adverse effects of cannabis use among adults with medical marijuana cards in rural areas. The research aimed to analyze the correlation between the possession of these cards and the prevalence of CUD, as defined by the Diagnostic and Statistical Manual (DSM-5) criteria and assessed using the CUDIT-R. The study examined the demographic factors of age, gender, and education level as independent variables influencing the development of CUD in this population. By exploring the complex interplay of sociodemographic and biopsychosocial factors contributing to cannabis use behaviors in rural communities, the study sought to inform targeted interventions and policies.

Research Questions and Hypotheses

RQ1: What is the relationship between age and the high-risk use of cannabis?

H_o1: There is no relationship between age and the high-risk use of cannabis.

H_a1: There is a relationship between age and the high-risk use of cannabis.

RQ2: What is the relationship between gender and the high-risk use of cannabis?

H_o2: There is no relationship between gender and the high-risk use of cannabis.

H_a2: There is a relationship between age and the high-risk use of cannabis.

RQ3: What is the relationship between the high-risk use of cannabis and the level of education?

H_o3: There is no relationship between the level of education and the high-risk use of cannabis.

H_a3: There is a relationship between the level of education and the high-risk use of cannabis.

Theoretical Framework

The biopsychosocial theory model, introduced by Engel in 1977, was developed to address the rising health care costs by broadening the understanding of health and illness beyond the traditional biomedical model. This model emphasizes the importance of considering psychological, social, and cultural factors, alongside biological ones, in inpatient care (Lee & Oldham, 2022). Since its inception, the biopsychosocial theory model has been widely applied across health care, psychology, and related fields. Initially implemented in psychiatric settings, the model provides a framework for scientifically exploring the human domain, allowing for the study of interactions between professionals and patients through methods such as interviewing (Lee & Oldham, 2022).

A key feature of the biopsychosocial approach is its focus on lifestyle and identity changes, which are crucial in substance use rehabilitation. This approach, distinct from other forms of rehabilitation, involves a structured, self-governed process that encourages individuals to integrate into social networks, develop social skills, increase

accountability, and foster self-reliance (Staiger et al., 2020). The model supports a holistic approach to treating substance use disorders by recognizing the need for integrated, multidimensional interventions that address biological, psychological, and social aspects of addiction. Biological factors such as cravings and withdrawal symptoms can be managed with pharmacotherapy, while psychotherapy and counseling address psychological factors, including coping skills and co-occurring mental health issues (Staiger et al., 2020). Social support interventions, such as family therapy and support groups, enhance social connections, address environmental triggers, and promote recovery-oriented lifestyles (Staiger et al., 2020). Overall, the biopsychosocial theory model underscores the necessity of a comprehensive approach to addiction treatment, addressing the complex interplay of factors that influence recovery.

Nature of the Study

A quantitative approach was chosen to examine the relationship between demographic factors and the prevalence of CUD among adults holding a medical marijuana card in a rural community. Using the CUDIT-R and a demographic questionnaire, I collected data on variables such as age, gender, education level, and employment status. Statistical analyses, including regression modeling and subgroup comparisons, were conducted to examine the associations between demographic variables and CUD prevalence. The findings may provide insights into the factors contributing to CUD in rural communities and may help guide targeted interventions and policy decisions to reduce its prevalence. The logical connections between the framework and the nature of this study include investigating the biological, psychological, and social

factors that lead to the behaviors associated with the use of cannabis. Using cannabis as a treatment for chronic conditions has potential side effects that interfere with the individual's quality of life, particularly if the individual has preexisting predictors that will perpetuate dependency (Engel, 1977).

Respect for participants' autonomy was another fundamental principle, particularly concerning sensitive topics such as substance use and mental health. Researchers should be culturally sensitive and inclusive, recognizing and respecting diverse cultural beliefs and practices related to cannabis use. Additionally, researchers must maintain integrity and transparency throughout the research process, adhering to ethical standards and disclosing conflicts of interest (Engel, 1977).

Definitions

Addiction: A neurological disease of compulsion and continued consumption despite negative consequences (Pickard, 2021).

Biological factors: Factors that play a significant role in the development and maintenance of substance use disorders. Genetic predispositions, neurobiological changes, and biochemical imbalances can influence an individual's vulnerability to addiction. For example, variations in neurotransmitter systems such as dopamine, serotonin, and endorphins can affect reward pathways and contribute to addictive behaviors (Staiger et al., 2020).

Cannabidiol (CBD): A component in cannabis found to have medical potential (Pennypacker & Romero-Sandoval, 2020).

Cannabis: A plant that contains several different cannabinoids used for medicinal and recreational consumption (Alcohol & Drug Foundation, 2023).

Cannabis use disorder (CUD): A problematic use of cannabis (marijuana) leading to clinical and significant impairments and dependency (DSM-5, 2013).

Nabiximols: A specific cannabis extract, or cannabinoid agonist, approved for use in treating CUD along with psychotherapy (Lintzeris et al., 2019).

Psychological factors: Factors that contribute to the onset and progression of substance use disorders. These may include stress, trauma, underlying mental health conditions (such as depression, anxiety, or trauma-related disorders), personality traits, and maladaptive coping mechanisms. Individuals may use substances as a way to self-medicate or alleviate emotional distress, leading to the development of dependence and addiction (Staiger et al., 2020).

Social factors: Factors that play a crucial role in substance use disorders. Environmental influences, peer pressure, family dynamics, cultural norms, socioeconomic status, access to substances, and exposure to trauma or adverse childhood experiences can impact substance use behaviors. Social networks and support systems can facilitate or hinder recovery efforts (Staiger et al., 2020).

Tetrahydrocannabinol (THC): The psychoactive component found in cannabis that causes a euphoric sensation and medical potential (Pennypacker & Romero-Sandoval, 2020b).

Assumptions

In this numeric quantitative study using a self-report inventory, I assumed that the survey data in the CUDIT-R would show an increase in the use of recreational cannabis. The quantitative research was conducted assuming all participants, including adults between 18 and 65 living in rural areas of Ohio, would answer the questionnaire honestly and completely. There was a possibility that due to the stigma of recreational use, some participants would not provide truthful answers because the inventory is a self-report assessment and may not measure the increase in the use of cannabis (see Siddiqui et al., 2022). The current study operated under several vital assumptions to ensure the integrity and reliability of its findings. First, I assumed that participants would provide accurate and truthful responses to survey questions regarding cannabis use and demographic information. This assumption underpinned the validity of the data collected and the subsequent analyses conducted. Additionally, I assumed that the sample of participants recruited from dispensaries in rural Ohio would be representative of the broader population of adults with medical marijuana cards in rural communities. I relied on the assumption that the CUDIT-R questionnaire and demographic survey would effectively measure CUD and demographic variables, respectively, within the study population.

I also assumed a degree of homogeneity among participants despite potential variations in age, gender, chronic conditions, and other demographic factors. I assumed that measures taken to ensure participant anonymity would encourage honest responses. Ethical considerations mandate voluntary participation, with participants consenting to engage in the study without coercion or pressure. Finally, I assumed that findings derived

from the study sample could be reasonably generalized to other rural communities with similar demographics and patterns of medical marijuana card use. These assumptions collectively underpinned the validity and applicability of the study's findings.

Scope and Delimitations

The scope of this research encompassed rural communities within a specified geographic region, targeting adults age 18 and above who possessed a medical marijuana card. The study was conducted within a defined time frame, concentrating on the prevalence of CUD as measured by the CUDIT-R and demographic factors assessed through a dedicated demographic questionnaire. The exclusion of urban areas ensured a focused exploration of the distinct dynamics surrounding cannabis use in rural settings (see Jeffers et al., 2021). Additionally, participants under 18 were excluded from the study to promote adult responses to the questionnaire, increasing the validity of the assessment while considering the cultural, social, and psychological influences (see Siddiqui et al., 2022). I relied on the CUDIT-R as the primary tool for assessing CUD, with a deliberate emphasis on relevant demographic factors (see Schluter & Hodgins, 2022).

Furthermore, the study was tailored toward adults with chronic conditions, omitting those without such health issues. I adopted a quantitative approach, emphasizing statistical analyses and excluding in-depth exploration of qualitative aspects related to cannabis use. Using a cross-sectional design, I provided a snapshot of the prevalence of CUD and demographic factors at a specific point in time. These defined parameters

contributed to a focused investigation, ensuring clarity and relevance in addressing the research questions and hypotheses.

Limitations

The quantitative study on the prevalence of CUD in adults in rural communities required samples from communities with similar characteristics. The first limitation was that the self-report inventory was self-administered, allowing for personal perception of problematic use (see Schluter & Hodgins. 2022). The inventory was direct, and anonymity was ensured. Nonetheless, because the use of cannabis for recreational purposes has been legalized in the state of Ohio, participants may have been less apprehensive about answering with honesty and full cooperation, thereby increasing the reliability of the findings. A second limitation was the possible influence of the recent changes in Ohio legislation regarding the recreational use of cannabis. Ohio became the 24th state in the United States to legalize the use of recreational marijuana as of November 7, 2023 (Singer, 2023). However, researchers have not studied how this may affect the rate of developing CUD.

Significance

This quantitative study may contribute to the understanding of the implications surrounding the use of medical cannabis, particularly in the context of managing access to cannabis via a medical card without screening for potential CUD (see Gilman et al., 2022). This insight may influence health policies related to the accessibility and coverage of medical marijuana in health care systems, how physicians and other health providers prescribe it, and the use of the biopsychosocial theory model to measure potential harm.

By examining the potential dependency due to daily cannabis use, the study provided a comparative perception of the risks and benefits associated with prolonged use (see Cooke et al., 2021). This information may be crucial for policymakers, health care providers, and individuals considering cannabis as a treatment option.

Investigating the motivations for cannabis use among older adults, especially for managing chronic pain and improving sleep quality, may add valuable insights into the reasons behind this demographic's engagement in long-term use (see Suraev et al., 2020). This information may be relevant for health care professionals and policymakers evaluating the rules and regulations on medical marijuana prescriptions (see Turna et al., 2020). Casarett et al. (2019) identified the economic factors influencing the choice of cannabis as a treatment, particularly when other medical treatments are perceived as expensive, and underscored the challenges related to insurance coverage for medical marijuana, informing discussions on health care affordability and accessibility. By exploring potential social problems related to cannabis use and its consequences, the current study addressed the broader societal impact of cannabis legalization (see Budney, Sargent, & Lee, 2019). This information may essential for public health interventions and policy development to mitigate any adverse consequences associated with cannabis use.

The controversy surrounding the potential harm of recreational and medical cannabis use continues to be a central research focus, especially in the context of ongoing debates about the potential side effects of long-term use. Addressing the challenges may facilitate conveying and interpreting current data and public awareness, emphasizing the considerable risk of developing CUD with excessive recreational use, stipulating that

there is a considerable risk of developing CUD or addiction when used excessively and for recreational use (Budney, Borodovsky, & Knapp, 2019). The DSM-5 and the International Statistical Classification of Diseases and Related Health Problems provide criteria for diagnosing CUD, and the severity is classified based on the number of symptoms met. The DSM-5 uses a list of 11 symptoms and signs that relate to impairment and control caused by excessive use of cannabis as criteria for CUD. In contrast, the International Statistical Classification of Diseases and Related Health Problems uses two separate lists to identify the syndrome and classify the condition as harmful use and dependency (DSM, 2013).

Summary

The study investigated CUD prevalence among rural adults possessing medical marijuana cards amid rising cannabis use driven by medical accessibility and social acceptance. The study aimed to examine the association between possessing a medical marijuana card and CUD likelihood, considering the increasing prevalence of cannabis use and dispensaries in rural areas. Previous studies examined cannabis popularity but lacked data on CUD development after acquiring medical cards. Socioeconomic stressors contribute to cannabis use, with many people turning to it due to financial struggles and lack of access to medical treatments. I used a quantitative approach, employing the CUDIT-R and demographic questionnaire to assess CUD prevalence and the influence of demographic factors. The biopsychosocial theory model informed the study, emphasizing the interplay of biological, psychological, and social factors in understanding substance use disorders. Limitations included potential biases in self-reporting and recent legislative

changes impacting cannabis use. The study's significance lay in informing health policies, health care providers, and individuals considering cannabis treatment, addressing challenges in insurance coverage and societal impacts of cannabis legalization. The study aimed to contribute valuable insights into the risks and benefits of cannabis use, particularly in managing chronic conditions among older adults. The study may highlight the need for improved screening and policy interventions to mitigate adverse consequences.

Chapter 2: Literature Review

This chapter addresses the existing literature to establish a detailed context and background for understanding the dynamics of cannabis use, both medically and recreationally. This chapter also highlights how adults, particularly those with medical marijuana cards, often use cannabis as self-medication for perceived stressors. This practice can lead to increased recreational use and a higher risk of CUD. This literature review explores various dimensions of cannabis use, including tolerance, withdrawal symptoms, unsuccessful attempts to quit, the impact on daily activities, and interpersonal conflicts, all within the framework of the biopsychosocial theory model proposed by Engel (1977). The study focused on rural Ohio, examining demographic trends and the implementation of the Ohio Medical Marijuana Control Program (OMMCP). The study also considered the role of psychiatric screening before card issuance as a preventive measure against CUD. By synthesizing diverse literature sources, this chapter aims to illuminate the complex nature of cannabis use and its motivations. The study may enhance understanding and inform policy, screening practices, and intervention strategies, focusing on evidence-based approaches to address associated risks and challenges.

This chapter's sections are organized by discussing the literature search strategy. Next, the conceptual framework of the biopsychosocial theory model details the relevance of employing this theoretical framework for understanding couples' relationship dynamics. Third, the relevant literature is discussed. The chapter concludes

with a summary of the purpose, the identified gap and clarity needed in the literature, and the relevance of this for appropriate treatment methodologies.

Literature Search Strategy

Research data and information on this topic were compiled from a variety of sources including Walden University Library, Google Scholar, Pearson publications, the Centers for Disease Control and Prevention, the Division of Cannabis Control, the Diagnostic and Statistical Manual of Mental Disorders (5th Edition), PsychNet.com, and PubMed, which provided access to relevant articles. The sites and libraries were searched using the keywords *cannabidiol*, *addiction*, *cannabis*, *Cannabis Use Disorder*, chronic illnesses, *THC*, *CBD*, *nabiximols*, *rural communities*, *adults who use cannabis*, *CUDIT-R and interventions such as pharmacotherapy*, *psychotherapy*, and *social support interventions*. The searches included various combinations of keywords, and articles published between 2019 and 2023 were included with relevancy and currency. The literature review explores the prevalence and impact of CUD among adults in rural communities, employing a comprehensive search strategy across scholarly databases and reputable sources.

Biopsychosocial Theory Model

This study was grounded in the biopsychosocial theory model, which emphasizes the complex interplay of biological, psychological, and social factors in the development and maintenance of chronic conditions and cannabis addiction (Engel, 1977). Psychologically, individuals' attitudes, beliefs, and motivations related to marijuana use are influenced by environmental factors such as peer pressure, family dynamics, cultural

norms, socioeconomic status, and exposure to trauma or adverse childhood experiences (Lee & Oldham, 2022). Social networks and support systems also play a crucial role in facilitating or hindering recovery efforts (Lapham, Matson, et al., 2023). The biopsychosocial theory model suggests that biological factors, including genetic predispositions, neurobiological changes, and biochemical imbalances, significantly influence an individual's vulnerability to addiction. Variations in neurotransmitter systems such as dopamine, serotonin, and endorphins affect reward pathways, contributing to addictive behaviors (Lee & Oldham, 2022). Psychological factors, such as stress, trauma, mental health conditions (e.g., depression, anxiety, trauma-related disorders), and maladaptive coping mechanisms, are critical in the onset and progression of substance use disorders (Lee & Oldham, 2022).

Individuals may use substances to self-medicate or alleviate emotional distress, leading to dependence and addiction (Lee & Oldham, 2022). Social factors, including peer influence, family dynamics, and societal norms, also contribute to substance use disorders. The possession of a medical marijuana card may influence perceptions of marijuana's medicinal benefits and attitudes toward recreational use, potentially increasing the risk of developing CUD. Social norms and community acceptance of marijuana use can further affect an individual's likelihood of engaging in problematic use (Lapham, Kivlahan, et al., 2023). The biopsychosocial theory model posits that substance dependence is closely linked to fundamental aspects of an individual's lifestyle and self-identity rather than solely to the addictive properties of specific drugs (Engel, 1977). In studying CUD among adults with medical marijuana cards in rural communities, the

current study addressed critical ethical considerations. These included obtaining informed consent, ensuring anonymity, emphasizing voluntary participation, and prioritizing beneficence and nonmaleficence to maximize benefits and minimize harm to participants (see Engel, 1977; Lee & Oldham., 2022).

Literature Review of Key Variables and Concepts

The increasing prevalence of cannabis use and the challenges in accurately measuring its impact have garnered significant attention in recent years. Distinguishing between recreational and medicinal use, as well as assessing the risk of CUD, is critical for effective screening and intervention. The literature highlighted the complexities of differentiating between these types of use, particularly in identifying addictive behaviors among individuals with a history of recreational cannabis use.

Screening tools such as the CUDIT-R are essential in evaluating the risk of CUD. However, accurately measuring prevalence remains challenging due to variations in usage patterns and demographics (Budney, Borodovsky, & Knapp, 2019). Recent studies, such as Coelho et al. (2024), investigated the effectiveness of the CUDIT-R in screening for CUD among young adults, focusing on the sensitivity, specificity, and item-level performance of the test. *Sensitivity* refers to the tool's ability to correctly identify individuals with CUD, while *specificity* indicates its accuracy in identifying those without the disorder. The findings from these studies provided valuable insights into the reliability of the CUDIT-R, contributing to efforts to improve early detection and intervention strategies for cannabis-related issues.

In the context of rural areas in Ohio, the current study examined the OMMCP, to assess the progress of legalization and demographic trends among medical marijuana cardholders. Cultural factors and demographic disparities in cannabis usage patterns are significant (Lapham, Kivlahan, et al., 2023). The motivations behind cannabis use, whether recreational or medicinal, are crucial for developing effective screening and intervention strategies. Wall, Liu, et al. (2019) advocated for psychiatric screening before issuing medical marijuana cards as a means to mitigate the risk of CUD, particularly among individuals with a history of recreational use. A comprehensive understanding of cannabis use, its motivations, and the associated risks is essential for informing policy, improving screening practices, and developing targeted intervention strategies.

Addictive Potential in Rural Adults With Medical Conditions

Measuring the prevalence of cannabis use using the CUDIT-R in the population is complex given the challenges in differentiating between recreational and medicinal use. Literature data highlighted the conditional use of cannabis associated with addictive potential, especially among individuals with a history of recreational use before medicinal use (Budney, Sargent, & Lee, 2019). When measuring the population's prevalence, researchers were not able to delineate recreational use from medicinal use or the use of clinically relevant patterns because the individual timelines of use vary with age and frequency as well as the daily increase of use (Manning & Bouchard, 2021). There is, however, a conditional use of cannabis that is presumed to be associated with addictive potential, particularly among individuals who have a history of recreational use before using cannabis for medicinal purposes (Turna et al., 2020). The process for CUD

diagnosing in the DSM-5 classified the severity depending on the number of symptoms met; mild requires at least two to three, moderate is four to six, and severe is seven or more (Budney, Borodovsky, & Knapp, 2019). By assessing the frequency of use via a medical marijuana card, I used a CUDIT-R, which is a standardized survey instrument designed to assess the likelihood or presence of CUD. Conducting a survey aligned well with this tool.

Although there are some medical uses for cannabis, there is substantial evidence that showed recreational patterns lead to the development of CUD (Budney, Borodovsky, & Knapp, 2019). The benefit of using cannabis for medical purposes usually outweighs the potential risk of cannabis use dependency for adults with chronic conditions (Budney, Sargent, & Lee, 2019). Nevertheless, screening is necessary to identify the potential development of the disorder. One way to screen is using the CUDIT-R, a self-report inventory that, when answered honestly by the participant, will measure the risk of developing CUD (Budney, Borodovsky, & Knapp, 2019). This instrument may be used as a motivational instrument to assist a potential addict in participating in some form of intervention or addiction treatment plan (Budney, Sargent, & Lee, 2019). This will require the individual to consider the use and the behavior risks and the need to reduce or stop using cannabis (Budney, Borodovsky, & Knapp, 2019). Very few individuals in several short-term studies attained long-term abstinence or even sought treatment.

An individual may experience withdrawal symptoms as part of cessation, which may complicate long-term sobriety from cannabis use (Connor et al., 2022). There is a clinical significance in measuring dependency and withdrawal symptoms for treatment

planning. Depending on the term of use, there is a potential tolerance increase correlated to intoxication, particularly to THC, after 4 days of 10 mg every 4 hours throughout the day. The prevalence of cannabis withdrawal syndrome is based on the length of time of use (Connor et al., 2021). Cannabis withdrawal syndrome is notably higher in adults who decline treatment and experience co-occurring cannabis use disorder with multiple symptoms but stabilize after 2 years (Coughlin et al., 2021).

Prevalence of Use of Cannabis in Rural Areas

The current study focused on rural areas in Ohio. The OMMCP provides statistics on the progress of legalization, including the number of cultivators, dispensaries, recommendations, and sales. Qualifying conditions for medical marijuana cards are outlined, but there is limited information on the repercussions of use and screening for CUD.

Medical marijuana was legalized on September 8, 2016, in Ohio. The OMMCP has a site that lists the most current statistics on the progress since legalization. According to the OMMCP, there are 37 cannabis cultivators and 113 legally active dispensaries (OMMCP, 2023). Since the legalization of medical marijuana, over 822,760 recommendations have been issued by physicians, of which more than 391,600 have registered as users of medical marijuana (OMMCP, 2023).

Conditions for Issuance of Medical Marijuana

The qualifying conditions approved for the recommendation of the medical marijuana card include positive HIV diagnosis, AIDS, cachexia, cancer, chronic traumatic encephalopathy, spinal cord disease or injury, Crohn’s disease, inflammatory

bowel disease, seizure disorders, glaucoma, hepatitis C, Huntington's disease, irritable bowel syndrome, multiple sclerosis, Parkinson's disease, Alzheimer's disease, post-traumatic stress disorder, sickle cell anemia, spasticity, terminal illness, Tourette syndrome, traumatic brain injury, ulcerative colitis, arthritis, chronic migraines and complex region pain syndrome, amyotrophic lateral sclerosis, chronic and severe or intractable pain, and fibromyalgia (OMMCP, 2023). Despite the program's consistent updates, there is little to no information about the repercussions of use and potential screening for CUD.

Cooke et al. (2021) highlighted the lack of studies on the development of CUD in individuals using medical cannabis. Their findings indicated that 3 out of 10 users of medical marijuana develop CUD, emphasizing the need for regulated follow-up after obtaining a medical card. The increase or amount of use correlated to the severity of symptoms and the desire to alleviate those symptoms (Cooke et al., 2021).

Factors That Influence the Acquisition of a Medical Marijuana Card

Many adults in the United States exhibit demographic, socioeconomic, and behavioral risk factors for cannabis use (Jeffers et al., 2021). A need to screen for the potential development of CUD based on the characteristics and traits of individuals using cannabis is recommended to measure the risk before issuing the medical marijuana card, which is correlated to and driven by social and racial disparities. Findings showed this to be prevalent in young adults and found that 6.4% of the U.S. population is engaging in cannabis use daily, increasing the risk for cannabis disorder, especially when not screened for the potentiality based on characteristics and traits of individuals who use

recreational or medical marijuana before attaining a medical marijuana card (Jeffers et al., 2021).

A comprehensive examination of cannabis use from a transcultural perspective offered a descriptive overview of how cannabis use varied across different cultures. Rafei et al. (2023) explored various cultural factors that influence patterns of cannabis use, including social norms, religious beliefs, historical context, and legal frameworks. By examining data from diverse cultural contexts, Rafei et al. highlighted the complex interplay between culture and cannabis use behaviors. Key themes included the historical use of cannabis in different cultures, cultural attitudes toward cannabis consumption, and the impact of globalization on cannabis use patterns. Additionally, findings proposed implications of cultural factors that proposition prevention, treatment, and policy interventions related to cannabis use offer a perspective that may contribute to a deeper understanding of the cultural dimensions of cannabis use and underscored the importance of considering cultural factors in efforts to address cannabis-related issues on a global scale.

The historical trajectory of cannabis policies and usage patterns has included significant shifts over time. Originating with the stringent regulations imposed by the Controlled Substance Act of 1971 in the United States, which classified cannabis as a Schedule I substance, the legal landscape surrounding cannabis became highly restrictive, leading to severe penalties for its use and distribution. These measures influenced similar regulatory actions in many other countries worldwide, reflecting a global effort to combat drug abuse. However, a pivotal moment occurred in 1996 when California enacted

legislation permitting the medicinal use of cannabis, heralding a transformation in cannabis policy. This marked the onset of a broader trend, with states such as Colorado and Washington subsequently legalizing recreational cannabis use (Risi et al., 2020). Internationally, Uruguay emerged as a trailblazer by regulating recreational cannabis use in 2013, setting a precedent for other nations to follow. The narrative also includes the escalating global prevalence of cannabis use, surging from 147 million individuals in 2010 to over 210 million by 2022 (see Rafei et al., 2023). The COVID-19 pandemic further fueled this trend, with lockdown measures facilitating increased access to cannabis and exacerbating feelings of boredom, depression, and anxiety, potentially driving greater consumption.

Of paramount concern is the observed rise in cannabis potency over recent decades, as evidenced by longitudinal studies indicating higher THC concentrations and lower CBD levels. This trend poses heightened risks to both physical and mental health, including dependency and the exacerbation of mental health disorders (Risi et al., 2020). Consequently, there is a pressing need to address public health implications associated with cannabis use, particularly given its evolving legal status and escalating potency levels (Rafei et al., 2023).

Lapham et al. (2023a) conducted a study to gather data not only as to why individuals use cannabis but also included characteristics of such individuals who use recreational and medical marijuana. The data was collected using a survey of 1463 individuals who use primary care to treat medical and psychiatric conditions and have a history of using cannabis. The results included 76.5% of MM were women, 43.4% used

R.M., 23.5% of men used MM, and 56% used R.M. (Lapham, Kivlahan, et al., 2023). Most users of MM, at 43.3%, were between the ages of 45 and 65, while 42.4% of R.M. users were between the ages of 16 and 29 (Lapham, Kivlahan, et al., 2023). Lapham et al. reported that 78.4% of MM users were White and 97% were non-Hispanic, while R.M. users were 79% White and 89.1% were non-Hispanic. Further, only 52.1% of MM used commercial insurance, while 33.3% used Medicare. The study also indicated a higher prevalence of 49.7% MM users and 61.1% R.M. users as married or living with a partner, 61.7% MM, and 62,3% R.M. users as homeowners (Lapham, Kivlahan, et al., 2023). The issue of screening before issuing an MC remains, as well as measuring the prevalence of cannabis use disorder as a result of the use of an MC.

Cannabis use is the most frequently used psychotropic drug in the U. S., second to alcohol (Waddell et al., 2021b). The motives and impulsivity of the use of cannabis and its contribution to the use of alcohol and other substances involve properties and differentiators of use motives (Schluter & Hodgins, 2022). The results show that there is a level of impulsivity and sensation-seeking factors that exist in the use of cannabis and the co-use of alcohol (Schluter & Hodgins, 2022). This supports the theory that there are specific antecedents and consequences to the recreational use of cannabis that may lead to the development of a disorder. Psychiatric screening should be conducted for the potential risk of cannabis use disorder when issuing a medical marijuana card to patients using cannabis for medicinal purposes. Studies show that recreational cannabis use is motivated by the issuance of MC, categorizing the participants by (1) using for medicinal purposes, (2) for recreational purposes), and (3) combined use (Wall et al., (2019a). The

study found that 89% of the participants use the MC for cannabis for non-medical purposes. Over 62% are male adults, and over 65% are white. Over 83% are under 50 years of age, supporting the hypothesis that white males are more likely to use MC to purchase cannabis for recreational use and that there is a risk of cannabis use disorder (CUD) if not screened before issuance of an MC (Wall et al., 2019b). A gap in this study included the type of cannabis used for their medical conditions, and a larger scale study that includes an inventory item detailing this gap may assist in either supporting or contradicting the prevalence of CUD (Wall et al., 2019a).

Cannabis use has become mainstream among various cultures, challenging historical stigmas. Further studies explore cultural factors influencing cannabis use, noting changes in acceptance and the diminishing stigma for both medicinal and recreational use. Data highlights the need for more research supporting the medical benefits and physician training in prescribing cannabis (Siddiqui et al., (2022)

Ironically, a historical stigma began due to some of the same factors that support legalization (Siddiqui et al., 2022). Abstinence was fundamentally disallowed by generational influences such as religious beliefs, ethnic or cultural prohibitions, familial denial, and parental discouragement (Siddiqui et al., 2022). As acceptance grows and the data from studies continue to support the benefits of cannabis use for medicinal purposes, these same generational influences, along with socioeconomic reasons, are more open-minded about cannabis use (Bakhshale et al., 2020). Meanwhile, in the U. S., increased distilleries are opening and giving access to medical cannabis, assisting in regulating sales. However, the issue left is regulating the individuals who purchase cannabis and

measuring the risks of CUD. For this reason, more studies supporting the medical benefits are necessary to get support via medical representation. At this time, the majority of physicians have no intentions of participating in formal training to become certified in prescribing cannabis for medical use, as well as measuring the potential risks associated with excessive use (Siddiqui et al., 2022).

Easier access to cannabis is due to legalization regulations, but there are limited studies of the repercussions of cannabis increased usage (Turna et al., 2020). It is necessary to understand recreational and medical use patterns better. Turna et al. (2020) surveyed a sample of community adults using a self-report method to measure recreational versus medical use. The study reports that over 60% of users do so mainly for recreational use, and about 38% use it for medicinal use, of which only 24% of the medicinal users had a prescription (Turna et al. 2020). The study supports the theory that most cannabis users do so for recreational purposes or dual-use and are negatively enabled by the prescription. Turna et al. (2020) surveyed community adults to differentiate between recreational and medical cannabis use. Their findings indicate that over 60% use cannabis for recreational purposes, emphasizing the importance of understanding usage patterns for effective screening.

CUD Screening

As the use of cannabis continues to increase with the pretext of treating chronic conditions such as anxiety and insomnia, the risk of dependency has also increased (Montebello et al., 2022a). The controversy is that cannabis may be effective in treating preexisting conditions but also create them when used excessively and unmonitored by

health professionals (Grigsby et al., 2020a). Montebello et al. (2022b) examined the effects of reducing the use of cannabis associated with the improvement of symptoms of chronic conditions, including depression, pain, and insomnia. During the study, the researchers used The Insomnia Severity Index (ISI) to measure participants' sleep problems and the Depression Anxiety and Stress Severity scale (DASS) to measure those conditions. The study found that ISI scores lowered to moderate when cannabis use was reduced. The data in this study support that controlled use and lowering the risk of dependency on cannabis can be used to treat insomnia and comorbid conditions. There is little research that shows an improvement in symptoms or conditions that are aggravated as the use of cannabis increases (Montebello et al., 2022a). Further, some individuals may experience difficulties in reducing the use of cannabis, causing an increase in mood and emotional dysregulation (Schermitzler et al., 2023).

In their study, Montello et al. gathered data from a double-masked, randomized trial testing the efficacy of several cannabis extracts most commonly used for medical and psychiatric conditions, such as THC, nabiximols, and CBD, and interviewed the participants in 24 weeks. The participants completed several inventories to measure the severity of their conditions. The primary hypothesis involved finding a correlation between treating CUD and improving comorbid conditions. Studies show that treating CUD and reducing the use of cannabis improved the symptoms of comorbid conditions (Montebello et al., 2022b). The study shows that the participants also reported lower scores in DASS and ISI as the study progressed over 24 weeks. Regardless, cannabis

users indicate that the use of cannabis to self-medicate is less expensive and more readily available with or without a prescription (Jeffers et al., 2021).

Although most people use cannabis to treat psychiatric and other chronic conditions, it is not unusual for individuals who use cannabis for medicinal purposes to use it for recreational purposes (Gendy et al., 2023). Most individuals who use medical cannabis also prefer the high concentration of THC and its effects. In the study conducted by Gendy et al. (2023), where 125 individuals participated and were assessed for CUD using the DSM-5, it was concluded that 58% used cannabis for both medicinal and recreational purposes, and 51% met the criteria for CUD (Gendy et al., 2023). Cannabis use is widespread in the population with substance use disorder, mainly used to treat opioid use disorder (OUD), alcohol use disorder (AUD), and, in some cases, cannabis use disorder (CUD). Researchers found that over 70% of the users were white males (Gendy et al., 2023).

Individuals with preexisting substance use disorder were more susceptible to cannabis use disorder when using cannabis for medicinal purposes (Gendy et al., 2023). Long-term use of cannabis, particularly to treat mental issues such as anxiety and depression, will consequently affect the systems that are meant to deal with reward processing and stress responsivity, creating neurobiological changes (Schermitzler et al., 2023). On a global scale, the prevalence of use is close to 4% of the population, making it more popular than opioids, which is 1.9% prevalent (Schluter & Hodgins, 2022). The legalization of cannabis use has also changed the modality of consumption, making it more difficult to track and measure the quantifying increase yearly. For this reason,

measuring potential CUD risk involves self-report assessment, and even then, it is difficult to collect accurate data on consumption and risk. Most self-reports measure risk using questionnaires that detect potential addiction behaviors as well as frequency (Schluter & Hodgins, 2022).

The rates of use of cannabis, both with a medical card (MC) and recreationally, are increasing due to the expansion of legalization in several states (Morean & Lederman, 2019). There is a disconnect in the research that evaluates the conditions in which an MC is merited and which of those show efficiency in the use of cannabis for symptom improvement (Morean & Lederman, 2019). Studies find that 55.5% of MC cannabis users also use it for recreational purposes, and more than 80% are white adults, supporting the hypothesis that individuals with an MC become recreational users.

Siddiqui et al. (2022) share that the perception of the use of cannabis for medicinal purposes is changing, influencing the legalization of its use, thus increasing daily use. There is relevance in cultural, social, and psychological factors related to the legal use of cannabis and the influence of religious, political, and subcultural groups (Rafei et al., 2023). Some negative beliefs and attitudes about the use of cannabis were uncovered, particularly in conservative groups, via political influence, and one of the factors is the prevalence of dependency (Siddiqui et al., 2022). There are cultural effects and dependency tendencies via particular cultural beliefs and attitudes toward cannabis use. It is vital to analyze if certain variables exist in the prevalence of use and risk of developing CUD, meriting further study with such variances (Siddiqui et al., 2022).

Research findings support the concept that global medical and recreational cannabis use has increased at a dramatic rate since legalization. This has also led to a reform in legalization policies and support from lawmakers, politicians, and healthcare representation (Siddiqui et al., 2022). In October 2022, cannabis use for medical purposes was legalized in 12 states in the U.S., gaining public support while dramatically increasing the investment opportunity in the cannabis market into the billions (Siddiqui et al., 2022). As the acceptance and lifting of the stigma for medical marijuana changes, the stigma for recreational use is also diminishing and is promoted by psychosocial, cultural, and subcultural factors (Rafei et al., 2023). The insights include summarising influences and reasons for legalization based on various countries' needs and cultures. Some reasons found to be central include reduction of crime rates, reduction of illegal trading, reduction of drug trafficking, treatment for medical purposes that would otherwise not be feasible, nullification of criminal records, thus improving unemployment rates, opening new revenue methods, reduction usage by youth, public protection, and other pertinent reasons (Siddiqui et al., 2022).

Social Change, CUD Prevention, and Treatment

Waddell et al. (2021a) studied motives and impulsivity in cannabis use, revealing a connection between impulsivity and the co-use of alcohol. The study supports the theory that recreational cannabis use may lead to the development of a disorder. Waddell et al. (2021a) conducted a study titled "The impact of cannabis use motives on cannabis use behavior among university students," published in Substance Abuse. The research investigated the influence of cannabis use motives on the patterns of cannabis use

behavior among university students. Specifically, the study explores the diverse reasons students may have for using cannabis and examines how these motives correlate with their actual usage behaviors. Using a comprehensive approach, Waddell and colleagues analyzed data collected from university students to identify the underlying motives driving cannabis consumption. They also assess the relationship between these motives and various aspects of cannabis use behavior, including frequency, quantity, and methods of consumption.

The findings of some studies provide valuable insights into the complex interplay between cannabis use motives and actual usage behaviors among university students. By understanding the underlying motivations behind cannabis consumption, researchers can better tailor prevention and intervention efforts to address problematic use and promote healthier behaviors among this population. Overall, the study contributes to our understanding of cannabis use behaviors among university students and highlights the importance of considering individual motives when designing effective prevention and intervention strategies.

Psychiatric Screening and MC Issuance

Wall et al. (2019a) advocate for psychiatric screening before issuing medical marijuana cards (MC), emphasizing the risk of cannabis use disorder. The study suggests a correlation between white males using MC for recreational purposes and the risk of CUD, while Montebello et al. (2022b) examine the effects of reducing cannabis use on symptoms of chronic conditions, demonstrating improvements in insomnia and comorbid

conditions. Screening tools such as self-report assessments and inventories are crucial, although challenges exist in collecting accurate data on consumption and risk.

Wall et al. (2019a) address the critical and timely issue regarding the relationship between psychiatric screening for cannabis use disorder (CUD) and the issuance of medical marijuana cards. By focusing on this topic, the authors contribute to the ongoing discussion surrounding the regulation and accessibility of medical marijuana. One notable strength of the study is its empirical approach, which utilizes data analysis to investigate the association between psychiatric screening and the likelihood of receiving a medical marijuana card. This quantitative methodology enhances the reliability and validity of the findings, providing valuable insights into the factors influencing the issuance of medical marijuana cards. Furthermore, the study's findings shed light on potential barriers that individuals seeking medical marijuana cards may encounter, particularly those related to psychiatric evaluations for CUD.

This information is valuable for policymakers, healthcare providers, and individuals navigating the medical marijuana system, as it underscores the need for comprehensive assessment and support for patients with cannabis-related concerns. However, the study also raises important questions regarding the impact of psychiatric screening on patient outcomes and access to medical marijuana treatment. Future research could explore the implications of these findings in greater depth, examining how psychiatric evaluation protocols may influence patient care and treatment outcomes over time. Overall, there are valuable insights into the complex interplay between psychiatric screening, cannabis use disorder, and access to medical marijuana cards. The theory of

developing CUD via an MC underscores the importance of addressing these issues within the broader context of healthcare policy and regulation, highlighting the need for evidence-based approaches to cannabis-related treatment and management. Askari et al. (2021) highlight a decrease in cannabis use disorder treatment-seeking, possibly linked to changes in medical marijuana laws. Effective treatment methods are discussed, including motivational enhancement therapy (MET) and cognitive-behavioral therapy (CBT). However, only a fraction of individuals participating in treatment demonstrate continuous improvement.

A factor for the prevalence of developing CUD may be age, which may explain the decrease of 44.6% in treatment-seeking by young adults between 2008 and 2016 (Askari et al., 2021). Data from government-funded organizations that collect information from non-institutionalized individuals determine treatment trends. In the study by Askari et al., of the 1,005,421 participants, 25% were 18-25, 50% were older, and met CUD criteria per the DSM-5. Only 2.19% perceived to need treatment, and only 6.06% sought treatment (Askari et al., 2021). Their study also shows a decrease in treatment-seeking through 2019 and is correlated to the changes in medical marijuana laws throughout the same period (Askari et al., 2021). The motivation to seek treatment is not as pertinent since the legalization of medical marijuana and the lax screening for CUD of patients using an MC. Montebello et al. (2022a) suggest that legalization increases the use of cannabis and reduces the perception of harm.

Summary

In summary, the literature review provides an in-depth analysis of various aspects of cannabis use, from controversies and prevalence to legislative perspectives, demographic statistics, and treatment approaches. The chapter lays the foundation for the subsequent research by identifying gaps, challenges, and key findings from existing studies. The information details the prevalence and impact of Cannabis Use Disorder (CUD) among adults in rural communities, drawing from the Biopsychosocial theory model to explore the multifaceted influences on addiction. It examines genetic, neurobiological, psychological, environmental, and social factors contributing to CUD, including the role of possessing a medical marijuana card in shaping attitudes toward marijuana use. Ethical considerations are highlighted, advocating for informed consent, confidentiality, and participant well-being. The study stresses the importance of balancing the benefits of medical cannabis with the risk of CUD, proposing screening tools like the Cannabis Use Identification Test (CUDIT-R) for assessment. Additionally, it advocates for psychiatric screening before issuing medical marijuana cards to mitigate CUD risk, acknowledging the need for intervention strategies, particularly among individuals with a history of recreational use. The findings underscore the necessity for further research to comprehend the intricate dynamics influencing cannabis use and the imperative for effective screening and monitoring measures to address associated risks, especially in medical settings.

Chapter 3: Research Method

This chapter presents the research methodology employed to investigate CUD's prevalence and potential consequences among adults in rural communities. Understanding the prevalence of CUD and its correlation with demographic factors among adults holding a medical marijuana card in rural communities was needed for informed public health interventions and policy decisions. I collected numerical data to investigate the prevalence of CUD and its association with demographic variables among adults with medical marijuana cards in rural areas. The chapter encompasses various elements including the research design, participants, data collection procedures, and data analysis methods.

Assessing the prevalence of cannabis use using the CUDIT-R in the population proved challenging due to difficulties in distinguishing between recreational and medicinal use. This challenge was compounded by the complex nature of cannabis use, especially among individuals with a prior history of recreational use before transitioning to medicinal purposes. Researchers face obstacles in accurately distinguishing between recreational and medicinal use, as well as determining clinically relevant usage patterns, given the variability in individual timelines of use, age, frequency, and the escalating daily consumption rates. There is a subset of cannabis users whose usage is linked with an inferred addictive potential, particularly among those with a history of recreational use preceding medicinal use.

Research Design and Rationale

I used structured surveys such as the CUDIT-R questionnaire and demographic surveys to sample adults with medical marijuana cards in the rural community. The data collected were quantitative, consisting of numerical responses and demographic categories. Survey research facilitated the quantitative analysis of the collected data, allowing for statistical comparisons, correlations, and predictive modeling to assess the relationship between potential risk factors and the likelihood of developing CUD. Once the data were collected, statistical analysis techniques were employed to analyze and interpret the data. The analysis included calculating prevalence rates of CUD, conducting correlation analyses to explore relationships between CUD and demographic variables, and performing inferential statistical tests to determine the significance of these relationships.

The study examined the prevalence of CUD and identified potential associations with demographic and cultural factors. The study provided a structured and objective approach to understanding the nature and extent of CUD among adults with medical marijuana cards in rural communities, revealing the relationship between biopsychosocial and cultural factors related to demographic characteristics. To determine whether CUD was prevalent, as measured by the CUDIT-R among adults with a medical marijuana card in a rural community and demographic factors as measured by a demographic questionnaire, I conducted a descriptive summary of the demographic characteristics to determine the percentage of individuals who met the rural adult criteria. Statistical Package for the Social Sciences (SPSS) facilitated a regression analysis to identify any

unique demographic contributions by the specific community that may predict the prevalence of developing CUD.

Rationale

A quantitative design was appropriate to administer surveys to a representative sample of the target population (e.g., White rural adults with medical marijuana cards). Survey research allowed for the generalizability of findings to a broader population, enhancing the study's external validity (Chen, 2021). Surveys are often a cost-effective and efficient method for collecting data from many participants, especially when compared to other quantitative methodologies such as experiments or longitudinal studies.

This study involved collecting numerical data to quantify the prevalence of cannabis use, identify demographic trends, and assess the impact of medical marijuana card issuance on the development of CUD. Surveys and questionnaires were administered through a representative of Ohio dispensaries who gathered data on cannabis use patterns, possession of medical marijuana cards, perceptions of benefits, and attitudes toward recreational use. Statistical analyses such as regression modeling, chi-square tests, and correlation analyses were used to examine relationships between variables and test hypotheses. The quantitative research design offered valuable insights into the prevalence and impact of CUD in rural communities, but this involved several constraints. One significant limitation was the potential for sampling bias in which the selected sample may not adequately represent the diversity of individuals within rural areas, leading to biased results.

Additionally, reliance on self-reported data in surveys and questionnaires can introduce biases such as social desirability or recall bias, affecting the accuracy of prevalence estimates. Moreover, quantitative measures may not fully capture the complexity of cannabis use behaviors and associated factors, limiting the scope of measurement. Although quantitative analyses identified associations between variables, they did not establish causality, and ethical and logistical constraints posed challenges in conducting large-scale studies in rural settings. Despite these limitations, quantitative research was valuable for generating empirical evidence on CUD prevalence and correlates, especially when complemented with qualitative methods and mixed-methods approaches to provide a more comprehensive understanding of cannabis use in rural areas. The current study assessed dependent variables by examining scores from the CUDIT-R, which gauged the probability or intensity of symptoms associated with CUD. Independent variables included age and gender with a medical marijuana card. Potential mediating factors, such as cultural norms and social influences, may influence individual attitudes and behaviors toward recreational and medicinal cannabis use.

Study Variables

The dependent variables included the scores obtained from the CUDIT-R indicating the likelihood or severity of CUD symptoms. The independent variables included the age and gender of participants holding a medical marijuana card. Possible mediating factors included cultural norms and social influences regarding cannabis use, which may mediate individual attitudes and behaviors toward its recreational and medicinal use. Factors such as religious beliefs, community attitudes, and legal

frameworks may influence patterns of use and perceptions of risk associated with cannabis. Individual psychological factors such as coping mechanisms, stress levels, and mental health conditions may mediate the relationship between cannabis use and the development of CUD.

For example, individuals may use cannabis as a means of self-medication for underlying mental health issues, which may exacerbate dependency and addiction. Environmental factors, such as access to cannabis dispensaries, advertising, and social networks, may mediate cannabis use behaviors. Availability and accessibility of cannabis products may influence patterns of use and the likelihood of developing CUD. Regulatory policies and laws governing cannabis use, both at the state and federal levels, may act as mediators in shaping patterns of use and prevalence of CUD. Changes in legalization status, enforcement practices, and medical marijuana card issuance procedures may impact the risk of developing CUD among cannabis users. Factors within the health care system, such as physician prescribing practices, availability of addiction treatment services, and patient education initiatives, may also mediate the relationship between cannabis use and CUD. Access to screening tools, intervention programs, and support services may influence outcomes related to CUD.

Methodology

Population

The population under study comprised adults in rural areas of Ohio who possessed a medical marijuana card and had been diagnosed with chronic conditions per Ohio regulations. The demographic questionnaire addressed the date of diagnosis and

qualifying medical condition. Sampling was conducted via dispensaries, with individuals recruited by an organization with access to the qualifying potential participants using a dispensary within the rural communities who use a medical card to purchase cannabis. The sample included adults age 18–65 who resided in a rural community in the state.

Sampling

The sample for this study was gathered from a rural community in southern Ohio dispensaries. The study included a one-stage cluster random sample from southern Ohio rural areas that serve clients with medical marijuana cards. Ihoped that the dispensary consumers would match the study's criteria because Ohio is primarily a rural state, and the data indicated a parallel correspondence to support the independent variables of age and population (see Risi et al., 2020). The least expensive process was to conduct the study within 2-3 months to recruit 135 participants or more.

Sampling Procedures

A power analysis was completed to determine the most effective process for selecting sufficient power to detect an interaction that supports or deserts the hypothesis (see Sommet et al., 2023). The minimum sample size was calculated using the G* Power tool. The expected prevalence rate was determined by the expected prevalence rate of CUD in White rural adults with a medical marijuana card. This was based on existing literature, pilot studies, and previous research or clinical expertise. The prevalence estimate's desired precision or margin of error was 5% or less. The statistical power was geared toward a standard power level of 0.80, indicating an 80% chance of detecting an effect if one existed. A significance level determined the desired significance level (1

alpha), typically set at 0.05. The study considered potential attrition or nonresponse account rates with the final collected sample size of 167.

Procedure for Recruitment, Participation, and Data Collection

Data Collection

Adults from rural Ohio were contacted through dispensaries where medical marijuana cards are accepted with the approval of the establishments. Participants completed a consent form, a demographic questionnaire, and the CUDIT-R during their visit. Data were collected anonymously and stored securely. An email was sent via the organization inviting potential participants.

The data collection process began with setting up an email that invited potential participants electronically and was written to attract random consumers. A link was prepared for the email with easy access to the consent form and questionnaire. Participants clicked on the link within the email invitation and were instructed to indicate their approval and consent before completing the survey pages. For survey completion, participants had one-time access to the questionnaire from their electronic email access, ensuring privacy away from employees and researchers. The questionnaire was organized in simple multiple-choice form to facilitate completion. The survey required that the questionnaire be completed to be valid. Maintaining anonymity was paramount throughout the interaction. Participants were instructed not to include personal information such as names, addresses, or any other identifiable details in their responses, ensuring the anonymity of their participation. This protocol safeguarded the privacy and anonymity of participants' responses throughout the data collection process.

Informed Consent

The data collection began with an email invitation from the participating organization on July 25, 2024. The participants were asked electronically and anonymously via an email letter if they were willing to participate in the study. Upon consent, the individuals were given a link on the cover page linking to the first page of the survey, including the informed consent they had to complete before beginning the survey. After the consent form was completed, the demographic survey began collecting data, and the CUDIT-R inventory followed. The participants were never asked to include personal information such as names, addresses, or other identifiable information.

Once the questionnaires were completed, the survey had a button that indicated the survey was complete. Once the participant clicked the "Done" button, the survey ended, and the link closed automatically. Because a minimum of 135 surveys needed to be completed for reliability, the link to the survey was closed after enough surveys were collected, and a significant period of inactivity indicated that no more participants were interested. The instruments were composed in English because the area is predominantly English speaking.

Instrumentation and Operationalization of Constructs

Instrumentation

The self-report instrument used to measure cannabis use within the past 6 months was the CUDIT-R. The CUDIT-R has been widely used to measure and identify risk in developing CUD (Coelho et al., 2024). The CUDIT-R, developed by Adamson et al. (2010), assessed cannabis abuse and dependence criteria over the past 6 months.

Validated by Adamson et al. to screen for DSM-5 criteria for CUD, the CUDIT-R comprises eight items, each with specific response options. For instance, Item 1 offers responses ranging from “Never” to “4 or more times a week,” while Item 8 distinguishes between past and current use. Six items implement a Likert-type scale from *Never* to *Daily or almost daily*. Total scores range from 0 to 32, with scores of 8 or higher indicating hazardous cannabis use and scores of 12 or higher suggesting possible CUD (Risi et al., 2020).

The inventory survey questions begin with “How often do you use cannabis?” The possible answers range from “Never” to “4+ times a week.” That question is followed with “How many hours are you stoned on a typical day when you had been using cannabis?” This question is measured with the possible answers with a range of “Less than 1” to “7 or more.” The rest of the questions measure usage within 6 months and predictive factors as contributors to the risk of hazardous use of cannabis. In a study by Risi et al. (2020), an analysis of each survey item found the standard deviation or statistical mean as shown in Table 1.

Table 1

Descriptive Information for CUDIT-R

Item	Mean (*SD*)	Range
Frequency of cannabis use	1.32 (1.54)	1–5
Hours stoned on a typical day	1.32 (.88)	1–5
Past 6 months unable to stop using cannabis once started	.23 (.73)	1–5
Past 6 months failed to do what's expected because of cannabis use	0.35 (0.69)	1–5
Past 6 months devoted time spent recovering from cannabis use	0.34 (0.82)	1–5
Past 6 months problems with memory or concentrating because of cannabis use	0.59 (0.94)	1–5
Cannabis use is risky or hazardous situation	0.43 (0.89)	1–5
Thought about cutting down or stopping cannabis use	1.82 (1.89)	1–3

Note. Adapted from Risi et al. (2020).

Studies showed that the CUDIT-R is a suitable inventory for measuring the risk of cannabis-related problems among young adults and older individuals (Mezquita et al., 2022). Mesquita et al. (2022) assessed the consistency of the CUDIT-R across seven countries and genders among college students who have used cannabis. The findings revealed that the CUDIT-R demonstrated consistency in structure and measurement properties across different countries and genders. Additionally, the study provided evidence supporting the reliability and validity of the CUDIT-R, showing strong correlations with other measures of cannabis-related problems and associations with frequency, quantity, and motives of cannabis use. Overall, the study suggested that the CUDIT-R is a reliable and valid tool for assessing cannabis-related problems across diverse populations.

Operationalization of Constructs

To begin the data collection of variables, a questionnaire included demographic and cultural factors that could have determined potential bias, background, and individual determinants such as age and gender. The survey items included pertinent information such as gender, age, county of residence, whether they have a medical marijuana card, and how long they have had the MC.

Table 2

Variables

Variable type	Variable	Operational definition
Dependent	CUDIT-R scores	The level of cannabis use disorder symptoms experienced by participants, as assessed by the CUDIT-R scale.
Independent	Participant's age	Chronological age of the study participants, measured in years.
Independent	Participant's gender	Categorizes participants based on their gender
Mediating	Recreational use before MC (cultural norms)	The influence of cultural norms on the relationship between recreational cannabis use and obtaining a medical marijuana card.
Mediating	Approved medical condition for MC (social influences)	The role of social influences in the relationship between having an approved medical condition for medical cannabis and obtaining a medical marijuana card.

Operationalization

In the context of studying cannabis use disorder (CUD) in rural communities, instrumentation plays a crucial role in gathering accurate and reliable data. This research

relied on standardized instruments such as a demographic survey, background questionnaires, and diagnostic assessments to assess cannabis use patterns, symptoms of CUD, and associated factors. These instruments are designed to be valid and reliable, ensuring they accurately measure the constructs under investigation. However, selecting appropriate instruments was challenging, as they needed to be sensitive to the unique characteristics of rural populations and their cultural contexts. Additionally, this study had to consider the potential biases and limitations associated with different instruments, such as social desirability bias in self-report measures or cultural insensitivity in standardized assessments. To address these challenges, the study adopted a demographic survey tailored to the specific needs of rural communities. Overall, carefully considering instrumentation was essential for obtaining high-quality data and gaining meaningful insights into the prevalence and impact of CUD in rural areas.

Data Analysis Procedure

Data Analysis Plan

Several statistical tests in SPSS will be necessary to analyze the data for this study. Initially, descriptive statistics will be computed to summarize the characteristics of the variables under investigation. Correlation analysis was employed to explore relationships between variables, such as the correlation between age and cannabis use disorder symptoms. Subsequently, independent samples t-tests were conducted to compare mean scores on the cannabis use disorder inventory test across different groups, including comparisons between age groups and between males with and without medical marijuana cards. If there are more than two groups for an independent variable, ANOVA

was used to compare means across these groups. Logistic regression analysis was applied to investigate the relationships between various factors and the likelihood of high-risk cannabis use. For the relationship between age and high-risk cannabis use, age serves as the predictor variable, while high-risk cannabis use (coded as 1,2 or 3) functions as the outcome variable. The logistic regression model estimates the probability of high-risk cannabis use based on age, with resulting coefficients indicating the direction and strength of this relationship.

Similarly, when exploring the relationship between gender and high-risk cannabis use, gender was treated as the independent variable, with coefficients revealing whether one gender category is associated with a higher or lower likelihood of high-risk cannabis use compared to the other. Additionally, to examine the relationship between high-risk cannabis use and the education level involved, including education level as the independent variable. Whether education level is categorical or continuous, logistic regression estimates the probability of high-risk cannabis use relative to different levels of education. It elucidates the impact of education on the likelihood of engaging in high-risk cannabis use. Overall, logistic regression facilitated the understanding of how age, gender, and education level influence the probability of high-risk cannabis use while accounting for potential confounding variables.

Additionally, mediation analysis techniques were employed to investigate the potential mediating effects of cultural norms and social influences on the relationship between independent and dependent variables. Finally, chi-square tests were utilized to analyze categorical data, such as the association between gender and possession of a

medical marijuana card. These statistical tests will provide valuable insights into the study's research questions and hypotheses.

The quantitative data was collected through a structured survey instrument based on validated tools such as the Cannabis Use Identification Test (CUDIT-R). The data analysis on cannabis use disorder (CUD) in rural communities was processed through the International Business Machine (IBM) Statistical Package for the Social Sciences (SPSS) to evaluate various assumptions that were made, including, (normality, linearity, collinearity, homoscedasticity. Several assumptions will be assessed to ensure the validity of the statistical analyses. Firstly, normality tests were conducted to verify if the data for each variable follows a normal distribution. This was evaluated using measures such as the Shapiro-Wilk test or visual inspection of histograms and Q-Q plots. Linearity was examined to confirm that the relationships between variables are linear, which can be assessed through scatterplots and correlation coefficients. Collinearity was assessed to ensure that independent variables are not highly correlated, which could affect the stability of regression coefficients. This was evaluated using variance inflation factor (VIF) values or correlation matrices. Homoscedasticity was checked to confirm that the variance of the residuals is consistent across all levels of the independent variables, which were assessed through scatterplots of residuals against predicted values or formal tests such as the Breusch-Pagan test. By conducting these assessments, the assumptions underlying the statistical analyses were verified, ensuring the reliability of the study's findings.

The multiple regression analysis aims to illustrate how the factors influence the prevalence of cannabis use disorder among a specific demographic group. The dependent variable, the prevalence of cannabis use disorder, serves as the focal point of the analysis. In contrast, the independent variables, including being a white rural adult and possessing a medical marijuana card, are examined for their respective contributions to the prevalence of the disorder.

By investigating how variations in these independent variables relate to the prevalence of cannabis use disorder, the study discerned the unique impact of demographic characteristics and medical marijuana card possession on the likelihood of experiencing the disorder within the target population. Through multiple regression analysis, the study was able to determine the complex interplay of these variables and provide insights into the factors driving the prevalence of cannabis use disorder among white rural adults with medical marijuana cards.

Descriptive statistics was employed to characterize the sample and assess the prevalence of cannabis use. Inferential statistics, such as chi-square tests and regression analyses, were utilized to examine associations between variables and identify predictors of CUD. To conduct the multiple regression analysis in SPSS using the variables "level of severity," "age," "gender," and "level of education," the analysis began by opening the SPSS software and importing the organized dataset from the surveys. Using the "Regression" tab and then "Linear" "Linear Regression" dialog box, the "level of severity" variable will be added to the "Dependent" box, and the "age," "gender," and "level of education" variables to the "Independent(s)" box. Once the analysis is complete,

reviewing the output will interpret the results, paying attention to coefficients, significance levels, and R-squared values.

Ensuring that the assumptions of multiple regression were met, a report of the findings in the context of the research question and hypotheses, discussing the significance of each independent variable in predicting the prevalence of cannabis use disorder among rural adults with medical marijuana cards, was summarized. Through this process, the study gained insights into the relationships between these variables and their impact on the prevalence of cannabis use disorder in the target population. If the dependent variable was continuous and the assumptions of linear regression were met, the study would result in a linear regression analysis. However, caution was considered with this approach when the dependent variable was not distributed, and there was concern about heteroscedasticity.

Assumption Checking

Assumptions such as linearity, independence of residuals, homoscedasticity, and normality of residuals will determine the significance of the independent variables in support of the hypothesis. The model estimator used SPSS statistical software to estimate the coefficients and evaluate their significance. Once the data was collected, the interpretation of the coefficients better explained the possible relationship between the independent variables and the prevalence of cannabis use disorder.

Cleaning and screening the data for this study on cannabis use disorder (CUD) in rural communities were crucial steps to ensure the accuracy and reliability of the findings. The cleaning process involved identifying and addressing inconsistencies,

errors, or missing values in the dataset. This included removing duplicate entries, correcting data entry mistakes, and inputting missing values using appropriate techniques such as mean substitution or multiple imputation. Screening involved checking for outliers and unusual patterns that may skew the results, such as potentially biased answers to the CUDIT-R. Outliers were identified through visual inspection of plots such as boxplots or histograms or statistical methods like z-scores or interquartile range (IQR) calculations.

Screening for data integrity issues such as entry errors or response bias involved conducting logic checks to ensure that responses are within valid ranges and consistent with the study protocol. For example, it was essential to verify that participants met the inclusion criteria for the study and that their responses were internally consistent.

Model Evaluation

It was crucial to carefully interpret the results to evaluate the model's overall fit using appropriate goodness-of-fit statistics, considering both statistical significance and practical significance. Additionally, it was essential to be aware of potential confounding variables that needed to be controlled for in the analysis. The atmosphere and environment within the participants' environment may have influenced their responses. Factors such as distractions or the presence of other individuals may have impacted the participants' concentration and survey completion. Characteristics of participants, such as age, gender, socioeconomic status, or previous experiences with cannabis may have affected their responses. For example, younger participants may have responded differently than older participants, and frequent cannabis users may have had a different

perspective compared to those who use it infrequently or have never used it. Researchers' biases or expectations did inadvertently influence participants or data collection procedures since there was no direct contact. This avoided subtle cues, tone of voice, or body language that could have unintentionally influenced participants' responses or behaviors.

The time of day when data collection occurred may have impacted participant responses. Factors such as fatigue or differences in customer task involvement at different times of the day may have influenced participants' willingness to participate or the quality of their responses. The geographic location of the dispensary could have introduced confounding variables related to regional differences in attitudes, perceptions, or usage patterns of cannabis. Participants may have provided responses that they perceive as socially desirable rather than reflecting their true beliefs or behaviors, especially in a public setting like a dispensary, their home, or another public place where they may have engaged in completing the survey and where there may be perceived social norms regarding cannabis use. Addressing these potential confounding variables through careful study design, data collection procedures, and statistical analysis was crucial for ensuring the validity and reliability of the research findings.

Research Questions and Hypotheses

RQ1: What is the relationship between age and the high-risk use of cannabis?

H_o1: There is no relationship between age and the high-risk use of cannabis.

H_a1: There is a relationship between age and the high-risk use of cannabis.

RQ2: What is the relationship between gender and the high-risk use of cannabis?

H_o2: There is no relationship between gender and the high-risk use of cannabis.

H_a2: There is a relationship between age and the high-risk use of cannabis.

RQ3: What is the relationship between the high-risk use of cannabis and the level of education?

H_o3: There is no relationship between the level of education and the high-risk use of cannabis.

H_a3: There is a relationship between the level of education and the high-risk use of cannabis.

Threats to Validity

External Validity

The study faced several potential biases and validity matters that could impact its findings' reliability and generalizability (McEwan, 2020). Sampling bias may have arisen if the sample was not representative of the target population, mainly if participants were recruited from specific dispensaries or communities, which may not have accurately reflected an even population amount of age, gender, and level of education with medical marijuana cards. If specific subgroups within the rural population were systematically excluded from the study, such as individuals without access to healthcare or those living in remote areas, sampling bias could have been inadvertently introduced and limited the generalizability of the findings.

Internal Validity

Self-report bias was another concern, as participants may have underreported or overreported health-relevant data via self-reports (Saeedi et al., 2020). In this case, their

answers about cannabis use or symptoms of cannabis use disorder due to social desirability bias or stigma associated with drug use could have been skewed by self-preservation. Moreover, the generalizability of the findings may have been limited beyond the specific population studied, namely rural adults with medical marijuana cards, due to their unique characteristics (Risi et al., 2020). Additionally, the validity and reliability of the cannabis use disorder inventory test used in the study may have been questioned, potentially affecting the accuracy of the results. Participants may have modified their behavior or responses simply because they were aware of being studied, leading to the Hawthorne effect. This could have impacted the validity of self-reported data on cannabis use and related behaviors (Turner et al., 2023). Further, participants may underreport or overreport their cannabis use due to social desirability bias, mainly if there was a stigma associated with cannabis use in their immediate community. These biases could have distorted the true prevalence of CUD and other related factors.

The study lacks control over confounding variables, such as co-occurring mental health conditions or socioeconomic factors, which could influence the prevalence of cannabis use disorder (Saeedi et al., 2020). Uncontrolled confounding variables, such as co-occurring mental health disorders or socioeconomic factors, could have influenced the relationship between cannabis use and CUD. Failing to account for these variables could have led to erroneous conclusions about the study's findings. Recall bias may have further contributed to inaccuracies in self-reported data, as participants may have struggled to accurately recall past cannabis use behaviors or experiences (Denson et al., 2023). Lastly, errors in classifying participants based on their medical marijuana card

status could have introduced misclassification bias, impacting the integrity of the study's findings. These limitations were carefully considered when interpreting the results and drawing conclusions from the study.

Construct Validity

Construct validity threats pertain to the extent to which the operationalizations of the variables in a study accurately represent the underlying theoretical constructs of interest (Chester & Lasko, 2021). They encompass concerns about how well the measures used in the research assess the intended theoretical concepts. Construct underrepresentation may occur when the chosen measures do not fully capture the breadth and depth of the studied constructs, leading to incomplete or inaccurate representations. Reactive measurement may occur when the measurement itself influences participants' responses, leading to artificial changes in behavior or attitudes, thus giving biased answers to disregard a potential risk of CUD.

Ethical Considerations

Conducting large-scale quantitative studies in rural communities posed logistical challenges, such as recruiting and retaining participants and navigating ethical considerations related to informed consent and participant well-being (APA, 2017). These constraints limited the feasibility and generalizability of quantitative research findings. Further, research involving substance use disorders requires careful consideration of participant autonomy, confidentiality, and potential harm. This research adhered to ethical guidelines to protect participants' rights and well-being. Ethical approval was obtained from the relevant institutional review board (IRB) before

commencing the study. Informed consent was obtained from all participants, emphasizing voluntary participation, confidentiality, and the right to withdraw at any stage without consequences. Ethical considerations included the participants' confidentiality, especially since they were recipients of the MC and medical diagnosis.

Ethical considerations related to the stigma surrounding cannabis use disorder and the potential consequences of identifying individuals with the disorder were carefully and consistently addressed. The surveys that required demographic information omitted identifiable items or questions. The surveys were carefully explained so the participants did not feel judged or fear potential social exposure. It was pertinent that the participants felt safe from identification and relieved from the stigma of the label of addiction, not to be deterred from honest and accurate responses.

Conclusion

This chapter outlined the research methodology designed to comprehensively address the research questions and objectives. Utilizing a quantitative approach, the study aimed to gain a nuanced understanding of cannabis use patterns, associated factors, and the prevalence of Cannabis Use Disorder (CUD) among adults in rural Ohio. The research specifically focused on the correlation between demographic factors and the prevalence of CUD among medical marijuana cardholders in these communities. To achieve this, structured surveys, including the Cannabis Use Disorder Identification Test-Revised (CUDIT-R) and demographic questionnaires, were used to collect data. Statistical analyses, such as prevalence rate calculations, correlation analyses, and regression analyses, were employed to interpret the data and identify potential risk factors

for developing CUD. Participants were recruited from dispensaries in rural areas using a convenience sampling method based on criteria such as residency, possession of a medical marijuana card, and diagnosis of qualifying chronic conditions. The chapter also acknowledges several potential biases and validity concerns that may affect the reliability and generalizability of the findings, including sampling bias, self-report bias, limitations in controlling confounding variables, and potential errors in classifying participants based on their medical marijuana card status. Ethical considerations, particularly regarding participant confidentiality and the stigma associated with cannabis use disorder, were emphasized to ensure participant safety and privacy. Despite these limitations, the study aims to provide valuable insights into the prevalence and demographic correlates of CUD among adults in rural communities, ultimately contributing to informed interventions and policies to address this public health concern.

Chapter 4: Results

This quantitative study investigated the potential development of high-risk use of cannabis by adults in rural areas of Ohio who had a medical marijuana card. I used the CUDIT-R to determine the possible high-risk use by using it as part of a survey administered anonymously to medical marijuana users with a medical card. Using a theoretical framework to support the utilization of the CUDIT-R, the survey measured the consistency of the participants' use of cannabis, their dependency, and their perception of the need for cannabis. Preceding the CUDIT-R was a demographic questionnaire that addressed the independent variables of age, gender, and level of education, which are consistent with the biopsychosocial factors of dependency. The purpose of the study was to examine the prevalence of CUD affiliated with the use of an unmanaged prescription through a medical marijuana card for adults in rural communities with social disparities. The study found a correlation between age and gender as social factors that promote the use of cannabis noncompliantly, leading to potential health risks and addiction in rural social groups.

This chapter includes the research questions and hypotheses, the data collection process, and the interpretation of the results. This chapter also presents the results of the study examining the relationship between age and high-risk cannabis use. The study aimed to address three primary research questions: (a) How does age influence the severity of cannabis use? (b) Are there specific demographic factors that moderate this relationship? (c) What are the implications of these findings for understanding high-risk cannabis use across different age groups? The literature review provided the rationale for

the study and identified the population and variables considered for the study. The literature review also identified the gap between studies that motivated the purpose to investigate the potential risks of using a medical marijuana card (see Grigsby et al., 2020). The current study aimed to determine whether the use of medical marijuana led to CUD in adults from rural communities with factors associated with biological, psychological, and sociological motivations. The results are discussed in the theoretical framework outlined in the introduction, which posits that age-related factors, such as developmental stage and social influences, play a critical role in substance use behavior. This chapter presents the findings and critically engages with the existing literature to interpret the results within a broader context.

Data Collection

Once the proposal for the study was reviewed and approved by the institutional review board (approval # 07-19-24-1037673), according to federal and university guidelines, I collected data by creating a survey with demographic questions and a list of CUDIT-R items using Survey Monkey. I collaborated with an agency that had access to the population in the study. The organization contacted the population via email with an invitation that included the link to the survey. I never had access to the participants' email addresses or direct contact with the participants.

The CUDIT-R is the most widely used and most effective tool to measure the quantity of cannabis use while also measuring the severity of use (Coelho et al., 2024). The assessment tool measures severity at three levels. This tool measures problematic use as scores within a range of 0–32. Scores under 8 indicate no risk, while scores between 8

and 11 indicate a severe risk of CUD. Scores 12 and over indicate the individual has CUD. Studies have supported the tool's validity in identifying CUD following the DSM. Although the CUDIT-R measures the severity of dependency, the DSM only recognizes the continuum of symptoms listed.

On July 25, 2024, the organization sent an anonymous invitation that included a brief explanation of the purpose of the study, an informed consent form, and a process for completing the questionnaire. The study ran until July 29, 2024. At this point, no surveys were completed after 5 days and none during the last 24 hours. The data, which contained no identifiable information, were accessed only by me. The organization recruited 167 participants who agreed to complete the survey.

Results

An Ohio agency with access to a list of participants with a medical marijuana card within rural communities recruited participants between the ages of 18 and 65, living in rural areas, and owners of a valid and active medical marijuana card. The dependent variable was CUDIT-R self-report inventory, and the independent variables were age, gender, and level of education. A total of 167 individuals participated in the study, and 146 completed surveys that were valid for measurement. Only the 167 who completed the survey, 21 were disqualified because their surveys did not have enough information to support the study. An independent samples *t*-test results indicated that there was a statistically significant difference in the level of severity of CUD between the independent demographic variables of age, gender, and level of education. The data analysis was conducted using multiple regression models to examine the relationship

between age and high-risk cannabis use, controlling for demographic variables such as gender, education, and income. The results are summarized with key findings in the following sections.

Descriptive Statistics

The study sample comprised 83 women (56.8%) and 63 men (43.2%). The age distribution was as follows: 18–24 years (*n* = 1, 0.7%), 25–34 years (*n* = 9, 6.2%), 35–44 years (*n* = 27, 18.5%), 45–54 years (*n* = 36, 26.7%), 55–64 years (*n* = 50, 34.2%), and 65 years and older (*n* = 20, 13.7%). In terms of education level, the sample included participants with no high school diploma (*n* = 4, 2.7%), a high school diploma or GED (*n* = 31, 21.2%), some college or trade school education (*n* = 75, 51.4%), and a bachelor's degree or higher (*n* = 36, 24.7%).

Table 3 presents a comprehensive summary of the independent variables. Over 56% of the surveys were completed by women, with the most represented age group being 55–64 years, comprising 34.2% of the sample. Participants with some college or trade school education made up the most significant educational group, representing 51.4% of the sample. These statistics provide an overview of the demographic profiles of medical marijuana users in the study, highlighting the frequencies of use across different age and educational backgrounds.

Table 3

Frequencies and Demographic Data

Variable	Category	Number	Percentage
Gender	Male	63	43%
	Female	83	57%
Age	18–24	1	.7%
	25–34	9	6.2%
	35–44	27	18.5%
	45–54	39	26.7%
	55–64	50	34.2%
	65+	20	13.7%
Education level	No high school diploma	4	2.7%
	High school/GED	31	21.2%
	Some college/trade school	75	51%
	Bachelor's or higher	36	24.7%

The summary of statistics in this study offers a snapshot of the key descriptive data related to the participants' demographic characteristics and the main variables under investigation. These statistics provide an overview of the sample's demographic makeup and the key findings regarding the relationship between demographic factors (age, gender, and education) and the severity of cannabis use. To test the hypotheses, I conducted a linear regression analysis to examine the relationship between age and the risk of cannabis use. Table 4 presents the descriptive statistics for each variable about the use severity, as measured by the CUDIT-R.

Table 4

Summary of Descriptive Statistics and Variables

Variable	*n*	Min	Max	*M*	*SD*
Age	146	1	6	4.29	1.14
Gender	146	.0	1	.57	.50
Education level	146	1	4	2.98	.76
Severity level	146			1.50	.71

RQ1: What is the relationship between age and the high-risk use of cannabis?

$H_0$1: There is no relationship between age and the high-risk use of cannabis.

H_a1: There is a relationship between age and the high-risk use of cannabis.

Table 5 shows that as age increased, the severity of cannabis use decreased (coefficient = -0.154, $p = 0.003$). Men had a lower severity of cannabis use compared to women (coefficient = -0.297, $p = 0.011$). The analysis revealed no statistically significant relationship between education level and the severity of cannabis use (coefficient = 0.007, $p = 0.922$).

Table 5

Coefficients[a]

Model 1	B	*SE*	Beta	*t*	Sig.	Lower bound	Upper bound	Tolerance	VIF
(Constant)	2.307	.308		7.499	<.001	1.699	2.916		
Age	-.297	.116	-.209	-2.567	.011	-.526	-.068	.970	1.031
Gender	-.154	.051	-.249	-3.030	.003	-.255	-.054	.948	1.054
Education level	.007	.076	.008	.098	.922	-.143	.157	.976	1.025

[a]. Dependent variable: level of severity.

The regression analysis indicated that age was a significant predictor of cannabis use severity, with younger individuals likely at higher risk for more severe use. Connor et al. (2021) stated that the younger the onset age, the higher the risk of developing CUD,

particularly in late adolescence. The *p* value of 0.003 supported rejecting the null hypothesis and provided strong evidence for the alternative hypothesis. This findings indicated a significant relationship between age and high-risk cannabis use, allowing me to reject the null hypothesis that no such relationship exists.

Certain biopsychosocial factors influence young users and the rate of progression, such as genetics, lack of education or dropout rates, mental illness, and family history of substance use (Connor et al., 2021). Studies also showed that young adults between the ages of 18 and 25 typically have a high risk due to social factors such as decreased parental supervision, college socialization, and greater experimentation as recreational use before medicinal use.

RQ2: What is the relationship between gender and the high-risk use of cannabis?

H_o2: There is no relationship between gender and the high-risk use of cannabis.

H_a2: There is a relationship between age and the high-risk use of cannabis.

The linear regression analysis revealed a significant relationship between gender and the severity of cannabis use. The coefficient for gender was -0.297 with a *p* value of 0.011, indicating that men (coded as 1) were associated with lower cannabis use severity compared to women (coded as 0). The significant *p* value supported rejecting the null hypothesis, confirming that gender was an important predictor of high-risk cannabis use. This evidence showed a statistically significant difference in cannabis use severity between men and women, supporting the hypothesis that gender is related to high-risk cannabis use.

Recent studies indicated that males show an accelerated use of cannabis after legalization than females (Greaves & Hemsing, 2020). The results of the current study were influenced by the number of female respondents and the individuals who completed the survey. Most studies are the result of intervention and treatment studies. Sex-related factors encompass biological aspects such as human biology, physiology, and genetics that influence how substances such as cannabis are absorbed and processed and affect the body differently in males and females. These factors also impact responses to treatment. Gender-related factors, on the other hand, involve the influence of societal norms, gender identity, and institutional factors on substance use and treatment outcomes. The interaction between sex and gender significantly shapes patterns of substance use and treatment responses (Greaves & Hemsing, 2020). Understanding these interactions, especially in cannabis research, is crucial for developing effective policies, programs, and treatments.

RQ3: What is the relationship between the high-risk use of cannabis and the level of education?

H_o3: There is no relationship between the level of education and the high-risk use of cannabis.

H_a3: There is a relationship between the level of education and the high-risk use of cannabis.

The lack of a significant relationship between education level and cannabis use severity challenges some of the assumptions in the existing literature. Previous studies often linked higher education levels with lower substance use, but current results suggest

that education may not have a protective effect on high-risk cannabis use. This warrants further exploration in future research, possibly considering other factors such as peer influence or cultural attitudes toward cannabis. The linear regression analysis indicated that the level of education did not have a statistically significant relationship with the severity of cannabis use. As shown in Table 5, the coefficient for education level was 0.007 with a *p* value of 0.922, suggesting that any observed relationship was likely due to chance rather than a genuine effect. The high *p* value (0.922) indicated that there was insufficient evidence to reject the null hypothesis, meaning that the alternative hypothesis, which posited a significant relationship between education level and high-risk cannabis use, was not supported. The analysis indicated that education level did not significantly predict cannabis use severity, and education level was not a relevant factor in predicting high-risk cannabis use in this study. In contrast, Moore et al. (2021) found that individuals with a high school education and some college education had a lower likelihood of developing CUD. In the current study, the 95% confidence interval for B showed the range within which the true population parameter was with 95% confidence. For gender, the interval was from -0.526 to -0.068, indicating that the effect was likely negative.

Kilwein et al. (2020) explored college students' perceptions of cannabis use and how it has become normalized on a college campus. The study found that many students perceived cannabis use as common and socially acceptable, with some viewing it as less harmful than alcohol or other substances. The normalization of cannabis was linked to factors such as changing legal landscapes, social influences, and perceived benefits of

use. The findings highlight the need for campus health initiatives to address the increasing normalization and potential risks associated with cannabis use among college students.

Collinearity in regression analysis refers to a situation in which two or more independent variables are highly correlated, making it difficult to isolate the individual effect of each variable on the dependent variable. I used statistical measures such as *tolerance and variance inflation factor* (VIF) to assess collinearity. Tolerance values close to 1 suggest that the independent variables are not highly correlated, indicating low collinearity. Similarly, a VIF close to 1 indicates low multicollinearity, meaning the variables are not highly correlated. If VIF values are above 10, it may signal problematic multicollinearity, in which the variables are too interdependent to be reliable in the model (see Table 6).

Table 6

Collinearity Diagnostics[a]

Model 1 dimension	Eigenvalue	Condition index	(Constant)	Gender	Age	Education level
1	3.548	1.000	.00	.02	.00	.00
2	.377	3.069	.00	.88	.02	.01
3	.052	8.233	.00	.03	.58	.58
4	.023	12.353	.99	.07	.40	.41

[a]. Dependent variable: level of severity.

The collinearity diagnostics in Table 6 can be further interpreted using Eigenvalues and the Condition Index. Eigenvalues represent the variance explained by each dimension in the data, while the Condition Index measures the extent of multicollinearity. A high Condition Index (greater than 30) might indicate potential

multicollinearity issues, but in this case, the highest index is 12.353, suggesting that multicollinearity is not a significant concern. Variance Proportions in the table help identify how much each independent variable contributes to the variance in each dimension. Higher variance proportions (close to 1) suggest that the variable significantly contributes to that dimension's variance.

Residual statistics offer further insights into the model's accuracy. Predicted Values represent the severity levels of cannabis use as predicted by the model, with values ranging from 1.1006 to 2.1683 and a mean of 1.5000 with a standard deviation of 0.20943. Residuals, the differences between observed and predicted values, range from -0.86751 to 1.60218, with a mean of 0.00000 and a standard deviation of 0.67538. These residuals indicate the model's prediction accuracy, with smaller residuals suggesting more accurate predictions. Finally, Standardized Predicted Values and Residuals allow for comparison across different scales. The standardized predicted values range from -1.907 to 3.191, while standardized residuals range from -1.271 to 2.348, indicating some variability in the model's predictions, which is typical in real-world data. Understanding these collinearity statistics and residuals helps ensure that the regression model is reliable and interpretable, minimizing potential distortions and assessing the accuracy of predictions.

The linear regression analysis reveals that gender and age significantly predict the level of cannabis use severity, with males and older individuals showing lower levels of severity. Specifically, being male is associated with a decrease of 0.297 units in the severity score, and each additional year of age decreases the severity score by 0.154

units. Both effects are statistically significant. However, the level of education does not significantly predict severity levels. The model shows minimal multicollinearity, as indicated by the VIF values close to 1 and acceptable condition indices. The residual analysis suggests that the model's predictions are reasonably accurate, with predicted severity levels closely matching the observed data.

Table 7

ANOVA[a]

Model 1	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	6.360	3	2.120	4.551	.004[b]
Residual	66.140	142	.466		
Total	72.500	145			

[a] Dependent Variable: Level of Severity

[b] Predictors: (Constant), Level of Education, Gender, Age

The ANOVA results suggest that the overall regression model is statistically significant ($p = 0.004$), indicating that at least one of the independent variables (Level of Education, Gender, Age) 77 is a significant predictor of severity in cannabis use. The independent variables collectively explain a portion of the variance in the level of severity. However, a substantial portion of the variance remains unexplained, as indicated by the residual sum of squares.

Summary

As age increases, the severity of cannabis use decreases, and males tend to have lower severity of use compared to females—both statistically significant relationships. Although a slight positive association between education level and severity of cannabis

use was observed, this relationship was not statistically significant, as indicated by the ANOVA results. These findings hold important implications for both research and practice. Future studies should investigate the factors contributing to the lack of significant relationships between education, income, and cannabis use severity, potentially expanding the theoretical framework to include cultural and peer influences. The results suggest that prevention and intervention efforts should focus on younger individuals and incorporate gender-specific strategies. This study contributes to the field by providing a detailed examination of age-related factors influencing cannabis use, challenging some existing assumptions, and laying the groundwork for future research. By addressing these critical areas, the chapter not only enhances our understanding of high-risk cannabis use but also offers practical insights for reducing substance use among at-risk populations.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to investigate the correlation between the development of CUD and the use of a medical marijuana card by adults in rural communities. This study proposed a better understanding of the prevalence of using cannabis via a medical marijuana card, leading to an increase in developing an addiction. Because recreational use has now been legalized in Ohio and many other states, the current study addressed the social and professional responsibility of screening and monitoring the use of cannabis to prevent the dangers of addiction and chemical dependency. This research aimed to offer a deeper understanding of how medical marijuana use might contribute to the onset of cannabis addiction. The discussion addresses the relationships between age, gender, and level of education with cannabis use severity. I also explore the study's limitations, propose recommendations for future research, and consider the broader implications of the findings.

Interpretation of the Findings

The study investigated the relationship between three independent variables (age, gender, and level of education) and the dependent variable) severity of cannabis use) as measured by the CUDIT-R scores. Findings indicated a significant negative relationship between age and the level of severity of cannabis use. As age increased, the severity of cannabis use decreased. This suggests that younger individuals are at higher risk of engaging in more severe cannabis use behaviors compared to older individuals.

The findings also indicated that gender plays a significant role in the high-risk use of cannabis. The negative coefficient for gender indicated that men were less likely to

have severe cannabis use compared to women. This finding suggests that women might be at higher risk for severe cannabis use behaviors than men. This contradicts previous literature that associated higher substance use disorders with males, suggesting that gender differences in cannabis use may vary based on population characteristics or other contextual factors (Kilwein et al., 2020). Further research is needed to explore the underlying reasons for these gender differences, such as psychological or sociocultural influences.

The current study found no significant relationship between level of education and severity of cannabis use. The very low and statistically insignificant coefficient indicated that education level did not have a meaningful impact and that cannabis use was relatively uniform across different educational levels. These findings suggest that other socioeconomic or psychological factors not captured by education level may be more influential. It is also possible that the relationship between education and substance use is more complex than the current study could capture, potentially involving mediating or moderating variables that were not included in the analysis. Further studies might focus on other factors besides age and gender.

When viewed through the biopsychosocial lens, the study's findings suggest that the normalization of cannabis use among college students is a multifaceted process influenced by the interplay of biological, psychological, and social factors. The framework helps to contextualize the results, indicating that although social and cultural changes are driving the normalization of cannabis use, these trends are also supported and reinforced by individual psychological factors and potentially by biological

predispositions. The application of the biopsychosocial theoretical framework to the results of Kilwein et al. (2020) provides a more comprehensive understanding of the normalization of cannabis use on a college campus, highlighting how biological, psychological, and social factors converge to influence student perceptions and behaviors, offering a holistic perspective that enriches the current study's conclusions. By acknowledging the complex interactions between these factors, the current study's findings may be better understood in the context of broader patterns of substance use behavior among college students. To incorporate the results related to gender and age into the biopsychosocial theoretical framework, researchers can further analyze how these demographic factors interact with biological, psychological, and social influences to shape the normalization of cannabis use among college students.

Gender and age have biological underpinnings that may influence cannabis use. For example, hormonal differences between males and females can affect how cannabis impacts the body, potentially leading to different usage patterns or susceptibilities to developing dependence. Younger individuals, particularly those in late adolescence and early adulthood, are at a stage of brain development when they might be more vulnerable to the effects of cannabis, including its impact on memory, learning, and impulse control. The current study's findings that younger students and females might have distinct perceptions or behaviors around cannabis use may be partly attributed to these biological differences.

Psychologically, age and gender also play a critical role in shaping perceptions of cannabis use. Younger students might be more prone to experimentation and risk-taking

behaviors, which can be linked to cognitive development stages at which impulse control is still maturing. This might explain why younger individuals are more likely to engage in high-risk cannabis use. Additionally, gender differences in coping strategies, such as how males and females deal with stress or peer pressure, can influence how cannabis is used. The current study's results suggest that gender differences in cannabis use severity may reflect these underlying psychological factors, in which females might experience different stressors or societal pressures that influence their usage patterns.

Social influences are deeply intertwined with age and gender. Younger students are often more susceptible to peer influence, and in a college setting where social acceptance of cannabis is high, this can lead to increased use and normalization. The current study's findings that younger individuals are at higher risk of engaging in severe cannabis use behaviors align with the social aspect of the biopsychosocial framework, in which age-related social dynamics, such as the desire for social belonging and acceptance, play a crucial role. Gender norms and expectations also significantly impact cannabis use. For instance, societal views on female cannabis use may differ from those on male use, potentially contributing to the observed differences in usage patterns. The current study's finding that females might be at a higher risk for severe cannabis use could be influenced by these social factors, in which gender-specific social norms and stigmas around substance use affect how and why individuals use cannabis.

Integration of Age and Gender Into the Biopsychosocial Framework

When incorporating age and gender into the biopsychosocial framework, the current study's findings suggest that these demographic factors do not operate in isolation

but interact with biological, psychological, and social influences to shape cannabis use behaviors. Younger individuals' biological vulnerability, combined with their psychological tendencies toward risk-taking and their social environments, creates a context in which cannabis use can become normalized. Similarly, gender differences in biological responses, psychological coping mechanisms, and social expectations contribute to the varying patterns of cannabis use observed between males and females (Kilwein et al., 2020).

Limitations

The current study included several limitations that could impact the validity and generalizability of its findings. One significant limitation was the sample size and the diversity of the sample. A small or homogeneous sample can restrict the applicability of the results to a broader population because the study's findings may not accurately reflect the relationship between factors such as age, gender, and education with cannabis use severity across different demographic groups. Additionally, limitations in the measurement of variables posed a risk. The tools or methods used to measure cannabis use severity or demographic factors may have lacked sensitivity or accuracy. The data might not accurately represent participants' behaviors due to potential measurement errors. These errors could result in underestimating or overestimating relationships between variables, thereby affecting the study's conclusions.

The CUDIT-R is a self-report inventory, meaning it relies on participants to accurately and honestly report their cannabis use behaviors and related problems. Self-report measures are subject to various biases such as social desirability bias in which

individuals may underreport behaviors perceived as harmful or socially unacceptable. There was also the possibility of recall bias in which participants may not accurately remember or estimate their cannabis use, especially if the behavior is infrequent or occurred some time ago. These biases could lead to an underestimation or overestimation of cannabis use severity, thereby affecting the validity of the study's findings. If participants underreported their cannabis use, the study might underestimate the prevalence of high-risk cannabis use, leading to potentially misleading conclusions.

The study relied on the CUDIT-R for assessing cannabis use severity. Although the CUDIT-R is a validated tool, a single data collection method can limit the robustness of the findings. For example, there was no triangulation with other data sources such as biological measures (e.g., drug tests), clinical interviews, or collateral reports from friends or family. The reliance on a single method limits the ability to cross-validate the data, potentially reducing the overall reliability and validity of the results. If the self-reports were inaccurate, the study lacked alternative data sources to verify or challenge those reports.

The data collection process was limited in scope because it did not account for other important variables that could influence cannabis use, such as psychological factors (e.g., stress, mental health disorders), environmental influences (e.g., peer pressure, availability of cannabis), or legal context (e.g., local cannabis laws). Additionally, the findings might not be generalizable to other populations or settings because the data collection process was conducted over a short period and within a specific geographic location. The limited scope may have resulted in an incomplete understanding of the

factors contributing to cannabis use severity. Essential variables that could moderate or mediate the relationship between the predictors (age, gender, education) and cannabis use severity might have been overlooked, leading to an incomplete or potentially biased analysis.

The reliance on the CUDIT-R as a self-report inventory introduced several limitations to the study, including potential biases in reporting, limited data collection methods, and the risk of response fatigue. These factors could have affected the study's findings' accuracy, reliability, and generalizability. Future research could mitigate these limitations by incorporating multiple data collection methods, such as biological verification, and by expanding the scope of the variables assessed to provide a more comprehensive understanding of the factors influencing high-risk cannabis use.

Furthermore, the study's cross-sectional design limits the ability to infer causality. Although the study identified associations between age, gender, education level, and cannabis use severity, it could not determine cause-and-effect relationships. Longitudinal studies would be necessary to explore these causal pathways. Another limitation was the potential presence of confounding variables, such as mental health status or peer influence, that were not measured or controlled for. These unmeasured variables could distort the studied relationships, leading to spurious associations. Moreover, reliance on self-reported data introduced the risk of social desirability bias or inaccurate reporting by participants. This could lead to inaccuracies in the data, affecting the findings' reliability and potentially skewing the observed relationships.

Several directions should be considered to address these limitations and enhance future research. Longitudinal studies are recommended to understand the causal relationships between age, gender, education level, and cannabis use severity, providing insights into the directionality of these relationships and identifying long-term effects. Expanding sample diversity is also crucial; future studies could include participants from various demographic backgrounds to improve the generalizability of the findings. Incorporating additional variables, such as mental health status and socioeconomic factors, could help control for potential confounders and offer a more nuanced analysis of cannabis use behaviors. Additionally, future research could focus on developing and using more precise measurement tools to assess cannabis use severity and demographic factors, thereby enhancing the accuracy and reliability of the data collected. Lastly, exploring the interactions between biological factors, such as sex differences in metabolism and hormone levels, and sociocultural factors, such as gender norms, would provide a deeper understanding of their combined impact on cannabis use and treatment outcomes. Future studies could build on the current findings by addressing these limitations and pursuing these research directions, offering more robust insights into the factors influencing cannabis use severity and guiding more effective interventions.

Recommendations for Further Studies

Future studies could consider incorporating multiple data collection methods to validate self-reported data. This could include biological measures such as administering drug tests (e.g., urine, blood, or hair samples) to verify cannabis use levels objectively. Another recommendation is the use of clinical interviews. These biological measures

could be included while conducting structured or semistructured interviews with participants to cross-check the accuracy of self-reported information. Collateral reports are a manner of gathering information from close associates (e.g., family members or friends) to provide additional perspectives on participants' cannabis use behaviors. The rationale for these recommendations is that having multiple data sources would help triangulate the data, thereby enhancing the reliability and validity of the findings and reducing the impact of self-report biases.

Another recommendation is using a longitudinal study design to examine changes in cannabis use over time and to explore causal relationships between age, gender, education level, and high-risk cannabis use. The longitudinal design would allow researchers to observe how cannabis use patterns evolve, assess the long-term effects of demographic factors, and examine whether changes in these factors influence the development of cannabis use disorders. A third recommendation would be to include additional variables that could impact the use of cannabis, such as psychological factors. Future research may include assessing mental health status, stress levels, and coping mechanisms. Social factors may include the influence of peer pressure, social support, and the legal context on cannabis use. Other social influences may include how cultural attitudes toward cannabis and economic status influence use and risk levels. Including a wider array of variables could provide a more comprehensive understanding of the factors that contribute to high-risk cannabis use and allow for a more nuanced analysis of demographic influences.

Studies aim to recruit more diverse and representative samples, including participants from different geographic locations, ethnic backgrounds, and socioeconomic statuses. A more diverse sample would enhance the generalizability of the findings and allow for the exploration of how different demographic and cultural factors influence cannabis use. A focus on specific subpopulations might be at higher risk of cannabis use disorder, such as adolescents, individuals with a history of substance abuse, or those with co-occurring mental health disorders. Targeted studies can help identify specific risk and protective factors within these groups, leading to more tailored intervention and prevention strategies.

A fourth recommendation is the examination of the impact of legalization. Investigating the effects of cannabis legalization on high-risk use patterns by comparing populations in regions with different legal statuses of cannabis (e.g., legal, decriminalized, or illegal) may offer a better understanding of the impact of legalization on cannabis use behaviors and risks could provide valuable insights for policymakers and public health initiatives.

Finally, an advanced statistical analysis by utilizing statistical techniques such as structural equation modeling (SEM) or multilevel modeling (MLM) to explore complex relationships between variables and to account for potential confounding factors would allow for a more detailed analysis of the relationships between multiple variables, considering potential interactions and hierarchical data structures.

Implications

The overall model significance supports the ANOVA results, which demonstrate that the combined effect of age, gender, and level of education on cannabis use severity is statistically significant. This suggests that these variables provide a meaningful explanation of variance in cannabis use severity, even though not all individual predictors (e.g., level of education) are significant. This also supports the idea that demographic factors are essential in understanding cannabis use patterns. This underscores the importance of a multifaceted approach when studying substance use behaviors, where multiple demographic factors are considered together. The overall findings highlight the importance of targeting younger age groups in interventions aimed at reducing high-risk cannabis use. Age appears to be a crucial factor in determining the severity of cannabis use, making it a key demographic variable for public health strategies. The gender difference in cannabis use severity pointed to the need for gender-specific approaches in prevention and treatment programs. Understanding why females might be at higher risk could help design more effective interventions.

The long-term implications of this study on cannabis use severity, particularly regarding the influences of age, gender, and education, can be multifaceted, impacting various domains such as public health, policy-making, and further research. The findings of this study may inform public health campaigns aimed at reducing high-risk cannabis use. Understanding that age and gender are significant predictors of cannabis use severity could lead to targeted interventions. For instance, educational programs could focus on younger individuals, emphasizing the risks associated with cannabis use. Additionally,

recognizing the differences in usage patterns and severity between genders may help design gender-specific prevention and treatment programs, improving their effectiveness.

The insights from this study can guide policymakers in creating regulations and laws regarding cannabis use and legalization. If younger individuals are found to be at higher risk for severe cannabis use, this may influence age-related policies, such as setting a minimum legal age for cannabis purchases. Furthermore, as gender differences in cannabis use are highlighted, policies may also consider these factors, leading to more equitable approaches to addressing substance use disorders. The findings can also prompt discussions on the need for comprehensive treatment options that consider the unique needs of different demographics.

The study's results can drive advancements in treatment protocols for cannabis use disorders. By identifying age and gender as critical factors, mental health professionals and addiction specialists can tailor treatment strategies that address the specific needs and risks of different groups. For instance, younger users may benefit from interventions that incorporate lifestyle changes, education about the risks of cannabis use, and alternative coping strategies. At the same time, treatment for females may focus on addressing underlying issues such as trauma or mental health conditions that could contribute to higher severity of cannabis use.

The limitations identified in this study also point to important future research avenues. Longitudinal studies can explore the causal relationships and long-term consequences of cannabis use severity among different demographic groups. Additionally, investigating the interplay between biological factors (like sex differences

in metabolism) and sociocultural factors (like gender norms) could provide deeper insights into substance use behaviors. This could lead to a more comprehensive understanding of addiction and better-informed prevention and treatment strategies.

Lastly, the findings may influence societal attitudes towards cannabis use, especially concerning gender. By highlighting the differences in usage patterns, there is potential for reducing the stigma associated with high-risk cannabis use among certain groups, fostering a more nuanced understanding of addiction as a complex interplay of biological and sociocultural factors. This could lead to more supportive environments for individuals seeking help and reduce the social stigma of seeking treatment.

Overall, the long-term implications of this study extend beyond its immediate findings, impacting public health initiatives, policy development, treatment approaches, future research, and societal attitudes. By leveraging these insights, stakeholders can create more effective strategies for addressing cannabis use severity, ultimately contributing to healthier communities and improved outcomes for individuals at risk.

Conclusion

This study revealed a clear correlation between age, gender, and level of education as essential factors in the prevalence of use of cannabis through the use of a medical marijuana card. The findings from this study reveal that age and gender are significant predictors of cannabis use severity, with younger individuals and females at higher risk. However, the level of education does not significantly impact cannabis use severity. These insights suggest that public health efforts should prioritize younger populations and consider gender differences when designing prevention and intervention

strategies for high-risk cannabis use. Although there remain many controversies and a gap of significant data to support the efficiency of the use of cannabis in relieving chronic medical conditions and side effects, there is absolute support for data that indicates the increase in the use of cannabis as a self-medicating effort.

Further studies should address the current research's limitations by incorporating multiple data collection methods, broadening the range of variables examined, and employing advanced statistical techniques. Additionally, exploring the effects of legalization and focusing on diverse and specific populations would provide deeper insights into the factors contributing to high-risk cannabis use. These steps would ultimately contribute to a more comprehensive understanding of cannabis use disorders and inform effective prevention and treatment approaches. By integrating age and gender into the biopsychosocial theoretical framework, the study's findings provide a nuanced understanding of how these demographic factors influence the normalization of cannabis use among college students. The results support the idea that cannabis use behaviors are shaped by a complex interplay of biological, psychological, and social factors, with age and gender acting as critical moderators in this process. This comprehensive perspective allows for a more targeted approach in developing interventions and public health strategies aimed at reducing high-risk cannabis use among specific demographic groups in college settings. Future research should address the limitations identified in this study by incorporating multiple data collection methods, broadening the range of variables examined, and employing advanced statistical techniques.

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Appendix A: Demographic Questionnaire

1. Are you 18 years of age or above?

2. What is your Ohio County of residence?

3. What is your age?

    a. 18-24 years of age
    b. 25-34 years of age
    c. 35-44 years of age
    d. 45-54 years of age
    e. 55-64 years of age
    f. 65+ years of age

4. What is your education level?

    a. No high school diploma
    b. High school / GED
    c. Some College / Trade school
    d. Bachelor's Degree or higher

5. What is your gender at birth?

    a. Male
    b. Female

6. What is your household income?

    a. Under $15,000
    b. Between $15,000 and $29,999
    c. Between $30,000 and $49,999
    d. Between $50,000 and $74,999
    e. Between $75,000 and $99,999
    f. Between $100,000 and $150,000
    g. Over $150,000

7. Did you use cannabis before acquiring the medical card? ___Yes ___No

8. Date you acquired the medical card?

9. Is it expired? ___Yes ___No

10. Select the qualifying condition.

Appendix B: Cannabis Use Disorder Inventory Test-Revised (CUDIT-R)

Have you used any cannabis over the past six months? Yes_____ No _____
If you answered "Yes" to the previous question, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use over the past six months

1. How often do you use cannabis?

   Never Monthly or less 2-4 times a month 2-3 times a week 4+ times a week
   0 1 2 3 4
2. How many hours were you "stoned" on a typical day when you had been using

   cannabis?

Less than 1 1 or 2 3 or 4 5 or 6 7 or more
   0 1 2 3 4
3. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?
4.

   Never Less than monthly Monthly Weekly Daily/almost daily
   0 1 2 3 4

4. How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?

   Never Less than monthly Monthly Weekly Daily/almost daily
   0 1 2 3 4

5. How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

   Never Less than monthly Monthly Weekly Daily/almost daily
   0 1 2 3 4

6. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

   Never Less than monthly Monthly Weekly Daily/almost daily
   0 1 2 3 4

7. How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children?

Never Less than monthly Monthly Weekly Daily/almost daily
   0 1 2 3 4

8. Have you ever thought about cutting down, or stopping, your use of cannabis?

Never Yes, but not in the past 6 months Yes, during the past 6 months
0 2 4

This questionnaire was designed for self-administration and is scored by adding each of the 8 items:

Questions 1-7 are scored on a 0-4 scale
Question 8 is scored 0,2, or 4

Score: _____

Scores of 8 or more indicate hazardous cannabis use, while scores of 12 or more indicate a possible cannabis use disorder for which further intervention may be required.

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Appendix C: Raw Scores

Case Processing Summary

		N	Marginal Percentage
Level of Severity	Low Risk	91	62.3%
	Hazardous	37	25.3%
	High Risk	18	12.3%
Level of Education	No HS Diploma	4	2.7%
	HS Diploma/GED	31	21.2%
	Some College/Trade School	75	51.4%
	Bachelors or Higher	36	24.7%
Age	18-24	1	0.7%
	25-34	9	6.2%
	35-44	27	18.5%
	45-54	39	26.7%
	55-64	50	34.2%
	65+	20	13.7%
Gender Female		83	56.8%
Male		83	43.2%
Valid		146	100.0%