Cannabis Dependence: Unmasking the Reality of Addiction

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Cannabis dependence is a condition defined in DSM-IV applying the general concept of substance dependence to cannabis.

Despite cannabis being one of the most widely used illicit drugs in the world, controlled trials for cannabis use disorder have only been reported in literature in the last 15 years. Although cannabis dependence is physically non-existent (many clinicians continue to conclude that the relatively mild withdrawal syndrome associated with cannabis indicates that dependence is unlikely and treatment unnecessary), research has shown that some cannabis users may develop cannabis-related problems, including mild dependency.

Evidence for cannabis dependence comes from a number of sources including epidemiological surveys, studies of long-term users, clinical trials of people seeking treatment, controlled experiments on withdrawal and tolerance and laboratory studies on cannabis brain mechanisms. Budney et al. state that "clinical and epidemiological studies indicate that cannabis dependence is a relatively common phenomenon associated with significant psychosocial abnormality. Basic research has identified a neurobiological system specific to the actions of cannabinoids. Human and non-human studies have demonstrated a valid withdrawal syndrome that is relatively common among heavy marijuana users". In addition, clinical trials evaluating treatments for cannabis dependence indicate that, among other substance dependencies, cannabis dependency is responsive to intervention.

Worldwide data on cannabis use and dependence

The Australian National Survey of Mental Health and Wellbeing indicated that approximately 300,000 people (or 2.2% of the adult population of Australia) either used or were dependent on cannabis. Swift et al. estimate that this equates to roughly one in three individuals having used cannabis in the past 12 months. According to Swift, Hall and Teeson (2001), the top four symptoms reported by dependent adults were: withdrawal or using cannabis as withdrawal relief (88.8%); persistent desire or unsuccessful attempts to control use (86.9%); tolerance (72.6%); and using cannabis in larger amounts or for a longer time than intended (62.8%).

Only a minority of cannabis users seek medical help, but demand for treatment for cannabis use disorder is increasing internationally. Gates et al. report that 1.5% of Australians (approximately 200,000) are considered dependent on cannabis and research indicates that 1 in 10 people who try cannabis feel dependent. Hall et al. provide evidence that suggests that among those who have used cannabis more than a few times the risk of developing dependence is in the range of from 1 in 5 to 1 in 3; the more often cannabis has been used, and the longer it has been used, the higher the risk of the feeling of dependence. In addition, the majority of 'dependent' users continue to use cannabis without seeking treatment.

Agosti and Levin (2004) indicate that cannabis-dependent users are more likely to seek professional treatment for dependency if they had previously sought treatment or suffered from alcohol dependence. However, only 1/10 - 1/3 cannabis dependent users will seek treatment within a year. And the percentage of cannabis-dependent users who entered treatment is the lowest of all illicit drugs.

An Australian study showed that of individuals presenting for interventions for cannabis problems, many had been using on an almost daily basis for an average of 14 years and were suffering serious health and psychological consequences from cannabis use. In addition, Arendt and Munk-Jorgensen (2004) report that cannabis-dependent users entering treatment for cannabis dependency were found to have previously suffered from depression, schizophrenia and personality disorders more than people dependent on other drugs. This research indicates that these psychological problems are among the main reasons for seeking treatment for cannabis use.

Studies of long-term and regular cannabis users have found that a variety of cannabis-related problems are reported. For example, among a sample of heavy cannabis users in rural Australia, three in four people reported experiencing a persistent desire for cannabis and frequent intoxication during daily activities. Over half of the survey group (54%) reported tolerance while 5% reported suffering withdrawal symptoms. Swift et al. surveyed long-term cannabis users in Sydney, Australia and found that 78% reported withdrawal and 76% reported tolerance. More than a third (39%) reported using cannabis to relieve withdrawal symptoms.

Hathaway reports that in a study of regular cannabis users in Canada the symptoms most frequently reported for the 12 months prior to the study were using cannabis in larger amounts of for longer than intended (32%) and a persistent desire to cut down or unsuccessful attempts to do so (24%). One in ten (10%) respondents reported giving up or reducing social, recreational or work activities due to cannabis use.

Diagnostic criteria

According to Hall et al. who quotes the Diagnostic and Statistical Manual of the American Psychiatric Association, "the essential feature of Substance Dependence is a cluster of cognitive, behavioral and physiologic symptoms indicating that the individual continues use of the substance despite significant substance-related problems". Accordingly, a diagnosis of substance dependence is made if three or more of the following criteria occur at any time in the same 12-month period:

Tolerance, as defined by either or all of the following:

A need for markedly increased amounts of the substance to achieve intoxication or the desired effect

A markedly diminished effect on the user with continued use of the same amount of the substance
Withdrawal, as manifested by either of the following:
Characteristic withdrawal symptoms from the substance, such as insomnia, restlessness, loss of appetite, depression, irritability, and anger.
The same or closely related substance is taken to relieve or avoid withdrawal symptoms
The substance is often taken in larger amounts or over a longer period than was intended
There is a persistent desire to cut back or control substance use, or unsuccessful attempts to do so
Considerable time is spent obtaining the substance
Social, occupational or recreational activities are given up or reduced because of use of the substance
The substance is used despite knowledge of persistent or recurrent physical or psychological problems caused by the substance.

Evidence suggests that cannabis users can develop tolerance to the effects of THC and experience withdrawal symptoms. Tolerance to the behavioral and psychological effects of THC has been demonstrated in humans and animals The mechanisms that create this tolerance to THC are thought to involve changes in cannabinoid receptor function.

Addiction potential

Research has shown the overall addiction potential for cannabis to be much less than for tobacco, alcohol, cocaine or heroin, but slightly higher than that for psilocybin, mescaline, LSD, and MDMA. There is some evidence that dependence on cannabis can exist in some heavy users. One study with 500 heavy users of cannabis showed that when trying to cease consumption, some experience one or more symptoms such as insomnia, restlessness, loss of appetite, depression, irritability, and anger. Cannabis Dependence has been recognized as a clinical entity in the DSM-IV. Prolonged marijuana use produces both pharmacokinetic changes (how the drug is absorbed, distributed, metabolized, and excreted) and pharmacodynamic changes (how the drug interacts with target cells) to the body. These changes require the user to consume higher doses of the drug to achieve a common desirable effect (known as a higher tolerance), and reinforce the body's metabolic systems for synthesizing and eliminating the drug more efficiently. It is clear that cannabis ultimately acts through the mesolimbic dopaminergic system of reinforcement, just as all other addictive substances act.

Preliminary research, published in the April 2006 issue of the Journal of Consulting and Clinical Psychology, indicates that cannabis addiction can be offset by a combination of cognitive-behavioral therapy and motivational incentives. Participants in the study (previously diagnosed with marijuana dependence) received either vouchers as incentives to stay drug free, cognitive-behavioral therapy, or both over a 14-week period. At the end of 3 months, 43 percent of those who received both treatments were no longer using marijuana, compared with 40 percent of the

voucher group, and 30 percent of the therapy group. At the end of a 12-month follow-up, 37 percent of those who got both treatments remained abstinent, compared with 17 percent of the voucher group, and 23 percent of the therapy group.

A 1998 French governmental report commissioned by Health Secretary of State Bernard Kouchner, and directed by Dr. Pierre-Bernard Roques, classed drugs according to addictiveness and neurotoxicity. It placed heroin, cocaine and alcohol in the most addictive and lethal categories; benzodiazepine, hallucinogens and tobacco in the medium category, and cannabis in the last category. The report stated that "Addiction to cannabis does not involve neurotoxicity such as it was defined in chapter 3 by neuroanatomical, neurochemical and behavioral criteria. Thus, former results suggesting anatomic changes in the brain of chronic cannabis users, measured by tomography, were not confirmed by the accurate modern neuro-imaging techniques. Moreover, morphological impairment of the hippocampus of rats after administration of very high doses of THC (Langfield et al., 1988) was not shown (Slikker et al., 1992)." Health Secretary Bernard Kouchner concluded that : "Scientific facts show that, for cannabis, no neurotoxicity is demonstrated, to the contrary of alcohol and cocaine."

In treating marijuana use, Dr. David McDowell of Columbia University found that there is a need for the clinician to differentiate in the spectrum between a casual user who still has difficulty with drug screens, and a daily, heavy user. McDowell found that the sedating and anxiolytic properties of THC in some users might make the use of cannabis an attempt to self-medicate personality or psychiatric disorders.

Risk factors for developing cannabis dependency

Hall et al. conclude that around one in ten people who ever try cannabis will become dependent at some point. For those who use cannabis several times the chance is increased from one in five to one in three and daily users are considered at the greatest risk of dependence with about a one in two chance.

Certain factors are considered to heighten the risk of developing cannabis dependence and longitudinal studies over a number of years have enabled researchers to track aspects of social and psychological development concurrently with cannabis use. Increasing evidence is being shown for the elevation of associated problems by the frequency and age at which cannabis is used, with young and frequent users being at most risk.

Cross-sectional studies that examine the association between conduct disorder and attention deficit hyperactivity disorder have reported a significant association in community and in treatment populations with cannabis use and dependence among adolescents. Although early cannabis initiation is considered a strong predictor of later cannabis-related problems, findings that early

cannabis initiators are a group already facing social problems have been supported by longitudinal research in Australia. Coffey et al., in a study of 2032 secondary school students in Victoria, found that mid-school cannabis use was associated with factors including daily cigarette smoking, peer cannabis use and anti-social behaviour. The study also found that regular use at an early age predicted persistence in use from mid- to late-school, with potentially harmful late-school use occurring in 12% of mid-school initiators. A recent follow-up of this group at age 20-21 found that one in five adolescent users experienced later cannabis dependence.

According to Copeland, Gerber and Swift, the main factors related to a heightened risk for developing problems with cannabis use include frequent use at a young age; personal maladjustment; emotional distress; poor parenting; school drop-out; affiliation with drug-using peers; moving away from home at an early age; daily cigarette smoking; and ready access to cannabis. The researchers conclude there is emerging evidence that positive experiences to early cannabis use are a significant predictor of late dependence and that genetic predisposition plays a role in the development of problematic use.

Groups at higher risk of developing cannabis dependence

A number of groups have been identified as being at greater risk of developing cannabis dependence and include adolescent populations, Aboriginal and Torres Strait Islanders (in Australia) and people suffering from mental health conditions.

Adolescent populations

In their review of the literature, McLaren and Mattick indicate that young people are at greater risk of developing cannabis dependency because of the association between early initiation into substance use and subsequent problems such as dependence, and the risks associated with using cannabis at a developmentally vulnerable age. In addition there is evidence that cannabis use during adolescence, at a time when the brain is still developing, may have deleterious effects on neural development and later cognitive functioning.

Aboriginal and Torres Strait Islanders (an Australian perspective)

There is evidence that cannabis use occurs at higher rates among Aboriginal and Torres Strait Islander peoples when compared to the general population in Australia. This is part of a broader picture of poor health and wellbeing, stemming from the alienation and dispossession experienced by this population over time. Many of the social determinants of harmful substance use are disproportionately present in Aboriginal and Torres Strait Islander communities.

Psychiatric disorders

McLaren and Mattick show a correlation between populations who suffer from a mental disorder such as schizophrenia and a worsening of these symptoms with cannabis use. In addition, people who are vulnerable to developing psychosis, such as people with a family history of the disorder or with a genetic predisposition, may be at risk of developing a psychotic disorder following frequent cannabis use. Hall and Solowij indicate that given this risk the finding that cannabis use if higher among those with mental health problems than those who do not suffer from such problems is of concern and this population should be treated as a group at risk of adverse effects from cannabis use. This is an especially challenging group to engage and retain in treatment and "clinician's recommendations for the management of substance use in the context of severe and persistent mental illness rests with integrated shared care or dual diagnosis services, in which the critical components are assertive outreach, motivational interventions, skilled counseling, social support interventions, a comprehensive and long-term perspective and cultural sensitivity and competence".

Treatment

Demand for treatment for cannabis dependency is increasing internationally. Cannabis is responsible for most illicit drug admissions in the USA, with a 32% increase in the proportion of admissions for cannabis-related problems from 12% in 1996 to 16% in 2006. The most commonly accessed forms of treatment, according to Copeland and Swift, were 12-step programmes, physicians, rehabilitation programmes, and detox services, with inpatient and outpatient services equally accessed (each approximately 10%). In the EU approximately 20% of all primary admissions and 29% of all new drug clients in 2005, had primary cannabis problems. And in all countries that reported data between 1999-2005 the number of people seeking treatment for cannabis use increased. In Australia between 2006 and 2007, cannabis was the second most common principal drug of concern for which treatment was sought after alcohol, accounting for 23% of closed treatment episodes. Among 10-19-year-old clients, cannabis represented 47% of episodes compared to 29% for alcohol. Stephens et al. describe the symptoms reported by 382 people who signed up for treatment for cannabis dependency. These included: "an inability to stop using (93%), feeling bad about using cannabis (87%), procrastinating (86%), loss of self-confidence (76%), memory loss (67%) and withdrawal symptoms (51%).

Treatment options for cannabis dependence are far fewer than for opiate or alcohol dependence. Most treatment falls into the categories of psychological or psychotherapeutic, intervention, pharmacological intervention or treatment through peer support and environmental approaches. McRae, Budney and Brady postulate that, as with alcohol research, the therapeutic effects of pharacotherapy and psychotherapy may be synergistic, with greatest treatment efficacy seen when medications are combined with psychotherapy, as per the research of Anton et al., 1999.

Degenhardt et al. indicate that screening and brief intervention sessions can be given in a variety of settings, particularly at doctor's surgeries, which is of importance as most cannabis users seeking help will do so from their general practitioner rather than a drug treatment service agency. Hall and Swift conclude that brief intervention sessions should involve the provision of personalized advice about the client's cannabis use, information about cannabis use and dependence and self-help materials. Evidence suggests that there is value in brief sessions, even for highly dependent cannabis users, and treatment outcomes for cannabis-dependent individuals is considered comparable to those suffering from dependence on other substances.

Psychological intervention

Psychological intervention is most commonly Cognitive Behavioral Therapy (CBT) or Motivational Interviewing (MI). According to Copeland et al., while CBT examines the interplay between thoughts, behaviour and environment, the main aim of MI is to enhance the motivation of the participant to change. Stevens et al. conducted the first psychological intervention study in the US, with a sample of 212 heavy cannabis users. Participants were assigned to either a 10-week social support group or a 10-week relapse prevention group with a CBT focus. The support group took part in discussions that centered on issues such as: the giving and receiving of support; dealing with denial; and affiliating with friends who still used cannabis The 10-week relapse prevention CBT group included planned exercises, homework and formalised quit contracts undertaken between participant and counsellor. A 12 month follow up revealed similar rates of reduction in cannabis use for both groups (15.2% remained abstinent in the CBT group; 18.1% in the social support group) and one in five people from both groups were judged to have improved, either reporting a 50% less usage than pre-treatment levels or no cannabis related problems.

Later follow up of this study saw Stevens et al. introduce a delayed treatment condition, offered four months later than in the active treatment groups, a 14-week CBT relapse prevention group and a brief two-session MI interview (to create a control group for comparison). Results showed that at the follow-up participants in the active treatment groups had a significantly lower number of dependence symptoms and fewer cannabis-related problems compared to the delayed treatment group. Abstinence rates at four months were 37% for both active groups, compared to 9% for the delayed treatment condition.

An Australian study undertaken by Copeland, Swift, Roffman and Stevens further supported the effectiveness of brief interventions for cannabis use. 229 cannabis users were allocated treatment in either six sessions of CBT, one session of CBT or a delayed treatment control group. The CBT interventions incorporated elements of MI and thereby compared two matching therapies, the only difference being in length. At follow up it was found that 15.1% of participants in the six-session CBT group had achieved continuous abstinence as compared to 4.9% in the single session CBT group and 0% in the delayed treatment group. In addition, those in the active treatment groups

were considered to be less severely dependent than before the study and reported "higher levels of control over their cannabis use and fewer cannabis-related problems compared to those in the delayed treatment group"

Budney et al. conducted a smaller study that tested the effect of a voucher system, whereby heavy cannabis users were offered vouchers that could be exchanged for retail items in exchange for abstinence.

Participants had to provide cannabinoid-free urine samples to be eligible for the vouchers, the rationale of the study being that previous research indicated that voucher incentives, in conjunction with behavioral interventions, improved the treatment outcome of cocaine-dependent individuals. Results showed that the group receiving motivational enhancement (ME), CBT and voucher incentives (as opposed to ME; ME and CBT) were more likely to have been abstinent during the last week of treatment (35% as opposed to ME/ CBT: 10%; MET: 5%). Furthermore, at 30 days post treatment although all groups reported using substantially less cannabis than before treatment, there was a higher reduction for the voucher group. A recent study with cannabis users referred from probation strengthens these findings further. Participants were involved in either three sessions of motivational enhancement therapy, or this same therapy with added vouchers for attendance. Results showed that significant reductions in cannabis use were noted in both groups, however, more participants in the voucher group completed the treatment. Research undertaken by Copeland and the Cannabis Centre at the University of NSW indicates that although relatively brief, CBT has the strongest evidence of success for adults with cannabis dependence, among adolescents involved in the juvenile justice system and those with severe persistent mental illness.

Pharmacological intervention

Research that relates to pharmacological intervention for cannabis dependency is in its infancy. Carl Hart, in the journal Drug and Alcohol Dependence reviews data from recent research on cannabinoids. The discussion considers the findings from studies that have assessed the ability of medications to ameliorate cannabis-related symptoms in laboratory animals and human research participants. In addition, "data from studies that have investigated the effects of pharmacological agents on cannabis self-administration are also reviews because these data may provide information critical for informing relapse prevention medication development efforts". A number of small-scale trials have examined the impact of mood-altering substances on cannabis withdrawal, and the impact of drugs that block the acute effects of cannabis. Drugs such as Buproprion, Nefazodone and Lithium Carbonate have all been tested with variable results. Studies that consider the effects of oral THC maintenance for cannabis craving and withdrawal also produced mixed results. Hanley et al. proved that the administration of oral THC had no significant effect on the frequency at which participants chose to smoke cannabis. A 2001 study published in the Journal of Neuroscience, however, indicated that the effects of a mood stabilizer (divalproex) and

oral THC on cannabis cravings and withdrawal symptoms effectively reduced cannabis craving and very low doses of oral THC were effective in decreasing all measured withdrawal symptoms in addition to craving. The use of antagonistic pharmacotherapies, agents that block the effects of drugs by binding to receptors in the brain, is used in the treatment of opiates, alcohol and nicotine. One drug that shows promise in this field is CB1 cannabinoid receptor antagonist SR141716A (Rimonabant), which inhibits signs of THC intoxications in monkeys, rats and pigeons. A human clinical trial undertaken in 2002 found that SR141716 blocked the acute effects of smoked cannabis.

Columbia University, in collaboration with the National Institute on Drug Abuse (NIDA), is undertaking a clinical trial that looks at the effects of combined pharmacotherapy on cannabis dependency, to see if Lofexidine in combination with Marinol is superior to placebo in achieving abstinence, reducing cannabis use and reducing withdrawal in cannabis-dependent patients seeking treatment for their marijuana use. 180 men and women between the ages of 18-60 who met DSM-IV criteria for current marijuana dependence were enrolled in a 12 week trial that started in January 2010.

Peer support and environmental approaches

Self-help groups that strongly endorse the therapeutic potential of peer support, such as Narcotics Anonymous (NA), are increasingly used as an approach to cannabis dependency. The only requirement for membership at NA is a 'desire to stop using drugs'. Twelve step programs such as NA view addiction as a disease, with complete abstinence the only option for recovery; the support of a former addict helping another is at the core of the program's philosophy and people who become a part of the NA program acquire a 'sponsor', someone who provides personal support and helps recovering addicts implement the 12 steps. These steps include belief in a higher power and keeping a fearless moral inventory of oneself.

Evaluations of Marijuana Anonymous programs, modelled on the 12-step lines of Alcoholics Anonymous and Narcotics Anonymous, have shown small beneficial effects for general drug use reduction.

Barriers to cannabis treatment

Research that looks at barriers to cannabis treatment frequently cites a lack of interest in treatment, lack of motivation and knowledge of treatment facilities, an overall lack of facilities, costs associated with treatment, difficulty meeting program eligibility criteria and transport difficulties. According to Marlatt et al., the most frequently reported social barrier to treatment entry is the stigma associated with being labelled as an illicit drug user and associated concerns over privacy. A recent technical report compiled by Australia's National Cannabis Centre

Quitting Cannabis

Cannabis is the most widely used illicit drug in the Western world and there is little, if any evidence that describes the addictive nature of cannabis. There is plenty of documented evidence to suggest a need for users to find ways to assist them to stop using cannabis and the demand for treatment for cannabis dependency is increasing internationally. There are a number of ways to quit cannabis and increasing evidence-based treatments for cannabis users wishing to change the patterns of their use. Luckily withdrawal symptoms from pre-longed cannabis use are mild with most users experiencing no symptoms.