Cannabis-Induced Psychotic Disorder and Schizophrenia
Diagnostic Comparison

Tyanna Brodhagen
Western Michigan University

Follow this and additional works at: https://scholarworks.wmich.edu/honors_theses

Part of the Psychology Commons

Recommended Citation
Brodhagen, Tyanna, "Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Comparison" (2023). Honors Theses. 3743.
https://scholarworks.wmich.edu/honors_theses/3743
Cannabis-Induced Psychotic Disorder and Schizophrenia: Diagnostic Comparison

Anna Brodhagen

Lee Honors College, Western Michigan University

PSY4990: Honors Thesis in Psychology

Lisa Baker, Ph.D.

January 16, 2024
Abstract

Recent changes in cannabis legalization will have broad societal impacts for decades to come, not the least of which are the unknown consequences to neuropsychiatric health, particularly for adolescents and young adults. Cannabis-induced psychotic disorder (CIPD) is a controversial and poorly understood neuropsychiatric condition characterized by a psychotic experience brought on by excessive cannabis intoxication and/or withdrawal. Although CIPD is currently an uncommon diagnosis, the overlapping symptomology and comorbidity with schizophrenia indicates CIPD may be underdiagnosed. Some authors suggest the under diagnosis of CIPD may be correlated to physician diagnostic practices. This honors thesis constitutes a scholarly literature review and preliminary research proposal. The objective of the literature review is to explore the medical scientific literature on the diagnostic criteria, overlapping symptomology, as well as contributing genetic and epigenetic factors to CIPD and schizophrenia. The aim of the research proposal is to survey practicing psychiatrists to examine their perspectives on the diagnostic process with reference to their patients’ demographics, the prevalence of cannabis-induced psychotic disorder and schizophrenia, the clinician’s medical training, and diagnostic instruments they utilize in their practice. Physician demographics will also be addressed within the study, requesting the history of the clinician’s medical training such as time spent in the field and which diagnostic manual they were originally taught in medical school. The length of time spent with a patient before providing a proper diagnosis, the medications most frequently prescribed to patients with schizophrenia and/or cannabis-induced psychotic disorder, and the efficacy and adverse effects of those medications, will also be considered, as well as whether insurance coverage may influence a clinician’s use of diagnostic codes. The purpose of this proposed research is to assess the diagnostic practices of various
clinicians who treat patients at in-patient psychiatric hospitals in order to determine the efficacy of their diagnoses and compare the process that each of the clinicians uses when diagnosing schizophrenia and cannabis-induced psychotic disorder.
Introduction

Cannabis use has increased in recent years, presumably due to decriminalization or legalization of products derived from this plant. According to Radhakrishnan et al. (2014), five million individuals use cannabis worldwide. Cannabis use has increased over the last five years, with a growing number of individuals receiving a cannabis use disorder diagnosis or presenting with psychotic symptoms associated with cannabis use (Hjorthoj et al., 2023). Bramness (2022) addresses the prevalence of cannabis-induced psychosis and its overall effects on public health, as diagnoses continue to increase at a substantial rate, with treatments for cannabis use disorder and schizophrenia reported with higher incidence in recent years. Furthermore, the prevalence of cannabis use in those who have consumed the substance in the last month increased by 27% in 2021 (Lopez-Pelayo et al., 2022). This may be due to medical and recreational legalization, perceived health benefits, childhood exposure, and/or popular culture. Regardless, frequent use of cannabis is on the rise and is becoming a psychological health epidemic as a substance use disorder alone, even without psychotic symptoms present.

Several studies have found multiple correlating variables that may contribute to cannabis-induced psychotic disorder. These correlations are especially astounding considering 32% of people with cannabis-induced psychosis are diagnosed with a schizophrenia spectrum disorder during their treatment. Cannabis-induced psychotic disorder is associated with the highest rate of psychosis, with 44% of cases leading to a schizophrenia diagnosis (American Psychological Association, 2022). In a study of individuals with cannabis-induced psychosis compared to those with acute schizophrenia, Nunez & Gurpegui (2008) reported male gender, labile mood and ideation, dissociations, visual hallucinations, and sensorium disturbances occurred more frequently in the former. However, because these disorders present with similar symptomology,
acute schizophrenia and cannabis-induced psychosis may be comorbid diagnoses. Nunez & Gurpegui (2008) also found that the risk for schizophrenia increases when using cannabis use. Multiple high-potency strains of marijuana and the individual’s preference for the type of cannabis product (smoking, edibles, waxes, etc.) are hypothesized to cause severe psychotic symptoms in more people today compared to previous decades. Finally, Gage et al. (2016) found that high-THC cannabis is correlated with psychotic episodes, whereas low-THC cannabis is not (Gage et al., 2016). Along with THC concentration, the frequency of cannabis use may provide observational differences for comparison of schizophrenia and cannabis-induced psychotic disorder. According to Rubio et al. (2012), the more one consumes cannabis, the more severe their symptoms may be. Rubio et al. (2012) also found that by analyzing the differences between the neurotic and psychotic symptomology of cannabis-induced psychotic disorder and schizophrenia as well as recording the patient’s frequency of cannabis use, they may be able to differentiate the two disorders accurately. Analyzing the symptoms that present during the intoxication period may also aid clinicians in distinguishing between cannabis-induced psychotic disorder and schizophrenia (Nunez & Gurpegui, 2008). Nunez & Gurpegui (2008) also found that frequency of use is correlated with an increased likelihood of developing a psychotic disorder.

Many people will not experience psychological harms associated with cannabis use, such as psychosis or cannabis-induced psychotic disorder. However, the more cannabis one consumes, an individual could experience psychosis symptoms as well as other adverse physical health effects such as respiratory and cardiovascular disease (Bramness, 2022). Because psychotic disorders and schizophrenia are often correlated and their diagnostic criteria are similar, the physician needs to be very careful in differentiating drug-induced psychosis, schizophrenia, or
another psychotic disorder (APA, 2022). Because cannabis-induced psychotic disorder presents with similar symptoms observed during the onset of schizophrenia, differentiating between the two disorders upon the initial visit proves to be difficult (Pearson & Berry, 2019). This review will summarize previous literature on cannabis-induced psychotic disorder and examine factors that contribute to the diagnosis, the risk factors of use, diagnostic comparisons between cannabis-induced psychosis and schizophrenia, treatment methods of both disorders, comorbidity, and incongruences in the diagnostic process of each disorder. This literature review should exemplify the need for future research regarding physician diagnostic practices in order to prevent misdiagnosis of cannabis-induced psychotic disorder and schizophrenia.

**Benefits and Risks of Cannabis Use**

While cannabis is dangerous for certain populations, many individuals may not experience psychotic symptoms. Cannabis has been shown to treat a variety of physical ailments. Sarzi-Puttini et al. (2019) summarized research evidence that cannabis may alleviate the symptoms of rheumatoid arthritis and other rheumatic disorders. Moreover, cannabis-containing compounds may be used to treat rare and severe illnesses such as uncommon and debilitating forms of epilepsy such as tuberous sclerosis complex. They may also decrease nausea in cancer patients and help individuals with AIDS regain their appetite (Sarzi-Puttini, 2019).

Although cannabis may be used to treat various physical ailments, research indicates potential psychoneurological detriments outweigh these advantages. Using cannabis may also lead to various respiratory illnesses (Center for Disease Control, 2020), even if 98% of individuals who use cannabis will not develop a psychotic disorder or experience a psychotic episode, cannabis-induced psychotic disorder (Gage et al., 2016). Overall, cannabis use should be viewed as a public health issue because it may increase the likelihood of an individual
developing schizophrenia (especially in males and those with genetic susceptibility and genetic predisposition). Cannabis use is dangerous for heart and lung health due to smoking and increases the risk of stroke and heart diseases (CDC, 2023). Reducing or abstaining from cannabis use may also improve mood and daily functioning and reduce psychotic symptoms in those present with a pre-existing psychotic disorder.

Cannabis use poses threats to the general population in various other ways than the possibility of developing psychosis. Zvonarev et al. (2019) provide documentation of higher suicide rates in states where cannabis has been legalized. This could be because if an individual develops psychosis, it may be detrimental enough to their overall mental health that they feel as if they have no way out of the disorder. Additionally, a high rate of suicide is reported in patients with schizophrenia (Zvonarev et al., 2019). The increase in suicide shows the potential severity of cannabis-induced psychotic disorder and correlates it to the severity of schizophrenia. Furthermore, Zvonarev et al. (2019) provide the rehabilitation and hospitalization rates for states that have legalized cannabis use and found that cannabis use accounts for 17% of rehabilitation inpatient stays in California. They also found that children under the age of 12 have started to use cannabis, which as discussed previously leads to permanent and severe developmental problems of the prefrontal cortex. Furthermore, cannabis use has been associated with social anxiety, depression, suicide, and the eventual diagnosis of schizophrenia if one does encounter psychosis throughout each state that legalized the substance (Zvonarev et al., 2019). Finally, research indicates a high comorbidity between cannabis use and increased mortality rates as a result of obesity, cardiovascular, and respiratory issues (Wilson & Cadet, 2009).

**Diagnostic Criteria, Methods, Prevalence, and Treatment**

*Schizophrenia*
Schizophrenia includes multiple facets of cognitive, behavioral, and emotional dysfunctions and impairs occupational and social functioning. Because schizophrenia is a heterogeneous disorder, the presentation of symptoms is often labile, contributing to diagnostic difficulty (APA, 2022). The etiology of schizophrenia is unknown, as the disorder may be conjoined with a variety of other psychiatric disorders. It is a chronic disorder that will permanently affect the individual’s life. Schizophrenia affects less than 1% of the population at approximately 0.3%-0.7% (APA, 2022). However, overdiagnosis and misdiagnosis are common within this disorder due to the heterogeneous presentation of symptoms.

Schizophrenia’s symptoms are categorized as positive, negative, cognitive, and disorganized symptoms. Positive symptoms are delusions and hallucinations, and negative symptoms are decreased emotional expression, avolition, and flat affect. The cognitive symptoms of schizophrenia are deficits in attention, working memory, and verbal and executive function, where disorganized symptoms include deficits in motor and speech areas of the brain, leading to disorganized speech and catatonic behavior (APA, 2022). Individuals with schizophrenia also exhibit lower general intelligence (Bowie & Harvey, 2006). Moreover, the individual must present with these disturbances for at least six months, and during this time, these symptoms must be present for at least one month. For a schizophrenia diagnosis to be provided, no substance use or medical condition can influence the psychiatric disturbances that the individual experiences (APA, 2022).

Unfortunately, it is impossible to diagnose schizophrenia on radiological, laboratory, or psychometric tests alone, as none of these diagnostic instruments provide causal inferences leading to a direct diagnosis (APA, 2022). However, psychological examinations and other biological diagnostic tools may be used to distinguish and differentially diagnose schizophrenia.
from other psychotic disorders, such as various formal diagnostic instruments and cognitive assessments.

The treatment methods for schizophrenia may provide better insight into treating cannabis-induced psychotic disorder since psychosis is the most concerning symptom of both disorders. Treating schizophrenia may be difficult because the heterogeneity of the disorder provides confusion in diagnostic criteria, pathophysiology, and etiology (Patel et al., 2014). These factors also lead to difficulty in creating and performing effective treatments for the disorder. However, while it is difficult to treat schizophrenia initially, various methods provide relief to the patient experiencing the symptoms of schizophrenia. Clinicians may be able to distinguish schizophrenia and cannabis-induced psychotic disorders based on each treatment’s efficacy. Specifically, individuals treated with atypical antipsychotics instead of neuroleptics showed no better efficacy in treatment for cannabis use disorder comorbid with schizophrenia than any other antipsychotic available (Gorelick, 2016).

Pharmacological therapies remain one of the best treatment methods for schizophrenia. Antipsychotics are used as the main treatment method, with physicians prescribing both atypical antipsychotics and classical neuroleptics. However, the atypical antipsychotic, clozapine, is one of the most common and highly prescribed antipsychotics because it is 30% more effective than other atypical antipsychotics or neuroleptics. Although clozapine may be effective for many individuals with schizophrenia, it still has a low efficacy rate. Long-acting antipsychotic agents are also available for individuals with schizophrenia and are often prescribed along with oral antipsychotics, as a combination therapy. However, combination therapy should only be used in the later stages of treatment (Patel et al., 2014). This is because the more antipsychotics an individual takes, the higher the risk for potentially permanent physiological consequences. When
using multiple antipsychotics, dangerous drug interactions are more likely to occur, and compliance with taking the medication dwindles (Patel et al., 2014).

Non-pharmacological therapy provides one-on-one and group cognitive behavioral therapy. The exploration of novel psychological therapies for schizophrenia is ongoing, such as meta-cognitive training, narrative, and mindfulness-based therapy. Because medication may not always be effective, non-pharmacological therapies may be used in conjunction with atypical antipsychotics, enabling the individual to receive further treatment with a favorable prognosis. Unfortunately, schizophrenia may be resistant to treatment as 30-60% of individuals with the disorder do not see improvement (Patel et al., 2014). Thus, combination therapy must be used for treatment-resistant schizophrenia because antipsychotics and non-pharmacological therapy alone may not provide full recovery (Patel et al., 2014).

**Cannabis-Induced Psychotic Disorder**

Cannabis-induced psychotic disorder is one of many drug-induced disorders that present with symptoms of psychosis. Cannabis, alcohol, hallucinogens, prescription medications, cocaine, and other harmful environmental toxins may induce a psychotic episode during intoxication and after use (APA, 2022). In some instances, the physiological and neuropsychological effects of cannabis can severely disable an individual. Moreover, cannabis use is one of the leading causes of hospitalization for drug-induced psychosis (APA, 2022). The DSM-5-TR states that the criteria for cannabis-induced psychotic disorder include meeting at least one or both of the two main criteria: delusions and hallucinations. Furthermore, an individual must have developed these basic symptoms during intoxication or withdrawal. The symptoms cannot be attributed to any other underlying psychotic disorder, such as schizophrenia (APA, 2022). However, if symptoms persist longer than one month, cannabis-induced psychotic
disorder may not be an appropriate diagnosis, as a return to baseline functioning is needed to
diagnose cannabis-induced psychotic disorder (Pearson & Berry, 2019). Because cannabis is one
of the most common substances linked to drug-induced psychosis, it is no surprise that the
prevalence rates for abuse and psychosis are high. The DSM-5-TR explains that between 7% and
25% of individuals who experience their first episode of psychosis have substance or
medication-induced psychotic disorder (APA, 2022).

Cannabis-induced psychotic disorder is diagnosed in various ways using physician
methods that are standardized by accredited diagnostic criteria. Firstly, a physician may diagnose
this disorder during patient intoxication if the criteria mentioned in the DSM (positive, negative,
cognitive, and disorganized symptoms, duration of symptom presentation and onset, and
presence of cannabis use) are met during this period. The physician may also diagnose this
disorder if the criteria are met during withdrawal or if the effects continue after use and THC or
its metabolites are no longer detected in blood or urine. To properly diagnose cannabis-induced
psychosis, cannabis must be ruled out from other substances that are causing psychosis
symptoms. This is considered by the disorder’s onset and course. Finally, the physician needs to
complete a variety of tests to ensure that cannabis is the cause of psychosis symptoms by
completing medical examinations, tests, and a history of use, as well as blood tests (APA, 2022).

The treatments for cannabis-induced psychotic disorder are similar to other illnesses that
present with psychosis, however many of them directly treat the individual’s cannabis use. Both
schizophrenia and cannabis-induced psychotic disorder are treated with antipsychotics.
Lurasidone is an atypical antipsychotic recently approved to treat the novel onset of
schizophrenia and has shown reliable results in populations with cannabis-induced psychotic
disorder (Ricci et al., 2022). There is limited research on medication for the treatment of
individuals with comorbid schizophrenia and cannabis-induced psychosis. (Ricci et al., 2022).

Ricci et al. (2022) also state that Lurasidone can maintain the disturbances of these disorders to keep the illness at a lower severity and allow the individual to resume their daily lives.

Non-pharmacological treatments are available for cannabis-induced psychotic disorder, although they should not be prescribed without medication. Smoking/using cessation is another form of treatment offered to individuals with cannabis-induced psychotic disorder as it helps them stop using cannabis and other substances that they may use, which is important for overall health (BrightQuest Treatment Centers, 2023). Group and individual psychotherapy have been shown to reduce problematic thoughts and influence better life skills for individuals with cannabis-induced psychotic disorder as well. Cognitive Behavioral Therapy may also decrease anxiety and depression in patients and provide relief from the emotional symptoms associated with the disorder (BrightQuest Treatment Centers, 2023).

**DSM-4 versus DSM-5-TR Comparison**

**DSM-4**

The diagnostic criteria for schizophrenia and drug-induced psychotic disorder differ substantially between the Diagnostic and Statistical Manual – 4th Edition (DSM-4) and the Diagnostic and Statistical Manual – 5th Edition – Text Revision (DSM-5-TR). Firstly, the DSM-4 characterizes drug-induced psychotic disorder and schizophrenia differently based on each disorder’s subtypes and does not recognize schizophrenia as a spectrum disorder. Instead, it mentions schizophrenia as one disorder that may encompass other schizophrenia-related disorders such as schizotypal disorder, schizoaffective disorder, schizoid, and schizophreniform disorder (APA, 1994). The DSM-4 also includes substance-induced psychotic disorder as an illness within the schizophrenia chapter (APA, 1994). The DSM-4 (1994) further provides
specific subtypes of schizophrenia such as paranoid, disorganized, catatonic, undifferentiated, and residual. Finally, the DSM-4 discusses catatonia and specifies its presentation for each subtype of schizophrenia and specifies schizophrenia by the disorder’s course, but it does not provide descriptions for each schizophrenia classification.

**DSM-5-TR**

The DSM-5-TR recognizes substance-induced psychotic disorder as an illness within a separate chapter, unrelated to schizophrenia diagnostic criteria (APA, 2022). Furthermore, the DSM-5-TR includes catatonia as a condition that is present in schizophrenia and psychotic disorders, however, it does not provide criteria for each subtype of schizophrenia as it was removed in this edition. The DSM-5-TR also specifies schizophrenia by the disorder’s potential longitudinal course. Importantly, the aforementioned differences between the two diagnostic manuals may be relevant to potential misdiagnosis depending on which diagnostic manual a physician commonly uses or was taught during their medical training.

**Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Measures and Tools Comparison**

Cannabis-induced psychotic disorder and schizophrenia can be diagnosed in multiple ways, such as using the DSM-5-TR, the Cross-Cutting Symptom Measure, the Clinician-Rate Dimensions of Psychosis and Symptom Severity test, the Alcohol, Smoking and Substance Involvement Test, and the pro and anti-saccade tasks. Physician-administered tests should be performed to examine the neuropsychological differences between cannabis-induced psychosis and schizophrenia to help clinicians make a proper diagnosis based on the overall symptom presentation. Because psychotic disorders and schizophrenia are often correlated and their criteria for diagnosis are similar, the physician needs to be very careful in differentiating
cannabis-induced psychosis, schizophrenia, or another psychotic disorder (APA, 2022). Because cannabis-induced psychotic disorder presents with similar symptoms that are seen during the onset of schizophrenia, differentiating between the two disorders upon the initial visit proves to be difficult (Pearson & Berry, 2019). Unlike cannabis-induced psychotic disorder, a schizophrenia diagnosis can only be made when a psychotic episode is continuous and is not a result of substance use (APA, 2022). However, multiple diagnostic tools may provide psychiatrists with better accuracy in diagnosing both disorders.

The Cross-Cutting Symptom Measure provided by the DSM-5-TR is a diagnostic tool for differentiating between multiple diagnoses and can only diagnose schizophrenia and drug-induced psychotic disorders. This tool uses a threshold of a 0-3 scale to assess the severity of the disorder based on the occurrence of symptom presentation. 0 equates to “none at all”, 1 is “slight or rare”, 2 is “mild or several days” and 3 is “severe or nearly every day” (APA, 2022). When diagnosing schizophrenia, this test is used to solidify the diagnosis, but should not be used on its own. Criteria provided by the DSM-5-TR should always be examined for each patient, followed by the Cross-Cutting Symptom Measure Test. Furthermore, the Cross-Cutting Symptom Measure Test may only be used for drug-induced psychosis when it is unrelated to another psychiatric disorder, such as schizophrenia, brief psychotic disorder, or another schizophrenia spectrum disorder (APA, 2022). The Alcohol, Smoking, and Substance Involvement Test (ASSIST) is required to determine drug-induced psychosis along with the Cross-Cutting Symptom Measure test and the utilization of the DSM-5-TR.

Psychosis alone cannot be differentially diagnosed using this tool. Instead, psychosis (or brief psychotic disorder) is diagnosed with the Clinician-Rate Dimensions of Psychosis Symptom Severity. This diagnostic tool provides a scale to assess the positive, negative,
cognitive, and disorganized symptoms of schizophrenia (APA, 2022). This test asks the physician to rate each symptom’s severity during the most severe point in the last week within a 4-point scale, with 0 equating to “none”, 1 equating to “equivocal”, 2 equating to “present, but mild”, 3 equating to “present and moderate”, and 4 equating to “present and severe”. These ratings are provided for each symptom of psychosis that the individual experiences. At the end of the test upon its completion, the physician will then score it and make their diagnosis accordingly (APA, 2022).

The pro-saccade and anti-saccade tasks may be used to analyze the differences between the diagnostic criteria of schizophrenia and cannabis-induced psychotic disorder. The pro-saccade task requires the individual to move their gaze towards a target and the anti-saccade task requires the individual to shift their focus away from the target (Zeligman & Zivotofsky, 2016). Woolridge et al. (2022) found that individuals with cannabis-induced psychotic disorder performed better on multiple psychological tests including the pro-saccade task and the anti-saccade task. According to the results performed by Woolridge et al. (2022), the two disorders can be distinguished by using the pro-saccade and anti-saccade tasks because these cognitive symptoms of psychosis were not present in individuals with cannabis-induced psychotic disorder. Consequentially, those who were in the schizophrenia group performed significantly lower on the pro and anti-saccade tasks due to their lower cognitive functioning as a result of their disorder (Woolridge et al., 2022). Thus, the pro and anti-saccade task may help clinicians make a differential diagnosis between cannabis-induced psychotic disorder and schizophrenia by performing cognitive functioning exams such as the pro and anti-saccade task. As clinicians recognize this, they may be capable of providing an accurate diagnosis on this criterion alone.

Factors Contributing to a Cannabis-Induced Psychotic Disorder Diagnosis
Many variables may increase cannabis-induced psychotic disorder in multiple populations. These factors could be genetic predisposition, adolescent exposure, and childhood trauma. Certain genes may influence one’s risk for developing cannabis-induced psychotic disorder. Recognizing these genetic variations may help physicians understand which patient populations are at risk for developing this disorder. Furthermore, childhood is a primitive time for brain development. As the young brain matures into adulthood, cannabis use may have adverse effects on cognitive development. Finally, those with childhood trauma have been studied in individuals with cannabis-induced psychotic disorder and schizophrenia to determine if there is a correlation between neglect and abuse and developing a psychotic disorder. Cannabis may be influenced by these variables, correlating these factors to contribute to cannabis-induced psychotic disorder.

**Genetic Predisposition**

The likelihood of receiving a diagnosis of cannabis-induced psychotic disorder or schizophrenia resulting from cannabis use may be correlated to an inherited genetic susceptibility and the influence cannabis may have on various genes. Studies by Radhakrishnan et al. (2014) and Morgan et al. (2015) found that if a family member has schizophrenia, an individual who uses cannabis has an increased risk for cannabis-induced psychotic disorder.

Tetrahydrocannabinol (THC) is the primary psychoactive chemical in cannabis responsible for its mood-altering effects. The dopamine hypothesis (a dated theory for the suspected etiology of schizophrenia), may be relevant to understanding the neurochemical mechanisms underlying cannabis-induced psychotic disorder. For example, THC increases striatal dopamine release in relatives of those with a cannabis-related psychotic disorder (Radhakrishnan et al., 2014). Furthermore, gene-environment interactions may be relevant to the
development of cannabis-induced psychotic disorder, specifically the catechol-O-methyltransferase (COMT) and AKT Serine/Threonine Kinase 1 (AKTI) genes. These genes appear to be implicated in the likelihood of an adolescent developing cannabis-induced psychotic disorder if they heavily used cannabis during their childhood, before the age of 18 (Radhakrishnan et al., 2014).

The COMT gene is responsible for breaking down dopamine in the prefrontal cortex. A polymorphism of the COMT gene may be associated with negative symptoms and cognition of schizophrenia (Pearson & Berry, 2019). Pearson & Berry (2019) cite a study by Pelayo-Teran et al. (2009) who reported that individuals with a particular COMT genotype and used cannabis experienced psychotic symptoms earlier than those with the same genotype but did not use cannabis. Furthermore, the AKT1 gene is a kinase-based protein responsible for forming striatal dopamine receptors. This gene’s function acts as a signaling molecule for the dopamine D2 (DRD2) receptor (Morgan et al., 2015). If this gene’s function is decreased, then DRD2 may increase in the brain via receptor stimulation, which then causes dopamine to rise and provoke psychotic symptoms due to blocked dopamine release by responsible cannabinoid receptors (Morgan et al., 2015). This causes the AKT1 gene to decrease in functionality due to its interaction with cannabinoids, which could lead to the development of schizophrenia as the effects of THC increase dopamine release (Morgan et al., 2015). As a result, post-mortem studies of individuals with schizophrenia showed that the AKTI gene is dramatically decreased in the prefrontal cortex, which may provide evidence for the correlation between cannabis use and psychosis concerning neurocognition and brain functionality (Radhakrishnan et al., 2014).

Sex and Gender Correlations
Several studies indicate sex and gender differences in the presentation of psychotic symptoms. Males are more likely to develop psychosis after cannabis use than females (Leadbeater et al., 2018), and an estimated 20% of schizophrenia cases in young males could be prevented by abstaining from cannabis use (Hjorthoj et al., 2023). Hjorthoj et al. (2023) continued to report that the severity of psychotic symptoms is stronger in males correlated with cannabis use, and females are less likely to develop psychosis associated with cannabis use. This may be seen in prevalence rates in which more males are also affected by schizophrenia and other psychotic disorders. The implications for sex differences between males and females is largely unknown, however, a variety of factors have been considered, including hormonal differences and sex chromosomes. Estrogen may be a neuroprotective agent and is found to increase in females, which may decrease the likelihood of women developing schizophrenia (Li et al., 2016). Other than estrogen, levels of gamma-aminobutyric acid (GABA), glutamate, testosterone, and oxytocin may correlate to the sex differences in developing schizophrenia (Li et al., 2016). According to a study by Ritsner et al. (2006) and Ko et al. (2007), low levels of testosterone in males may be associated with more severe negative symptoms of schizophrenia (Li et al., 2016). Furthermore, oxytocin may influence sex differences. Females have higher oxytocin levels than males, which may contribute to the sex differences associated with psychosis (Marazziti et al., 2019). Studies by Sasayama et al. (2012) and Frost et al. (2014) state that individuals who had a higher level of oxytocin did not experience negative symptoms than those who had a lower level of the hormone. These studies show that various hormones may contribute to specific sex differences in developing a psychotic disorder, such as cannabis-induced psychotic disorder.

Adolescent Exposure
Murray et al. (2016) found that in brain imagining studies, there were greater changes in the brain of those who heavily used cannabis in their adolescence compared to those in adulthood. This included a decreased volume in many cortical and subcortical areas of the brain. (Murray et al., 2016). Because the young brain is constantly developing at an increased rate during the adolescent period, cannabis use can result in disruptions of cognitive and socioemotional function, lower verbal IQ scores, and may stunt the development of the brain overall (Pope et al., 2003). Furthermore, Murray et al. (2016) argue that cannabis use during this time may permanently affect the endocannabinoid system, which could detriment brain and neurotransmitter function. Since a variety of neurotransmitters are incredibly important in cognition and overall brain function, the influence of psychoactive substances may drastically affect the individual’s performance, and may lead to psychosis symptoms and serious psychological disorders in some individuals. Furthermore, the age of exposure is correlated to the severity of the psychosis that an individual may experience.

Schizophreniform disorder is also commonly seen in individuals who began cannabis use during their early adolescence. Gage et al. (2023) report that participants examined in the Dunedin study showed more symptoms of schizophreniform disorder if they used marijuana at the age of 15 and before the age of 18. Gage et al. (2023) support Murray’s et al. (2016) findings that cannabis use during adolescence may lead to detrimental effects on neurodevelopment and neuroplasticity. This may include poor cognitive functioning, decision planning, and an increased risk of psychosis due to cannabinoid CB1 receptor fluctuation during this time. Supporting this research, multiple studies have found that psychotic symptoms resulting from cannabis use declined with age, further pointing to the importance of abstaining from using the drug during the teenage years (Leadbeater, 2018).
**Childhood Trauma**

Childhood abuse is also a common factor that may contribute to the development of cannabis-induced psychotic disorder (Wilson & Cadet, 2009). Young adults and children alike who have experienced childhood trauma may turn to cannabis use for stress relief, emotional support, and/or a distraction from adverse childhood experiences. Studies have shown that among those who have experienced childhood abuse, cannabis use may exacerbate psychotic symptoms upon exposure, and lead to a cannabis-induced psychotic disorder or schizophrenia diagnosis (Read et al., 2005). Furthermore, Gage et al. (2016) echo this research by citing that multiple studies found a link between childhood trauma and cannabis use, as neglect and abuse increase the risk of developing psychosis substantially rather than other singular risk factors (Gage et al., 2016). Pearson & Berry (2019) also state that there may be a significant interaction between developing cannabis-induced psychotic disorder or schizophrenia when recognizing the combined effects of the COMT gene, cannabis use, and history of childhood abuse within the user (Pearson & Berry, 2019).

**Medical Insurance Influence**

The disproportionate diagnosis rate of cannabis-induced psychotic disorder among physicians may be influenced by health insurance coverage. Physicians use diagnostic codes that allow insurance companies to determine whether they will cover an individual’s psychological health treatment. Many codes for various insurance companies are not covered, and the physician is required to provide a separate diagnosis for the medication to be covered. Because cannabis-induced psychotic disorder is frequently treated with the same medication as schizophrenia, the likelihood that an individual is diagnosed with cannabis-induced psychotic disorder may be reduced if insurance does not cover the medication for that diagnosis. This limits the clinician’s
ability to prescribe effective medications and make accurate diagnoses. Because of this, insurance may be an underlying cause for the misrepresentation of cannabis-induced psychotic disorder, even if the physician recognizes this as an appropriate diagnosis.

International Classification of Diseases – 10th Revision (ICD-10) codes are used by physicians to diagnose their patients, regardless of the field in which they practice. While there are ICD-10 codes for substance use disorder, insurance companies may decline to cover these diagnoses as they are often considered unreliable in terms of treatment prognosis and medication distribution (Tareen, personal communication, July 2023). Furthermore, insurance companies use medical necessity to determine which criterion must be met to provide a diagnosis (Dickson-Gomez et al., 2022). If a diagnosis does not cause a life-threatening physical ailment, then insurance may not cover the medication for the diagnosis. As few deaths are related to cannabis abuse, it is not surprising that insurance companies typically do not cover the medication prescribed for cannabis-induced psychotic disorder. Furthermore, considering the lack of evidence-based research currently available on psychotic episodes related to cannabis use, it is not deemed an emergent public health issue for insurance companies to consider the underlying behavioral health complications that may arise from cannabis abuse.

Medications may be covered if they are connected to an unspecific diagnosis within ICD-10 codes. While many different ICD-10 codes are related to cannabis-induced psychotic disorder, many are unspecified diagnoses (cannabis abuse with psychotic disorder, unspecified; cannabis use unspecified with psychotic with hallucinations; cannabis dependence with psychotic disorder, unspecified; cannabis use, unspecified with psychotic disorder; etc.) (APA, 2022). Many insurance companies will only cover unspecified titled diagnoses without regard to the specific diagnoses that a psychiatrist may provide (schizophrenia diagnosis, substance-use...
disorder diagnosis, etc.). Consequently, unspecific diagnoses may result in the incongruences between cannabis-induced psychotic disorder and the more common (and covered) diagnosis of schizophrenia.

Controversies exist in determining where cannabis-induced psychosis should be listed in the ICD-10 code’s diagnostic manual. These codes are separated by numbers that point to a specific diagnostic category. Insurance companies may not cover these categories, which forces clinicians to choose between a diagnosis that somewhat matches the patient’s condition or does not match at all. Moreover, one-third of individuals with cannabis-induced psychotic disorder eventually receive a diagnosis of schizophrenia. This may imply that there is a causal relationship between the two disorders. This relationship has held merit for many years, although many are skeptical of this correlation. Furthermore, cannabis-induced psychotic disorder may fit better under the ICD-10 F2 chapter rather than the ICD-10 F1 chapter. If this is accurate, then all substance-induced psychotic disorders should be placed under the F1 chapter (Lopez-Pelayo, 2022). ICD-10 codes are specific to each diagnosis in which a physician may differentiate on an individual case basis. The accuracy of ICD-10 codes would then provide a better understanding of the diagnostic criteria for schizophrenia, cannabis-induced psychotic disorder, and other drug-related psychosis diagnoses. If ICD-10 codes remain unspecific, insurance companies may forgo accepting substance-related disorders for the antipsychotic medications these patients may require to resume daily functioning.

Comorbidity

A cannabis-induced psychotic disorder diagnosis may lead to a complete schizophrenia diagnosis as symptoms develop. However, cannabis use disorder may be comorbid with schizophrenia, only if the onset of psychotic symptoms were not applicable to a drug-induced
psychotic disorder diagnosis. In 2009, Wilson and Cadet reported that those who are diagnosed with a psychotic disorder may experience negative symptoms precipitated by substance use. Comorbidity may develop due to a multitude of co-occurring and contributing factors, such as homelessness, low compliance with medication, and relapse.

Evidence suggests that while there are similarities in the symptomology of schizophrenia and cannabis-induced psychotic disorder, their presentations differ widely among individuals. Rubio et al. (2012) found that those who have neurotic symptoms associated with cannabis use experience obsessive-compulsive behaviors, somatizations, interpersonal sensitivity, depression, anxiety, and phobic anxiety. Depressive symptoms alone could point to a reliable diagnosis, according to Rubio et al. (2012) who state that cannabis-induced psychotic disorder presents with a higher comorbidity rate of depression and anxiety than that of schizophrenia. Furthermore, Rubio et al. (2012) have also noticed a relationship between the symptoms of anxiety and sensitive personality in correlation with an increased risk of cannabis-induced psychotic disorder. Comorbidities between the two disorders may help clinicians better diagnose each of them when these relationships are considered. Finally, “The temporality and specificity of cannabis intoxication and [cannabis-induced psychotic disorder] (exposure and then immediate symptoms) allows us, with reasonable confidence, to say cannabis use “causes” these conditions...Cannabis use appears to be a component cause of schizophrenia but is neither necessary nor sufficient” (Pearson & Berry, 2019, p. 9).

Woolridge et al. (2022) continue to state that during the onset period of cannabis-induced psychotic disorder or schizophrenia, relying on the DSM-5 alone may not be enough to differentiate between the two disorders and that more research should be conducted on the neuropsychological differences to determine proper diagnostic methods and increase accuracy.
(Woolridge et al., 2022). This insinuates that the proposed research will not be sufficient to fully determine the causal effects of cannabis use in its correlation to psychosis. Relying on self-report responses from physicians in relation to diagnosis may be flawed and unreliable as a way to draw conclusive results regarding potential misdiagnosis.

The diagnostic methods utilized between physicians should reflect consistency in their practice, across all psychiatrists who treat patients with cannabis-induced psychotic disorder and schizophrenia. There are various differences in how physicians diagnose their patients, with multiple methods available for them to use. Uncovering the differences between clinician assessment is crucial to understanding the potential misdiagnosis of schizophrenia and cannabis-induced psychotic disorder. Therefore, when each physician uses a similar method of diagnosing their patients, misdiagnosis may be decreased or ruled out altogether. The previous section discussed the potential issues in physician diagnostic patterns and the incongruences of the two disorders thereof. Utilizing the methods in this proposed study, we may discover how various physicians diagnose schizophrenia and cannabis-induced psychotic disorder, make comparisons, and further analyze how misdiagnosis may be prevented. The proposed study aims to compare physician diagnostic patterns and provide descriptive data on the potential correlation between cannabis use and psychotic disorders.

Cannabis-induced psychotic disorder is often misunderstood and conjoined with a variety of other psychotic disorders, potentially misrepresented in the diagnostic process of psychiatry and clinical psychology. Schizophrenia and cannabis-induced psychotic disorder share similar diagnostic criteria, which may lead to potential confusion in separating the diagnoses. Thus, the purpose of this proposed research is to analyze the diagnostic practices of various psychiatrists
who treat patients at psychiatric hospitals to determine the efficacy of their diagnoses and compare the process that each of them uses when diagnosing these two complex disorders.

**Methodology**

**Design**

The proposed study consists of a self-report survey to evaluate physician perspectives on the diagnostic criteria for schizophrenia and cannabis-induced psychotic disorder. Clinicians will be asked to complete a 20-question survey to reflect their personal diagnostic process with reference to their patients’ demographics, the prevalence of cannabis-induced psychotic disorder and schizophrenia, the clinician’s medical training and diagnostic instruments they use, their length of time spent with a patient before providing a proper diagnosis, the medications most frequently prescribed to patients with schizophrenia and/or cannabis-induced psychotic disorder, the efficacy, and adverse effects of those medications, and whether insurance coverage may influence a clinician’s use of diagnostic codes. By asking these questions, clinicians may provide a better understanding of how they specifically diagnose individuals with cannabis-induced psychotic disorder and schizophrenia. This allows further comprehension of the differences in the diagnostic process, which may add to the current research of clinician misdiagnosis of these two disorders.

**Procedure for Analysis**

This study will follow strict methods to collect data and meet the goals of the research. Firstly, the researcher must recruit psychiatrists around the United States who practice at both private and state psychiatric hospitals. A minimum of 10 participants is required with 100 participants at maximum. The researcher will contact human resource departments and faculty of these psychiatric hospitals via email. The email will provide an overview of the study, its
purpose, and ask human resources departments to forward the email to psychiatrists within their organization. It is recommended that the researcher also utilize any personal connections to practicing psychiatrists in an in-patient hospital setting to further obtain participants.

After the email is sent, participants are instructed to contact the principal investigator or any other individuals serving on the research board. Once this contact is made, the researcher will then send an online anonymous informed consent document to the participant which will consist of a summary of the study. The summary will state the purpose of the study, the expectations of the participant, the anonymity of their responses, and the risks and benefits of participation.

Once this information is presented to the participant, they will determine if they would like to continue their participation in the research. If they choose not to continue, they will be instructed to close the anonymous informed consent document. However, if they wish to participate in the study, they will complete the Participant Qualification Questionnaire located within the anonymous informed consent document. A link will be provided at the end of the document for the physician to follow. This link will take them to a qualification screening using the Qualtrics data collection system. This screening will confirm the participant’s age (over 18 years), the possession of a medical doctorate degree, licensure status, and their availability to complete the study by following the time constraint and their access to a computer. As this survey is completed, a notification will be sent to the researcher via email from Qualtrics. The researcher will then review these responses and determine if the participant is eligible. If the physician is not eligible, they will be discontinued from the study. If the participant is eligible, another email will be sent to the participant, welcoming them to the study. This email will provide more information on what the physician can expect during the completion of the survey.
Then, the same anonymous informed consent document will be sent to the clinician, now with a link to the study questionnaire. Once reviewed, the participant will be instructed to complete the questionnaire. Upon the participant’s completion of the survey, the researcher will receive another notification via email from Qualtrics and will begin recording, comparing, and analyzing their responses. The researcher must follow the protocol provided by the instructions of the institution’s review board. All participant information must be kept anonymous, and the documents will not ask for any identifiable information from the participant or their patients.

From the survey responses, the researcher will analyze all variables using descriptive statistics, making comparisons among different physicians and how they diagnose schizophrenia and cannabis-induced psychotic disorder. Each question will be reviewed and compared to different answers, locating potential incongruences between physician diagnosis and the symptomology, presentation, treatment, and outstanding variables such as insurance in the process of making the diagnosis. If multiple incongruences are found, misdiagnosis of one or both disorders may be plausible. If limited incongruences are found, we can conclude that physicians accurately diagnose both disorders to their full extent following the diagnostic criteria that are suggested. This descriptive study will analyze data by calculating means, medians, and modes from physician responses.

**Conclusion**

According to Radhakrishnan et al. (2014), an individual who is diagnosed with cannabis-induced psychotic disorder may experience an increase in symptom severity that will further lead to a diagnosis of schizophrenia. Thus, it is incredibly important that physicians diagnose cannabis-induced psychotic disorder correctly, and efficiently treat the patient because the disorder may progress to schizophrenia (Radhakrishnan et al., 2014). The progression of
cannabis-induced psychosis begins with cannabis intoxication, then cannabis-induced psychotic disorder, to a final diagnosis of schizophrenia if left untreated (Pearson & Berry, 2019). It is not possible to reverse a cannabis-induced psychotic disorder diagnosis once it meets the full criteria of schizophrenia (Radhakrishnan et al., 2014). According to Pearson & Berry (2019), Forti et al. (2014) discovered that when reviewing a Danish registry between 1994 to 2014, 47.4% of patients who were treated for cannabis-induced psychotic disorder were eventually diagnosed with schizophrenia (Pearson & Berry, 2019). Pearson & Berry (2019) also found that there is a delayed conversion from cannabis-induced psychotic disorder to schizophrenia, with some diagnoses made a few short years after the first psychotic symptoms developed, and others made after multiple years (Pearson & Berry, 2019). This may be interpreted as evidence for cannabis-induced psychotic disorder as a separate diagnosis instead of an early misdiagnosis of schizophrenia (Pearson & Berry, 2019). Finally, if a schizophrenia diagnosis is given during the cannabis-induced psychotic disorder period, the data for cannabis-induced psychotic disorder prevalence and treatment may be skewed, as the individual would simply be classified with schizophrenia. Therefore, proper diagnosis and treatment are needed, and more research is warranted so physicians can correctly diagnose cannabis-induced psychotic disorder before a patient reaches the schizophrenia stage.

Misdiagnosis is incredibly important when determining the overall psychological and physical health of an individual with a cannabis-induced psychotic disorder. Misdiagnosis often leads to a continued use of antipsychotics when unneeded, which may in turn lead to multiple physical health issues and symptoms of antipsychotic use, such as tardive dyskinesia following prolonged use of a classical neuroleptic. Moreover, if one is hesitant to prescribe an individual with antipsychotics because of this reason, cannabis-induced psychotic disorder may be left
untreated which may then further the progression of the illness and potentially cause more adverse symptoms with dangerous and potentially permanent effects than if the disorder was diagnosed at an earlier point. If an individual is misdiagnosed with cannabis-induced psychotic disorder or schizophrenia, this can lead to prolonged or unnecessary use of antipsychotics. These disorders may also lead to a longer duration of psychosis that is untreated due to a physician’s hesitation in prescribing antipsychotics (Woolridge et al., 2022).

Each question within the survey asks the physician to identify crucial areas of diagnostic methods pertaining to how they diagnose cannabis-induced psychotic disorder and schizophrenia. We chose a specific set of questions that may allow us to find incongruences in diagnosing these two disorders in order to prepare future research on the potential misdiagnosis of schizophrenia and cannabis-induced psychotic disorder.

**Demographic Questions**

The beginning questions within the questionnaire refer to patient demographics. By asking these questions, we can review if psychiatrists are seeing patients that match the demographics of schizophrenia and cannabis-induced psychotic disorder in relation to age, gender, and prevalence statistics. Understanding the patient population gives us a broader view of not only the patients but also their illnesses.

**Diagnostic Preference Questions**

Many questions within the survey ask the psychiatrist about their diagnostic practices. We included these questions to obtain a thorough description of how they diagnose cannabis-induced psychotic disorder and schizophrenia. Determining how many patients the clinician may see during a typical week may provide information on diagnostic accuracy and reliability. If a clinician sees multiple patients a week, they may experience a smaller time frame for treatment
and determining a diagnosis. If the survey responses indicate psychiatrists spend very little time with their patients before making a diagnosis, we can assume that these diagnoses may not be as reliable as those who spend hours attempting to understand their patients’ illnesses.

**Diagnostic and Statistical Manual of Mental Disorders Questions**

We asked psychiatrists if they frequently use the DSM (either version) in their practice. Because the DSM is the most widely used and recommended diagnostic tool, we may conclude that the diagnoses made utilizing this instrument are more reliable than those that do not. We further asked which edition of the DSM each psychiatrist learned during medical school. This question can provide information on which manual they use to formulate diagnoses in their practice. If they use the DSM-4, their diagnoses may not be as reliable as those who use the DSM-5 due to the differences in the classifications of cannabis-induced psychotic disorder and schizophrenia in each edition. Thus, the differences in the DSM-5 and DSM-4 may produce incongruent diagnoses between physicians. The DSM-4 does not recognize schizophrenia as a spectrum disorder, which may lead clinicians to provide inconclusive diagnoses if using the DSM-4 alone. They may not recognize the full variability of the disorder, which can result in an inaccurate diagnosis. However, multiple supplemental diagnostic tools may be used in conjunction with the DSM. By asking psychiatrists if they use diagnostic instruments outside of the DSM and if so, which diagnostic tools they use, we can determine the patient population they work with most, as well as if they are going beyond the standard DSM to provide reliable diagnoses.

**Cannabis-Related Questions**

By asking questions that specifically pertain to patient cannabis use, we may obtain information regarding comorbidity, prevalence, and illness severity. We asked psychiatrists to
report if they have ever encountered a patient with a dual diagnosis of schizophrenia and cannabis-induced psychotic disorder. By doing so, the survey study results may confirm the published research stating that those with schizophrenia have a higher likelihood of using cannabis. We asked if they prescribed medication to these patients as well, further attempting to understand if these illnesses are as prevalent as previous research suggests. Asking if psychiatrists have encountered a patient whose symptoms have been exacerbated or precipitated by cannabis use may give us information on whether cannabis affects various psychological illnesses that are not exclusive to schizophrenia and cannabis-induced psychotic disorder. This provides us with a better understanding of the effects of cannabis on general mental illness as a whole.

**Medication Questions**

Medications are important to discuss when determining the efficacy of treatment for psychosis. We asked physicians which antipsychotics they most commonly prescribe to their patients with schizophrenia specifically. We predict that psychiatrists will report more atypical antipsychotic usage over classical neuroleptics due to their higher efficacy rate and overall adequate treatment of the disorder. Thus, we asked if each clinician observes stronger efficacy with some antipsychotic medications more than others. We hypothesize that they will report atypical antipsychotics. We further asked psychiatrists if they had ever prescribed medication for cannabis-induced psychotic disorder. Because schizophrenia and cannabis-induced psychotic disorder are both treated with antipsychotics, we asked which medications they found most effective in their treatment. This question is important because of the limited information available on the efficacy of treating cannabis-induced psychotic disorder with medication. Adverse effects of antipsychotic medications were requested from the psychiatrists as well. We
asked if they had observed any adverse effects and if so, to provide examples of these medications. We predict that psychiatrists will report more classical neuroleptics as they have more detrimental psychomotor side effects and are less effective compared to atypical antipsychotics.

**Medical Insurance Questions**

Insurance is a vital aspect of treatment and medication. Asking questions about insurance coverage may allow us to understand the prevalence of these occurrences and their impact on making a diagnosis. If psychiatrists report that insurance coverage affects their decision regarding which diagnosis to make, such responses may indicate diagnoses are unreliable. If a psychiatrist must use a schizophrenia diagnosis to prescribe antipsychotic medications to a patient with cannabis-induced psychotic disorder, or the opposite, then both prevalence statistics of cannabis-induced psychotic disorder and schizophrenia are influenced, as well as the treatment efficacy.

All questions were created to combine our hypotheses into the reliability of treatment and diagnosis. By asking these 20 questions, we may discover that clinicians may not have the ability to provide reliable diagnoses due to multiple factors, whether that be insurance involvement, inadequate prevalence statistics, or faulty diagnostic practices. More research must be conducted on diagnostic practices and treatment to determine causal relationships for misdiagnosis.

Completing this pilot study and performing future research that assesses physician practice may help us discover the definitive reasons for the misdiagnosis between cannabis-induced psychotic disorder and schizophrenia. Not only will the completion of this study provide essential preliminary data to evaluate potential misdiagnosis, it will also add to future studies by understanding the basic principles of the variability of diagnostic practices within the realm of
substance use and psychosis. Research is often conducted on an individual’s psychological illnesses, but less so on the psychiatrists diagnosing these illnesses. Thus, by utilizing the methods of the proposed study, the researcher aims to uncover potential diagnostic incongruences between physicians in their practice. More research is warranted on physician diagnosis and the effects of cannabis use in reference to psychosis to obtain valid and reliable data and to better understand possible incongruences in the prevalence of a cannabis-induced psychotic disorder diagnosis. Other methods of analyzing diagnostic measures such as tests performed in the realm of neuropsychological assessment will be essential to make causal inferences about misdiagnosis.
References

https://doi.org/10.1176/appi.books.9780890425787.Assessment_Measures

https://doi.org/10.1176/appi.books.9780890420614.dsm-iv

https://doi.org/10.1176/appi.books.9780890425787.x02_Schizophrenia_Spectrum

https://doi.org/10.1176/appi.books.9780890425787.x16_Substance_Related_Disorders

https://doi.org/10.1176/appi.books.9780890420614.dsm-iv


https://doi.org/10.1192/j.eurpsy.2022.45

https://doi.org/10.2147/ndt.2006.2.4.531


https://www.ncbi.nlm.nih.gov/books/NBK546579/

https://www.cdc.gov/marijuana/health-effects/heart-health.html#:~:text=Marijuana%20can%20make%20the%20heart,pressure%20higher%20immediately%20after%20use.&text=It%20could%20also%20lead%20to,disease%2C%20and%20other%20vascular%20diseases.


https://doi.org/10.111/eip.13348


https://iovs.arvojournals.org/article.aspx?articleid=2562768#:~:text=Purpose%20%3A%20In%20the%20pro%20and,while%20anti%20saccades%20are%20volitional


https://doi.org/10.7759/cureus.5806
Appendix A

Cannabis-Induced Psychosis and Schizophrenia Diagnostic Comparison Questionnaire

Introduction

Thank you for agreeing to participate in the Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Comparison research study conducted by Western Michigan University. This study aims to evaluate the diagnostic criteria for psychiatric disorders that present with psychotic symptoms and cannabis use. The purpose of this study is to evaluate clinicians’ perspectives on diagnostic criteria and treatment of schizophrenia and cannabis-induced psychotic disorder. All data will be used anonymously and confidentially according to Western Michigan University Human Subjects Institutional Review Board rules and regulations. Please answer the following 21 questions truthfully to the best of your ability. Please do not include any identifying information pertaining to you or your patients. Do NOT insert your name anywhere on this questionnaire. We are only asking for you to provide general demographic information according to diagnosis. Please refrain from providing any patient specific information.

General Information

Years in Practice: _______________________________________________________________

Organization: __________________________________________________________________

Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Provided Answers</th>
</tr>
</thead>
</table>
| 1. How many patients with a schizophrenia diagnosis do you visit with in a clinical setting during a typical week? | _____ Less than 1  
       _____ 1-2  
       _____ 3-5  
       _____ Greater than 5 |
| 2. What is the typical age range of the patients presenting with schizophrenia symptoms when you have an initial visit with them? | _____ 18-25  
       _____ 30s  
       _____ 40s  
       _____ 50s  
       _____ 60s |
| 3. Among your patients with a schizophrenia diagnosis, approximately what percentage of them are the following gender? | _____% cisgender males  
       _____% cisgender females  
       _____% transgender males  
       _____% transgender females  
       _____% non-binary |
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Approximately what percentage of your patient population with a schizophrenia diagnosis uses cannabis?</td>
<td>____%</td>
</tr>
</tbody>
</table>
| 5. Have you ever encountered a patient diagnosed with Cannabis-Induced Psychotic Disorder? | ____ Yes  
____ No                                                   |
| 5a. If yes, were you the physician to make this diagnosis? | ____ Yes  
____ No                                                   |
| 6. Which version of the Diagnostic and Statistical Manual of Mental Disorders (DSM) did you learn during your medical training? | ____ 4th Edition  
____ 5th Edition                                             |
| 7. Do you frequently utilize the DSM in your practice? | ____ Yes  
____ No                                                   |
| 7a. If you answered yes to the above question, which version of the DSM do you currently utilize when making a diagnosis of schizophrenia and/or cannabis-induced psychotic disorder? | ____ 4th Edition  
____ 5th Edition                                                  |
| 8. Do you diagnose schizophrenia and/or cannabis-induced psychotic disorder based on other diagnostic criteria not included in the DSM? | ____ Yes  
____ No                                                   |
| 9. Which of the following diagnostic instruments do you commonly use in your practice? (Check all that apply) | ____ Minnesota Multiphasic Personality Inventory (MMPI)  
____ Research Domain Criteria (RDoC)  
____ Montgomery-Asberg Depression Rating Scale (MADRS)  
____ Generalized Anxiety Disorder – 7 (GAD-7)  
____ Brief Dissociative Experiences Scale  
____ Other (please specify) |
| 10. How many hours do you spend with a patient before making a diagnosis of schizophrenia and/or cannabis-induced psychotic disorder? | ____ 1-2  
____ 2-3  
____ 3-4  
____ Greater than 4                                            |
| 11. Have you ever treated patients with a dual diagnosis of schizophrenia and cannabis use disorder? | ____ Yes  
____ No                                                   |
| 12. Have you ever encountered a patient in your care in an inpatient setting whose symptoms were exacerbated or precipitated by cannabis use? | ____ Yes  
____ No                                                   |
| 13. Which antipsychotic drugs do you most frequently prescribe to your patients with schizophrenia? | ____ chlorpromazine (Thorazine)  
____ haloperidol (Haldol)  
____ clozapine (Clozaril)  
____ risperidone (Risperdal)  
____ quetiapine (Seroquel) |
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Do you observe stronger efficacy with some antipsychotic medications for schizophrenia?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a. If yes, which antipsychotic medications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Have you ever prescribed medication for a patient with cannabis-induced psychotic disorder?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>15a. If yes, have you observed stronger efficacy with some antipsychotic medications for cannabis-induced psychotic disorder?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>15b. If yes, which antipsychotic medications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Have you ever prescribed these antipsychotic medications for an individual with a dual diagnosis of schizophrenia and cannabis use disorder?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>17. Do you observe greater adverse effects with some antipsychotic medications?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>17a. If yes, which antipsychotic medications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Does insurance coverage of certain medications impact your diagnosis?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>19. Is there a specific insurance code for medications to treat Cannabis-Induced Psychotic Disorder?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>20. Does insurance coverage impact your decision regarding what medications to prescribe?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>20a. If yes, how frequently does this occur?</td>
<td>Occasionally (1-2 a year)</td>
<td>Frequently (3-5 times a year)</td>
</tr>
</tbody>
</table>
Appendix B

Participant Qualification Questionnaire

Thank you for your interest in participating in the Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Comparison study. In order to participate in this research, please review the following questions to determine your eligibility. If you are found eligible, you will receive an email explaining the study, an anonymous survey information consent document, and the questionnaire. Please do NOT include your name or any personal identification related to you or your patients in this questionnaire or any other document related to the study.

1. Are you over the Age of 18?
   Yes____   No____

2. Do you have a medical doctoral degree from an accredited university with a specialization in psychiatry?
   Yes____   No____

3. Do you possess an active license to practice psychiatric medicine in your state of residence?
   Yes____   No____

4. Will you be able to complete a 21-question survey before November 30th, 2023?
   Yes____   No____

5. Do you have your own computer (your organization or personal computer is acceptable) to complete the questionnaire using the Qualtrics data collection system?
   Yes____   No____
Appendix C

Participant Recruitment Email

To Whom it May Concern,

My name is [name] and I am a [title/position] at [organization]. I will be conducting research during [date]. The purpose of this research is to survey clinician’s perspective(s) on diagnostic criteria for psychotic disorders including schizophrenia and cannabis-induced psychotic disorder. This study will evaluate psychiatrists perspectives regarding the diagnostic criteria and treatments for schizophrenia and cannabis-induced psychotic disorder.

My research will include an online questionnaire-based survey to be completed by psychiatrists with experience diagnosing and treating patients with schizophrenia and/or cannabis-induced psychosis. I respectfully request that you forward this recruitment letter to psychiatrists within your organization who may be interested in participating in my research.

For those who are interested or if you have any questions about the study, please contact:

[Student Researcher] at [organization email address]

[Principal Investigator] at [organization email address]

Thank you for your consideration,

[Name]
[Title]
[Organization]
[Email Address]
Participant Welcome Email

Dear [participant’s name],

Thank you for your interest in participating in the Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Comparison study. You are eligible to participate in this research. Within this email, you will find the anonymous survey informed consent document. Please click on the link below to proceed with the study questionnaire. As a reminder, by opening the link to the survey, you are consenting to participate. Please complete this questionnaire at your earliest convenience, preferably before [date].

If you wish to remove your consent to participate in this research, do NOT open the link to the survey.

We will not ask for any information that will allow for personal identification pertaining to you or your patient and no data from you will be collected prior to your consent. Please DO NOT insert your name anywhere on the questionnaire. We are only asking for you to provide general demographics and information according to diagnosis. Please do not provide any patient specific information on the questionnaire.

If you have any questions about the survey or its contents, please do not hesitate to reach out to:

[Researcher Name]: [Email Address]

[Principal Investigator Name]: [Email Address]

Thank you again for your participation in this research study,

[Name]
[Title]
[Organization]
[Email]
Appendix E

Anonymous Informed Consent Document

[Organization]
[Department]

Principal Investigator: [Name]
Student Investigator: [Name]

You are invited to participate in this research project titled “Cannabis-Induced Psychotic Disorder and Schizophrenia Diagnostic Comparison”.

STUDY SUMMARY: This form is part of an informed consent process for a research study. It will provide information to help you decide whether you want to take part in this study. Participation in this study is completely voluntary. You may choose to not answer any question. The purpose of the research is to: uncover the clinician’s perspective(s) on diagnostic criteria for psychotic disorders including schizophrenia and cannabis-induced psychotic disorder. If you take part in the research, you will be asked to complete an online anonymous survey. Your replies will be completely anonymous, so do not put your name anywhere on the survey. Your time commitment to complete the survey will be approximately 30 minutes. In addition to this minimal time cost, participating in this study involves a minimal risk of visual fatigue or discomfort due to viewing and completing the survey on a computer screen. The potential benefits of study participating include contribution to the field of clinical psychology and specifically to the educational and research objectives of the undergraduate honors student conducting the work. The study may add to our understanding of how physicians diagnose and treat various psychiatric disorders including schizophrenia and cannabis-induced psychotic disorder, and the findings from this study may highlight the parallels between schizophrenia and cannabis-induced psychotic disorder and inform further research opportunities to explore these connections. Your alternative to taking part in the research study is not to take part in it.

The de-identified (anonymous) information collected for this research may be used by or distributed to investigators for other research without obtaining informed consent from you.

Should you have any questions prior to or during the study, you can contact the principal investigator, [name] at [email address] or the student investigator, [name] at [email address]. You may also contact the Chair, Institutional Review Board at [telephone number] or the Vice President for Research and Innovation at [telephone number].

This study was approved by the [organization] Institutional Review Board (WMU IRB) on [date].

Participating in this survey online indicates your consent for use of the answers you supply.

I agree to participate in this research study (Follow link below)
[link to participant qualification questionnaire or study survey]
I do not agree to participate in this research study
Appendix F

DSM-4 to DSM-5 Schizophrenia Comparison

<table>
<thead>
<tr>
<th>Disorder Class: Schizophrenia and Other Psychotic Disorders</th>
<th>Disorder Class: Schizophrenia Spectrum and Other Psychotic Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <strong>Characteristic symptoms</strong>: Two (or more) of the following, each present for a significant portion of time during a 1-month period (or less if successfully treated):</td>
<td>A. Two (or more) of the following, each present for a significant portion of time during a 1-month period (or less if successfully treated). At least one of these must be (1), (2), or (3):</td>
</tr>
<tr>
<td>1. delusions</td>
<td>1-4 SAME</td>
</tr>
<tr>
<td>2. hallucinations</td>
<td>5. Negative symptoms (i.e. diminished emotional expression or avolition)</td>
</tr>
<tr>
<td>3. disorganization speech (e.g. frequent derailment or incoherence)</td>
<td></td>
</tr>
<tr>
<td>4. grossly disorganized or catatonic behavior</td>
<td></td>
</tr>
<tr>
<td>5. negative symptoms (i.e. affective flattening, alogia, or avolition)</td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong>: Only one Criterion A symptom is required if delusions are bizarre or hallucinations consist of a voice keeping up a running commentary on the person’s behavior or thoughts, or two or more voices conversing with each other.</td>
<td></td>
</tr>
<tr>
<td><strong>B. Social/occupational dysfunction</strong>: For a significant portion of the time since the onset of the disturbance, one or more major areas of functioning such as work, interpersonal relations, or self-care are markedly below the level achieved prior to the onset (or when the onset is in childhood or adolescence, there is failure to achieve expected level of interpersonal, academic, or occupational functioning).</td>
<td>B. For a significant portion of the time since the onset of the disturbance, level of functioning in one or more major areas, such as work, interpersonal relations, or self-care, is markedly below the level achieved prior to the onset (or when the onset is in childhood or adolescence, there is failure to achieve expected level of interpersonal, academic, or occupational functioning).</td>
</tr>
<tr>
<td><strong>C. Duration</strong>: Continuous signs of the disturbance persist for at least 6 months. This 6-month period must include at least 1 month of symptoms (or less if successfully treated) that meet Criterion A (i.e., active-phase symptoms) and may include periods of prodromal or residual symptoms. During these prodromal or residual periods, the signs of the disturbance may be manifested by only negative symptoms or two or more symptoms listed in Criterion A present in an attenuated</td>
<td>C. SAME</td>
</tr>
</tbody>
</table>
form (e.g., odd beliefs, unusual perceptual experiences).

<table>
<thead>
<tr>
<th>D. Schizoaffective and Mood Disorder exclusion: Schizoaffective Disorder and Mood Disorder With Psychotic Features have been ruled out because either (1) no Major Depressive, Manic, or Mixed Episodes have occurred concurrently with the active-phase symptoms; or (2) if mood episodes have occurred during active-phase symptoms, their total duration has been brief relative to the duration of the active and residual periods.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Schizoaffective disorder and depressive or bipolar disorder with psychotic features have been ruled out because either (1) no Major Depressive or Manic Episodes have occurred concurrently with the active-phase symptoms; or (2) if mood episodes have occurred during active-phase symptoms, they have been present for a minority of the total duration of the active and residual periods of the illness.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Substance/general medical condition exclusion: The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F. Relationship to a Pervasive Developmental Disorder: If there is a history of Autistic Disorder or another Pervasive Developmental Disorder, the additional diagnosis of Schizophrenia is made only if prominent delusions or hallucinations are also present for at least a month (or less if successfully treated).</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. If there is a history of autism spectrum disorder or a communication disorder of childhood onset, the additional diagnosis of schizophrenia is made only if prominent delusions or hallucinations, in addition to the other required symptoms of schizophrenia, are also present for at least 1 month (or less if successfully treated).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification of longitudinal course (can be applied only after at least 1 year has elapsed since the initial onset of active-phase symptoms):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify if: The following course specifiers are only to be used after a 1-year duration of the disorder and if they are not in contradiction to the diagnostic course criteria.</td>
</tr>
</tbody>
</table>

- Episodic With Interepisode Residual Symptoms (episodes are defined by the reemergence of prominent psychotic symptoms); also specify if: With Prominent Negative Symptoms
- Episodic With No Interepisode Residual Symptoms
- Continuous (prominent psychotic symptoms are present throughout the period of observation); also specify if: With Prominent Negative Symptoms

- First episode, currently in acute episode: First manifestation of the disorder meeting the defining diagnostic symptom and time criteria. An acute episode is a time period in which the symptom criteria are fulfilled.
- First episode, currently in partial remission: Partial remission is a period of time during which an improvement after a previous episode is maintained and in which the
- Single Episode In Partial Remission; also specify if: With Prominent Negative Symptoms
- Single Episode In Full Remission
- Other or Unspecified Pattern

<table>
<thead>
<tr>
<th>Defining criteria of the disorder are only partially fulfilled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First episode, currently in full remission: Full remission is a period of time after a previous episode during which no disorder-specific symptoms are present.</td>
</tr>
<tr>
<td>Multiple episodes, currently in acute episode: Multiple episodes may be determined after a minimum of two episodes (i.e., after a first episode, a remission and a minimum of one relapse).</td>
</tr>
<tr>
<td>Multiple episodes, currently in partial remission</td>
</tr>
<tr>
<td>Multiple episodes, currently in full remission</td>
</tr>
<tr>
<td>Continuous: Symptoms fulfilling the diagnostic symptom criteria of the disorder are remaining for the majority of the illness course, with subthreshold symptom periods being very brief relative to the overall course.</td>
</tr>
<tr>
<td>Unspecified</td>
</tr>
</tbody>
</table>

**Specify if:**

- With catatonia (refer to the criteria for catatonia associated with another mental disorder for definition).
- Coding note: Use additional code 293.89 (F06.1) catatonia associated with schizophrenia to indicate the presence of the comorbid catatonia.

**Specify current severity:**

- Severity is rated by a quantitative assessment of the primary symptoms of psychosis, including delusions, hallucinations, disorganized speech, abnormal psychomotor behavior, and negative symptoms. Each of these
symptoms may be rated for its current severity (most severe in the last 7 days) on a 5-point scale ranging from 0 (not present) to 4 (present and severe). (See Clinician-Rated Dimensions of Psychosis Symptom Severity in the chapter “Assessment Measures.”)

Note: Diagnosis of schizophrenia can be made without using this severity specifier.

<table>
<thead>
<tr>
<th><strong>Paranoid Type</strong> (295.30): A type of Schizophrenia in which the following criteria are met:</th>
<th><strong>Dropped</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Preoccupation with one or more delusions or frequent auditory hallucinations.</td>
<td></td>
</tr>
<tr>
<td>B. None of the following is prominent: disorganized speech, disorganized or catatonic behavior, or flat or inappropriate affect.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Disorganized Type</strong> (295.10): A type of Schizophrenia in which the following criteria are met:</th>
<th><strong>Dropped</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. All of the following are prominent:</td>
<td></td>
</tr>
<tr>
<td>1. disorganized speech</td>
<td></td>
</tr>
<tr>
<td>2. disorganized behavior</td>
<td></td>
</tr>
<tr>
<td>3. flat or inappropriate affect</td>
<td></td>
</tr>
<tr>
<td>B. The criteria are not met for Catatonic Type.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Catatonic Type</strong> (295.20): A type of Schizophrenia in which the clinical picture is dominated by at least two of the following:</th>
<th><strong>Dropped</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. motoric immobility as evidenced by catalepsy (including waxy flexibility) or stupor</td>
<td></td>
</tr>
<tr>
<td>2. excessive motor activity (that is apparently purposeless and not influenced by external stimuli)</td>
<td></td>
</tr>
<tr>
<td>3. extreme negativism (an apparently motiveless resistance to all instructions or maintenance of a rigid</td>
<td></td>
</tr>
</tbody>
</table>
posture against attempts to be moved) or mutism

4. peculiarities of voluntary movement as evidenced by posturing (voluntary assumption of inappropriate or bizarre postures), stereotyped movements, prominent mannerisms, or prominent grimacing

5. echolalia or echopraxia

**Undifferentiated Type** (295.90): A type of Schizophrenia in which symptoms that meet Criterion A are present, but the criteria are not met for the Paranoid, Disorganized, or Catatonic Type.

**Residual Type** (295.60): A type of Schizophrenia in which the following criteria are met:

A. Absence of prominent delusions, hallucinations, disorganized speech, and grossly disorganized or catatonic behavior.

B. There is continuing evidence of the disturbance, as indicated by the presence of negative symptoms or two or more symptoms listed in Criterion A for Schizophrenia, present in an attenuated form (e.g., odd beliefs, unusual perceptual experiences).

Retrieved from Gashleen et al., 2016
Appendix G

*DSM-4 to DSM-5 Substance-Related Disorders Comparison*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>DSM-IV</th>
<th>DSM-5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disorder Class</strong></td>
<td>Substance-related disorders, included only SUDs</td>
<td>Substance-related and addictive disorders class now includes SUDs and gambling disorder (formerly pathological gambling)</td>
</tr>
<tr>
<td><strong>Disorder Types</strong></td>
<td>Abuse and dependence hierarchical diagnostic rules meant that people ever meeting criteria for dependence did not receive a diagnosis of abuse for the same class of substance</td>
<td>SUD, substance abuse and dependence have been eliminated in favor of a single diagnosis, SUD</td>
</tr>
<tr>
<td><strong>Substances Assessed</strong></td>
<td>11 classes of substances assessed, plus 2 additional categories</td>
<td>10 classes of substances assessed, plus 2 additional categories</td>
</tr>
<tr>
<td></td>
<td>• Alcohol</td>
<td>• Alcohol</td>
</tr>
<tr>
<td></td>
<td>• Amphetamine and similar sympathomimetics</td>
<td>• Stimulant use disorder, which includes amphetamines, cocaine, and other stimulants</td>
</tr>
<tr>
<td></td>
<td>• Caffeine (intoxication only)</td>
<td>• Caffeine (intoxication and withdrawal)</td>
</tr>
<tr>
<td></td>
<td>• Cannabis (no withdrawal syndrome)</td>
<td>• Cannabis (with withdrawal symptoms)</td>
</tr>
<tr>
<td></td>
<td>• Cocaine</td>
<td>• Combined with other stimulants (e.g. amphetamines) under stimulant use disorder</td>
</tr>
<tr>
<td></td>
<td>• Hallucinogens</td>
<td>• Separated into phencyclidine use disorder and other</td>
</tr>
<tr>
<td></td>
<td>• Phencyclidine and similar arylocyclohexylamines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Inhalants (no withdrawal symptoms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Nicotine (dependence only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Opioids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sedative, hypnotics, and anxiolytics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Other drug abuse/dependence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Polysubstance dependence</td>
<td></td>
</tr>
<tr>
<td>Disorders Assessed</td>
<td>Substance abuse: One or more symptoms</td>
<td>SUD: Two out of 11 criteria clustering in a 12-month period are needed to meet disorder threshold</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• Recurrent substance-related legal problems</td>
<td>Dropped</td>
</tr>
<tr>
<td></td>
<td>• Recurrent substance use in situations where it is physically hazardous</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>• Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>• Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>• Added: Craving or a strong desire or urge to use the substance</td>
<td></td>
</tr>
<tr>
<td>Substance dependence: Three or more symptoms in the same 12-month period (or one symptom if hallucinogen use disorder</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Inhalants (no withdrawal symptoms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tobacco</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Opioids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Merged with hallucinations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sedatives, hypnotics, and anxiolytics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Any other SUD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dropped polysubstance use disorder</td>
<td></td>
</tr>
</tbody>
</table>
dependence criteria have been met previously in the lifetime)

| • Substance is taken in larger amounts or over a longer period than was intended | • Same |
| • There is a persistent desire or unsuccessful efforts to cut down or control substance use | • Same |
| • A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects | • Same |
| • Important social, occupational, or recreational activities are given up or reduced because of substance use | • Same |
| • Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by substance use | • Same |
| • Tolerance, as defined by either: (1) a need for markedly increased amounts of substance to achieve intoxication or desired effect or (2) a markedly diminished effect with continued use of the same amount of the substance | • Same |
| • Withdrawal, as manifested by either: (1) the characteristic withdrawal syndrome for the substance (excludes Cannabis, Hallucinogens, and Inhalants) (2) the substance (or a similar substance) is taken to relieve or avoid withdrawal symptoms | • Withdrawal, as manifested by either: (1) the characteristic withdrawal syndrome for the substance (excludes Phencyclidine, Other Hallucinogens, and Inhalants) (2) the substance (or a similar substance) is taken to relieve or avoid withdrawal symptoms |
closely related substance) is taken to relieve or avoid withdrawal symptoms. Note: This criterion is not considered met for those taking opioids, sedatives, hypnotics or anxiolytics, or stimulant medications solely under appropriate medical supervision.

| Severity | No severity criteria | Severity is assessed in terms of the number of symptoms that meet criteria:  
Mild: two to three symptoms  
Moderate: four to five symptoms  
Severe: six or more symptoms |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Speculation</td>
<td>With or without physiological dependence, early full remission, early partial remission, sustained full remission, sustained partial remission, on agonist therapy, and in a controlled environment</td>
<td>Early or sustained remission and if the person is in a controlled environment where access to the substance is restricted</td>
</tr>
</tbody>
</table>

Retrieved from Gashleen et al., 2016