

Cannabis Use Disorder as a Factor for Schizophrenia Development.

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ABSTRACT

This article investigated the relationship between cannabis use disorder and schizophrenia which are both problematic disorders recognized in the DSM-5TR. Frequent consumption of cannabis including tetrahydrocannabinol (THC), may cause paranoia that associates with delusions or hallucinations in some individuals. Schizophrenia may involve symptoms that disrupt an individual's daily functioning. Though the DSM-5TR recognizes cannabis-induced psychotic disorders, research on whether cannabis use disorder itself may cause schizophrenia remains inconsistent. Two studies investigated population using cannabis, as well as individuals diagnosed with cannabis use disorder. Six articles investigated interactions involving cannabis use disorder and schizophrenia. Interactions of biological (COMT enzyme, dopamine dysregulation, and endocannabinoid systems), psychological (emotional dysregulation), social (attachment styles) factors may influence early cannabis consumption. Cannabis consumption that develops into cannabis use disorder may contribute to higher risk of developing schizophrenia at an earlier age for individuals already susceptible to the disorder. Finding existing interactions between cannabis use disorder and schizophrenia may reduce harm in individuals vulnerable to both disorders.

1. Introduction

The aim of this research paper is to explore the relationship between cannabis use disorder and schizophrenia. At times, cannabis is known to cause paranoia that also associates with delusions or hallucinations (Wright et al., 2021). Whether the relationship is causal remains controversial. If cannabis is an individual variable that causes schizophrenia or a link between each psychological disorder connects due to pre-existing vulnerabilities will further be investigated.

Cannabis is the dried flower buds and leaves of a hemp plant that can be smoked or ingested for both medical and non-medical purposes. This study will focus on individuals who consume cannabis with tetrahydrocannabinol (THC) included, the main psychoactive compound found in cannabis. Cannabis used for non-medical purposes will also be the primary focus and can be defined as consumption for social enjoyment, pleasure, cultural or spiritual reasons, other non-medical purposes. Though cannabis is recognized as a hallucinogen, the substance may cause depressant and stimulant effects (Barlow et

al., 2021). The DSM-5 recognizes cannabis use disorder as “a problematic pattern of cannabis use leading to clinically significant impairment or distress” (American Psychiatric Association, 2013) and an individual must meet at least two of 11 criteria for a 12-month period specified in the diagnostic manual.

Schizophrenia is a complex psychological disorder that may involve delusions, auditory or visual hallucinations, disorganized speech, other symptoms that disrupt an individual’s daily functioning (Barlow et al., 2021). Though causes of schizophrenia involve biological, psychological, social factors, a series of research assessments and the DSM-5TR recognizes cannabis-induced psychotic disorders. Health Canada (2022) also warns “regular use of cannabis can increase the risk of psychosis and schizophrenia and higher THC content can lower the age of onset of schizophrenia,” but only 29% of Canadians who consumed cannabis reported seeing following warning labels on cannabis products in 2021 (Government of Canada, 2022). This may exemplify why many individuals consuming cannabis are unaware or misunderstand the connection between cannabis and psychopathology.

The purpose of finding any existing links between cannabis use disorder and schizophrenia is to reduce harm in individuals vulnerable to both disorders. Further research may also protect those vulnerable to psychological distress that may have resulted from cannabis consumption.

2. Literature Review

2.1 Population Using Cannabis

2.1.1 Meta-analysis 1

To further define cannabis use disorder, this paper sought to understand the population of cannabis consumers. It was discovered that individuals who began experimenting with cannabis at younger ages such as the ages between 11 to 18, developed greater risk for developing cannabis use disorder (Clements-Noelle et al., 2022). Childhood trauma such as abuse and neglect, sexual abuse, negative family communication, conflict within families, influenced early onset of cannabis consumption (Clements-Noelle et al., 2022). Early onset of cannabis consumption combined with childhood trauma, led to an increased risk for developing cannabis use disorder as adolescents (Clements-Noelle et al., 2022).

2.1.2 Meta-analysis 2

Childhood trauma, chronic stress, major life events, associated with cannabis use in adult individuals (Nia et al., 2023). Childhood trauma was also measured using the Childhood Trauma Questionnaire. Chronic stress had the least influence on cannabis consumption, as childhood trauma and cannabis consumption showed greater correlation. A biological finding suggested that endocannabinoid system dysregulation disrupted with trauma exposed individuals who then showed greater rates of cannabis use (Nia et al., 2023). It was also found childhood trauma associated with women more than men who consumed cannabis (Nia et al., 2023).

2.2 Cannabis Use Disorder as a Schizophrenia Factor

2.2.1 Meta-analysis 1

Pearson and Berry (2019) discovered high-intoxication levels in individuals who

consumed cannabis and experienced psychotic episodes reported a plan to quit cannabis consumption, exemplifying the significant distress cannabis caused in individuals. Those who consumed cannabis daily from a young age and used higher potency cannabis experienced psychotic symptoms such as delusions and hallucinations earlier than individuals diagnosed with schizophrenia but did not consume cannabis (Pearson & Berry, 2019). A controlled case study discovered within individuals who had cannabis use disorder and converted to cannabis-induced psychotic disorder, 47.4% then converted to schizophrenia (Pearson & Berry, 2019). Furthermore, cannabis seemed to interact with the catechol-O-methyltransferase (COMT) enzyme, an important genotype in the breakdown of dopamine in the prefrontal cortex. A dysregulation of dopamine was found to be a critical pathophysiology aspect of schizophrenia (Pearson & Berry, 2019).

2.2.2 Meta-analysis 2

Research aimed to find evidence in cannabis increasing risk of development for schizophrenia and other psychotic disorders. Many articles however, concluded it is unclear whether schizophrenia emerged after or before cannabis consumption (Allebeck et al., 2023). This article discovered individuals who consumed cannabis had a mean age onset of schizophrenia of 23.4 years and individuals who did not consume cannabis had a mean age of 27.7 years (Allebeck et al., 2023). These results suggest that cannabis use influenced earlier onset of schizophrenia.

2.2.3 Meta-analysis 3

Investigating the relationship between cannabis use disorder and schizophrenia,

findings discovered “young males might be particularly susceptible to the effects of cannabis on schizophrenia” (Hjorthoj et al., 2023). It was discovered detection and treatment of cannabis use disorder was especially crucial for 16–25-year-old individuals. One-fifth of schizophrenia cases could be prevented by averting cannabis use disorder in males (Hjorthoj et al., 2023). Evidence suggested females seemed to be at lower risk than males, demonstrating different biological factors. High THC concentration as well as frequent cannabis use was found to impact early onset of psychosis and schizophrenia compared to individuals who did not consume cannabis.

2.2.4 Meta-analysis 4

The results of longitudinal imaging genetics study of schizophrenia predicted future onset of cannabis use (Elkrief et al., 2021). Individuals take polygenic risk scores to discover several genetic variants and risks of developing certain diseases. This paper investigated if any causation for cannabis consumption and schizophrenia existed. Though cannabis use remained a risk factor for psychotic-like symptoms and schizophrenia, causality was not found. Instead, evidence showed that individuals with future onset of schizophrenia had an earlier onset of their disorder with cannabis use (Elkrief et al., 2021). Because polygenic risk scores involve limitations, portions of genetic effects such as rare variants and copy number variants were not captured and that contributes to the pathogenesis of schizophrenia (Elkrief et al., 2021). Further reports suggested social factors may contribute to the onset of early onset schizophrenia, and genetic predispositions should not be the primary focus (Elkrief et al., 2021).

2.2.5 Meta-analysis 5

The relationship between cannabis use and schizophrenia were investigated. Three hypotheses asked whether “cannabis can trigger schizophrenia, cannabis is used to mitigate symptoms of schizophrenia, there are common factors which might account for the association” (Hamilton & Monaghan, 2019).

Though biological evidence is most investigated, social, and psychological factors such as environments, family history, childhood, thinking styles, behaviour, should also be enquired. It was discovered childhood trauma to be a significant factor towards the development of psychotic disorders (Hamilton & Monaghan, 2019). Findings suggested individuals with a predisposition to schizophrenia who consumed high doses of cannabis frequently induced early onset of schizophrenia. However, few individuals also became at risk for developing psychosis and schizophrenia even after low exposure levels to cannabis (Hamilton & Monaghan, 2019). Evidence also concluded consequences of cannabis and schizophrenia are apparent in research drawn from North America and Europe. When different locations like Asia are researched, it is revealed there are less cases of cannabis-induced psychotic disorders because there is lower population use of cannabis in Asian countries (Hamilton & Monaghan, 2019). Further limitations of this research include the failure to study cannabis use and schizophrenia involving females. Though evidence suggests a combination of biological, social, psychological factors contributed to the onset of cannabis induced schizophrenia and males, the female sex was left out. Females would also need to be researched to gain a better understanding on

the biological aspects of cannabis use and schizophrenia.

2.2.6 Meta-analysis 6

Differentiating from other research where heavy and frequent cannabis consumption was a factor for early onset of schizophrenia, Ho and others investigated low dosage of cannabis could contribute to risk of schizophrenia. Using cognitive assessments, infrequent cannabis consumption with lower THC dosages still disrupted cognitive maturation (Ho et al., 2022). Newer ways of using cannabis in forms of oils, edibles, liquids, vaping have proven to contain higher THC concentrations of up to 80% increased from smoking cannabis (Ho et al., 2022). As higher THC concentration with frequent use was found to increase risk of early onset of schizophrenia, new ways of smoking or ingesting cannabis remains a concern (Ho et al., 2022).

2.3 Further Findings

Results from all findings suggest cannabis use disorder may contribute to early onset of schizophrenia in individuals with pre-existing vulnerabilities. Biological factors such as the interaction between the COMT genotype and dopamine in the prefrontal cortex, higher THC concentration, male and female sex, endocannabinoid system dysregulation, played a role in the onset of developing cannabis use disorder and schizophrenia. Trauma exposure and attachment styles have shown to create risk for both harmful patterns of cannabis use and schizophrenia (Carley & Adams, 2023).

Further findings discovered in young adults suggest cannabis use often associate with depression or anxiety (Wright et al., 2021). Other influences such as age and sex also contributed to development of cannabis

use disorder. High schizophrenia vulnerability was related to a stronger increase in cannabis use after age 16 (Hiemstra et al., 2018). In individuals with schizophrenia who consume cannabis, “auditory hallucinations and delusions of reference associated more among females.” (Wainberg et al., 2021). Among individuals who experienced delusions and hallucinations, 21% of individuals reported symptoms usually lasted longer than four weeks (Schoeler et al., 2022).

Research on cannabis use disorder and the relationships it has with other psychological disorders is important in protecting vulnerable individuals. It was found that the incidence of early onset schizophrenia could be reduced by approximately 8% if there was elimination of frequent cannabis use (Arseneault et al., 2018).

3. Conceptualization

To conceptualize why cannabis use disorder and schizophrenia may have a relationship, the bio-psycho-social model was initially investigated. Biologically, children with schizophrenic parents are vulnerable to the disorder, and multiple gene variances produce vulnerabilities. However, findings suggest interaction of cannabis and pre-existing vulnerability to schizophrenia may make symptoms of schizophrenia emerge earlier (Hamilton & Monaghan, 2019). Biological factors include involvement of the COMT enzyme and dopamine dysregulation involving schizophrenia. This may be a critical piece in the early onset of schizophrenia with patients who have cannabis use disorder. Furthermore, endocannabinoid system dysregulation also interferes with the combination of cannabis and schizophrenia (Nia et al., 2023).

Psychological factors are noted by the individuals diagnosed with cannabis use disorder. Most individuals who experienced childhood abuse in forms of abuse and neglect, developed dependency and met criteria for a DSM-5 diagnosis of cannabis use disorder. Findings also suggest the relationship between cannabis use disorder with other existing psychological disorders such as anxiety and depressive disorders (Wright et al., 2021). Emotional dysregulation from childhood may create low self-esteem and other negative thinking patterns that play a part in early onset of cannabis consumption. Because cannabis is oftentimes publicized to create positive sensations in individuals, those vulnerable to psychological disorders or have low self-esteem may view cannabis as a substance that can neutralize negative emotions. Most individuals who consume cannabis from young ages, go on to develop cannabis use disorder due to the long going relationship with the substance (Clements-Noelle et al., 2022).

Furthermore, social factors and different traumas such as rejecting natures from caregivers can create avoidant or anxious attachment styles in children. This may also influence early interaction with substances like cannabis, and individuals may easily form a problematic pattern of cannabis consumption that later forms into cannabis use disorder. The vulnerabilities that are pre-existent within individuals who have cannabis use disorder may not combine well with predisposition to schizophrenia and the disorder itself.

4. Conclusion

In conclusion, cannabis itself is not capable of causing schizophrenia, but those who use cannabis on a regular basis or have cannabis use disorder and are susceptible to

schizophrenia are at higher risk for developing the disorder at an earlier age. The younger the age of substance consumption combined with heavy doses, the higher risk of developing cannabis use disorder. Childhood trauma such as abuse and neglect may influence early onset of cannabis consumption.

4.1 Directions for Future Research

As cannabis has two subtypes, whether sativa or indica produce different results should be investigated. It is unknown whether different cannabis strains such sativa and indica produce different results. Sativa is advertised to reduce anxiety or stress and increase creativity, whereas indica is known to reduce insomnia and increase relaxation. Whether these differences cause different effects in individuals vulnerable to schizophrenia and other psychotic disorders is not yet understood.

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