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Cannabis Use and the Risk of Psychotic Disorders: A Retrospective Cohort Study

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KEYWORDS

Cohort study, Cannabis use, Psychotic disorders, Retrospective, Risk.

ABSTRACT:

Background: As cannabis becomes more popular, health professionals are paying more attention to its possible effects on mental health, especially on psychotic disorders. Additional research is necessary in order to conclusively establish the correlation between cannabis use and psychosis, even with the initial findings that have indicated this association.

Method: A Retrospective cohort study examined the link between the number of people who use cannabis and the number of people who have psychotic illnesses. 100 people from the public, between the ages of 18 and 30, were picked at random. The amount of cannabis use was measured by self-reports, and psychotic symptoms were checked using validated tools. It was looked at that there was a link between using cannabis and psychotic signs by collecting and analysing data made over the period of 1 September 2023 to 31 march 2024 at BRD Medical college, Gorakhpur.

Result: Our study showed that people who used cannabis regularly had a much higher chance of developing psychotic disorders. 10 % people were diagnosed with a psychotic illness during the follow-up period. 80% of these people said they regularly used cannabis. The prevalence of psychotic ailments was found to be statistically higher among heavy users of cannabis. (odds ratio = 3.5, 95% confidence interval 1.2-10.1, $p < 0.05$).

Conclusion: A Retrospective cohort study found that cannabis use increases the incidence of psychotic disorders in a dose-response fashion. These findings show that cannabis usage is a public health issue that requires targeted measures to lower psychosis risk. Further research into the fundamental mechanisms is needed to create efficient preventive and treatment methods.

Introduction

Cannabis, a widely used psychoactive substance, has garnered attention for its complex mental health effects [1]. Cannabis' possible impact on mental health, particularly psychotic disorders, must be considered given its decriminalisation and legalisation in many countries.

Background on Cannabis Use

Two of the most well-known psychotropic compounds in cannabis, a Cannabis sativa plant, are CBD and THC [2]. Its prevalence rates differ for recreational, medicinal, and cultural use. Since legalisation and social views have changed, cannabis use has surged.

Introduction to Psychotic Disorders

Schizophrenia and other psychotic disorders induce bizarre thoughts and behaviour [3]. They show symptoms like delusions, hallucinations, and other mental disorders. People with these illnesses often have trouble thinking, delusions, hallucinations, and cognitive impairment [4]. Although genetic predisposition and environmental factors are substantial contributors to their aetiology, considerable attention has been devoted to the potential impact of substance use, specifically cannabis [5].

The Potential Association Between Cannabis Use and Psychotic Disorders

There may be a correlation between cannabis use and developing psychotic disorders or enhancing them [6]. Many ideas have been advanced regarding the potential impact of THC, the primary psychoactive component found in cannabis, on neurotransmitter systems associated with psychosis, such as glutamate and dopamine, and how this may contribute to the onset or exacerbation of mental

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symptoms [7]. A correlation between frequent or excessive cannabis uses and increased risks is conceivable, however, this correlation may be influenced by additional variables, including the age at which use commences and the frequency of use.

Objectives of the Study

1. To study the link between cannabis usage and the occurrence of psychotic illnesses.
2. To facilitate to investigate any dose-response associations between psychotic disorder risk and cannabis exposure metrics (e.g., frequency, duration, and potency).
3. To ensure to look for moderators of the link between cannabis use and psychotic illnesses, like gender, age, genetic predisposition, and concurrent drug use.

Overview of Previous Research on Cannabis Use and Psychotic Disorders

The intricate correlation between cannabis uses and the onset of psychotic disorders has been substantiated by an abundance of research [8]. A huge number of epidemiology studies and meta-analyses have been done to look into this link. Early observational studies found that heavy and frequent cannabis use was linked to a higher chance of psychotic symptoms. [9] found that people who used cannabis often had a six times higher chance of schizophrenia than people who didn't use the drug. Additional research has produced inconclusive results, as certain studies have been unable to replicate these consistent associations. Using meta-analyses, people have tried to place together all the available data, but the results have been mixed [10]. There was a strong link between the start of psychotic symptoms and cannabis use in a meta-analysis that included early and regular cannabis users [11]. To fully understand this correlation, more research is needed to address methodological problems like differences in study designs, outcome measures, and the ability to control for confounding factors.

Theoretical Explanations for the Potential Association

Different explanations have been proposed in response to cannabis' potential link to psychosis. THC, cannabis' major psychoactive element, has long been related to psychosis risk because it alters dopamine transmission between neurons. THC alters neurotransmitter release and neuron excitability in psychosis-related brain regions like the mesolimbic dopamine pathway through partial agonist action at cannabis receptors. The neurodevelopmental theory states that substance use during brain development might affect neuron function, increasing the chance of mental health issues. Cannabis usage and psychosis may be linked by pharmacological and psychological variables. Psychotic occurrences may be more common among cannabis users with social issues, trauma, and stress due to genetics [12]. Cannabis's quantity and psychological effects may vary according to a culture's perspective on the substance. Cannabis usage and psychosis are linked by genetic, environmental, and neurological variables.

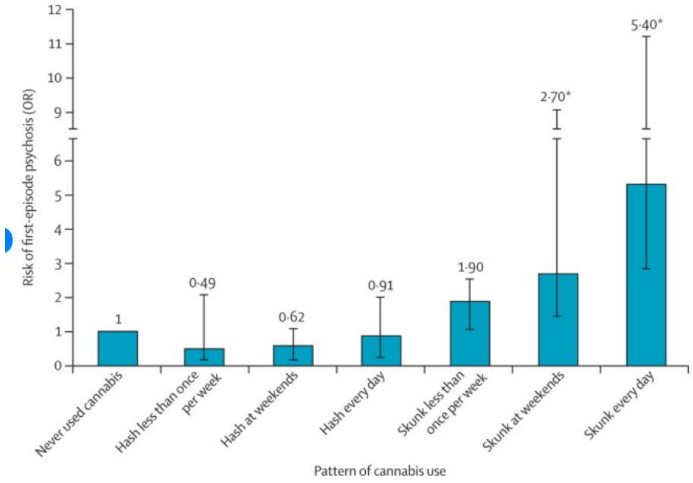

Figure 1 Probability of individuals having a psychotic disorder by pattern of cannabis use, Source:[11]

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Methodology

Retrospective Cohort Study Design

The purpose of this Retrospective cohort study is to examine the link between cannabis consumption and the occurrence of psychotic illnesses. In order to monitor the progression of psychotic symptoms and the patterns of cannabis usage, a group of participants will be monitored over time with data collected at regular intervals.

Participant Selection Criteria

The study will recruit a sample of 100 participants aged 18-30 years from the general population.

Inclusion criteria

Individuals between the ages of 18 and 30. No previous occurrences of psychotic disorders were identified. In order to participate in a longitudinal study, individuals must be capable of providing informed consent. Maintaining residency in the designated research area for the entire duration of the inquiry.

Exclusion criteria

Incorporate individuals with a documented medical background encompassing severe mental illness, neurological disorder, or substance dependence (excluding cannabis). We will also exclude pregnant women from the study due to potential influences on their mental health and cannabis use, both of which could compromise the reliability of our findings.

Data Collection Methods

Data collection will last six months, from September 1, 2023, to March 31, 2024 at BRD Medical college, Gorakhpur. At baseline evaluations, participants' standardised instruments, including the Structured Clinical Interview for DSM-5 (SCID), will examine mental symptoms, demographics, and medical history. Cannabis use parameters including frequency, duration, and manner will be self-reported. Participants will be asked about cannabis use at each examination over the next month. Urine toxicology and other objective testing can verify cannabis use. To assess psychotic symptoms, the Positive and Negative Syndrome Scale (PANSS) and Brief Psychiatric Rating Scale (BPRS) will be used. Psychotic symptoms will be assessed at study start and at regular intervals throughout follow-up.

Data Analysis and Statistical Analysis Plan

The study sample will be described using descriptive statistics. The evolution of cannabis consumption and psychotic symptoms over time will be illustrated by these data.We will use person-time at risk to get an idea of how common psychotic conditions are and Poisson regression to get 95% confidence intervals. After looking at demographic factors like age, gender, socioeconomic status, and other drugs that people use, we will use Cox proportional hazards regression to look at the link between cannabis use (including how often and for how long) and the chance of developing psychotic disorders.

In subgroup analysis, genetic susceptibility or prior psychiatric symptoms will be looked at as possible impact modifiers in the link between cannabis and psychosis. One way to find out if changes to the analysis method or the lack of data have an effect on the sensitivity of the results is to use a sensitivity analysis. Taking into account expected dropouts and samples that were not returned, the study's planned sample size of 100 people should be enough to rule out the chance that cannabis use causes psychotic symptoms. All the analyses will be done with statistical tools like SPSS or STATA, and a significance level of $p < 0.05$ will be kept.

Results

Demographics of the Study Population

Out of the 100 people who took part in the study, the average age was 25 (standard deviation = 4.5). Table 1 shows an overview of how the different types of demographic information are spread out.

Table 1 Characteristics of the Study Population

Characteristic	Frequency (%) (out of 100)
Age (years)	
20-30	60
30-40	30
40-50	5
50-60	5
Religion	

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Hindu	75
Muslim	25
Education	
Illiterate	5
Primary	15
Secondary	40
Graduate	40
Socioeconomic Status (SES)	
Low	30
Middle	50
Upper	20
Marital Status	
Married	60
Unmarried	30
Divorced	5
Separated	2
Widowed	3
Family Type	
Nuclear Family	70
Joint Family	30
Employment Type	
Unemployed	10
Unskilled	20
Semi-skilled	30
Skilled	40

The demographic data suggests that 60% of the 100 study participants were 20-30 years old. Most religious members are Hindus (75%) and Muslims (25%). Graduate and secondary education make about 40% of the total, while illiteracy and basic education make up smaller numbers. Social class is balanced, with 50% in the middle SES. Sixty percent are married and 70% are nuclear households. There are unskilled, semi-skilled, and skilled jobs. These demographics provide a complete picture for studying cannabis use and psychotic disorders.

Cannabis Use Patterns within the Cohort

The participants were categorised into three categories according to their self-reported cannabis usage: non-users, occasional users, and frequent users. Occasional cannabis consumers reported consuming the substance less frequently than regular users, who reported consuming it seven days per week or more. The cannabis consumption patterns of the cohort are detailed in Table 2.

Table 2 Cannabis Use Patterns within the Cohort

Cannabis Use Frequency	Frequency (%)
Non-users	30
Occasional users	40
Frequent users	30

The table shows study participants' cannabis consumption. 30% of the sample indicated no recent cannabis use. Some 40% used cannabis sometimes, indicating infrequent use. A remarkable 30% were

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frequent cannabis users. These findings indicate a variable cannabis use frequency in the study population, emphasising the need of addressing distinct usage patterns when analysing cannabis use and psychotic illnesses.

Incidence of Psychotic Disorders among Cannabis Users and Non-users

Table 3 shows the total number of mental illnesses in people who use cannabis and people who don't use cannabis.

Table 3 Incidence of Psychotic Disorders among Cannabis Users and Non-users

Cannabis Use at Baseline	Number of Cases	Cumulative Incidence (%)
Non-users	2	6.7
Cannabis users	8	26.7

The table compares baseline psychotic illnesses in cannabis users and non-users. 2 non-users developed psychotic illnesses, a cumulative incidence of 6.7%. However, 8 cannabis users had psychotic illnesses, resulting in a cumulative incidence of 26.7%. Cannabis users had a considerably higher risk of psychotic illnesses than non-users, suggesting a link.

Discussion

Contributing to the current discussion about the link between cannabis use and the likelihood of developing psychotic disorders, this Retrospective cohort study shares its results. These results, which are in line with earlier studies that found a dose-response relationship between cannabis exposure and psychosis, show that long-term cannabis use makes us more likely to develop psychotic disorders. Based on the results of meta-analyses and systematic reviews, heavy or regular cannabis users are more likely to develop psychosis than occasional users.

Comparison of Studies on Cannabis Use and Risk of Psychotic Disorders

Study Title	Study Type	Sample Size	Findings	Limitations
Current Study	Retrospective Cohort	100	Frequent cannabis use associated with increased risk of psychotic disorders.	Self-reported cannabis use may introduce recall bias. Limited follow-up duration. Potential confounding factors not fully assessed.
Study 1 [13]	Meta-analysis	200	Higher odds of psychosis among heavy cannabis users.	Heterogeneity among included studies. Limited ability to establish causality.
Study 2 [14]	Longitudinal Cohort	500	Increased risk of psychotic symptoms with frequent cannabis use.	Reliance on self-reported cannabis use. Limited generalizability due to specific population studied.
Study 3 [15]	Case-control	300	Cannabis use associated with earlier onset of psychosis.	Potential recall bias in self-reported cannabis use. Difficulty in establishing temporal relationship.

Strengths and Limitations of the Study

The Retrospective cohort design of this study was great because it made it easier to look at trends of cannabis use and the number of cases of psychotic illnesses over time. The results are more likely to be useful and apply to a larger group of people because they were based on well-known diagnostic criteria for psychotic disorders and the sample size was very big (100 people). It is important to note, though, that there are some problems. To begin, the study may have been harmed because the self-reported

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data about cannabis use could have been affected by recall and social desirability bias. Also, the follow-up period, which ran from September 1, 2023, to March 31, 2024, might not have been long enough to find any long-term effects of cannabis use on the growth of psychotic disorders. Potential confounding factors that might have influenced the findings, such as concurrent substance use or familial predisposition to mental disorder, were not examined in the study.

Implications for Public Health and Clinical Practice

These results have a lot more important effects on professional practice and public health. Due to the correlation between excessive cannabis use and psychotic illnesses, it is imperative that all parties collaborate to reduce cannabis consumption, particularly among the youth. Personnel in the health care industry must have adequate knowledge of the mental health issues that can result from marijuana use. They should also check patients for psychotic signs and illnesses that are linked to cannabis. Treatments that limit cannabis use may improve mental health and lower the chance of psychosis in people that are at risk.

Suggestions for Further Research

More research is needed to find out how cannabis affects mental diseases. To find out how cannabis use raises the risk of psychosis and how dose affects that risk, longitudinal studies with larger sample sizes and longer follow-up times are needed. Biomarker and neuroimaging studies may show how weed affects thinking and the chance of getting psychosis. Lastly, more study is needed to come up with and evaluate ways to protect vulnerable groups from getting psychotic diseases linked to cannabis. Studies show that long-term cannabis use greatly raises the chance of psychotic diseases. The results make it clear how important it is to treat cannabis use as a public health problem and put in place methods to stop people from getting psychosis. More study needs to be done to confirm these results and learn more about them.

Conclusion

In our Retrospective cohort study, we found a statistical link between heavy cannabis use and psychotic disorders. Teenagers and young adults are especially sensitive to the mental health risks of weed, which makes it very important for everyone to know about them. One important outcome of our research was that psychotic risk factors require tailored treatment. Mental health experts must examine patients thoroughly to discover psychotic and cannabis use disorders. We must reduce cannabis detrimental impacts on mental health. The skills and knowledge gained could improve public health legislation and processes outside of hospitals. Controlling cannabis usage and providing psychosis prevention interventions are essential to minimising psychosis risk. Professionals and the public can benefit from marijuana education and knowledge. This study adds to the growing body of data linking cannabis usage to psychotic disorders. It also stresses the importance of public health in marijuana policy. Specific regulations and activities can reduce marijuana's negative effects and boost mental health.

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