

Marijuana Use, Addiction, and Treatment

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Resumen

Existe mucha controversia acerca de la marihuana, particularmente con respecto a su potencial adictivo y a la necesidad de tratamiento para padecimientos de la marihuana. El presente artículo revisa las investigaciones recientes que apoyan la postura de que la marihuana tiene potencial adictivo significativo; que un número importante de adolescentes y adultos experimentan trastornos por el uso de la marihuana; y que se necesitan intervenciones fuertes para tratar esos trastornos. Los estudios epidemiológicos, de laboratorio y clínicos han demostrado la existencia, la prevalencia en aumento y a la significancia clínica de los trastornos del abuso y dependencia de la marihuana. Consecuentemente ha habido un aumento en los ingresos a tratamiento para la dependencia primaria a la marihuana en la última década. La investigación clínica y experimental también ha demostrado que la marihuana puede producir un síndrome de abstinencia clínicamente importante. Los estudios que han investigado el tratamiento para los trastornos por el uso de marihuana han demostrado que la terapia cognitivo-conductual, la terapia de reforzamiento motivacional y el manejo de contingencias son efectivas para reducir el uso de la marihuana y producir abstinencia. Sin embargo, los porcentajes de éxito son modestos, resaltando la necesidad para el desarrollo de tratamientos más potentes, incluyendo medicamentos. Los esfuerzos de prevención secundaria dirigidos hacia aquellos sujetos que son ambivalentes acerca de su uso de marihuana y que no están captados en un programa de tratamiento también se han evaluado y requieren atención adicional. Se discuten las limitaciones, retos y direcciones futuras para la investigación y tratamiento.

Palabras clave: marihuana, adicción, dependencia, abstinencia, tratamiento.

Summary

Controversy surrounds marijuana, particularly with regard to its addictive potential and the need for treatment of marijuana disorders. The current paper reviews recent research to support the contention that marijuana has significant addictive potential; that a substantial number of adults and adolescents experience marijuana use disorders; and that potent interventions are needed to treat these disorders. Epidemiological, laboratory, and clinical studies have demonstrated the existence, increasing prevalence, and clinical significance of marijuana abuse and dependence disorders. Consequently, there has been a rise in treatment admissions for primary marijuana dependence over the past decade. Experimental and clinical research has also demonstrated that marijuana can produce a clinically important withdrawal syndrome. Studies investigating treatment for marijuana use disorders have demonstrated that cognitive-behavioral therapy, motivational enhancement therapy, and contingency management are effective in reducing marijuana use and producing abstinence. However, the rates of success are modest, highlighting the need for the development of more potent treatments, including medications. Secondary prevention efforts to reach those who are ambivalent about their marijuana use and not engaged in the treatment system have also been evaluated and warrant additional attention. Limitations, challenges, and future directions for research and treatment are discussed.

Keywords: marijuana; addiction; dependence; withdrawal; treatment

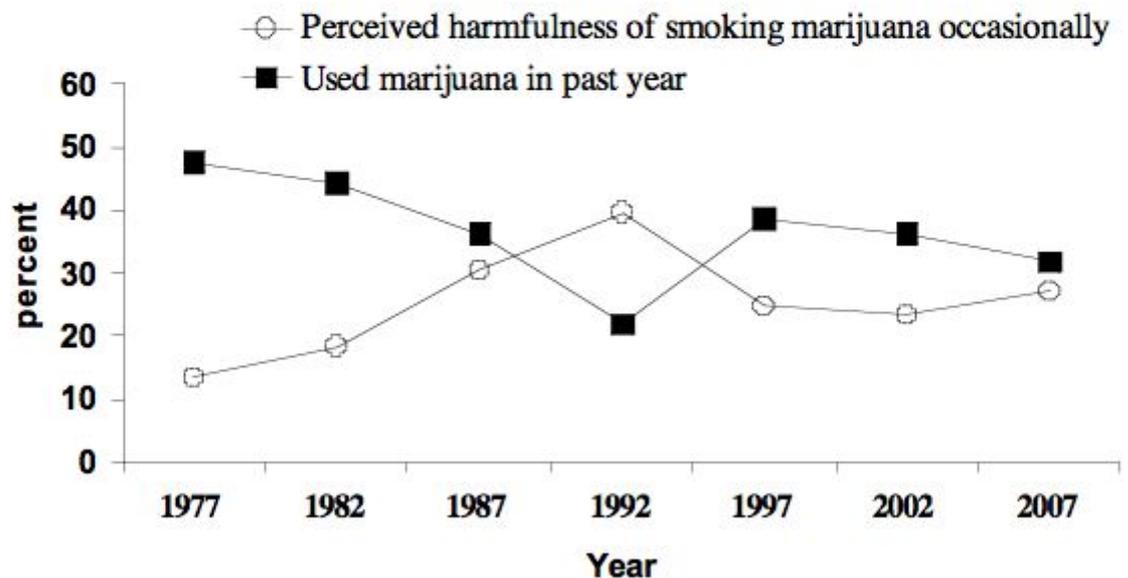
INTRODUCTION

Marijuana^{1[1]}, possibly more so than any other drug of abuse, incites a great deal of controversy. Controversy arises over its dependence or addictive potential, particularly physical dependence; its medical and psychosocial consequences; its potential as a “gateway” drug; its harmfulness; its illicit status; and the need for potent treatments to help with cessation attempts. Fortunately, recent research is beginning to shed light on these issues, providing information that should help resolve some of the controversy. As it is not possible to address all of these issues here, the current paper focuses on the addictive potential of marijuana and the need for treatment.

Changes in perception and policy in the US provide an example of the ambivalence and controversy over how to conceptualize and behave in relation to marijuana use. Over the years in the US the pendulum has swung back and forth with regard to the general public’s and the government’s perspectives on marijuana. After a period of popularity and unregulated use in the 1920’s, a movement grew to prohibit marijuana possession, and by 1937 when the federal Marijuana Tax Act was passed, all states had banned the drug. The Vietnam anti-war movement saw a substantial increase in the drug’s popularity, particularly among American young adults in the US. In reaction to the prison terms being imposed for possession, the National Commission on Marihuana and Drug Abuse recommended in 1972 that marijuana possession be decriminalized. In that decade a number of states replaced prison terms with either civil penalties or misdemeanor fines. While marijuana remained classified under federal law as having high risk and no accepted medical use, the last decades of the twentieth century saw a number of states enacting laws designed to legalize or protect patients from prosecution if a physician has recommended use of marijuana. Most recently, as the result of research on the consequences and addictive potential of marijuana, there is renewed

emphasis on educating the public about the potential for harm related to use of marijuana. The figure below illustrates how perceived risk from marijuana use and rates of use co-relate, and how they have changed over time [1] perhaps reflecting the ambivalence and uncertainty about how to characterize marijuana in the realm of harmful substances.

Marijuana Use and Perceived Risk of Harm



Below, a review of recent data is provided to support the contention that marijuana is a substance with significant addictive potential. The resulting marijuana abuse and dependence syndromes are experienced by a substantial number of adults and adolescents. Effective interventions to assist those with such problems have been developed, and, as with treatment for other substance abuse problems, development of more potent interventions is sorely needed.

Addictive?

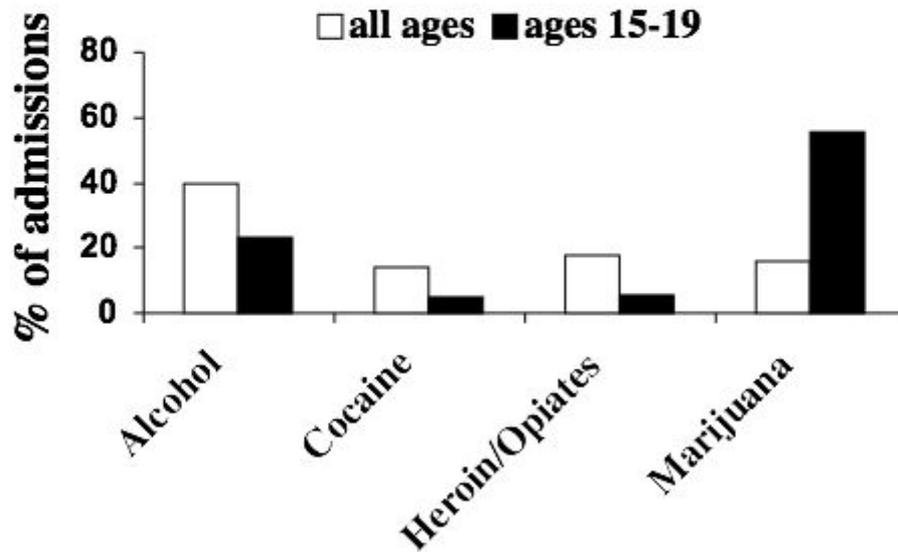
Epidemiology. One of the reasons that marijuana generates such controversy is the fact that it is the most commonly used illicit drug in the U.S., Europe, and Mexico [2-4]. Although some people question the concept of marijuana dependence or addiction, epidemiological, laboratory, and clinical studies clearly indicate that marijuana dependence occurs, is relatively common, is clinically significant, and causes harm [5-8]. As with other drugs, the majority of persons who have tried marijuana do not develop a problem with addiction. However, in the U.S., approximately 4% of

Americans have, at some time in their lives, met criteria for marijuana dependence disorder, as defined in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* [DSM; 9]. Although this may seem like a minimal percentage of the population, it is more than double the dependence rate for any other illicit drug [10, 11]. This high prevalence of dependence reflects the more widespread use of marijuana than other illicit drugs of abuse. Conditional dependence rates, that is, the percentage of persons who have ever used a drug that go on to become dependent, suggest that marijuana use less readily leads to dependence than use of most other illicit drugs. In the US, approximately 9% of those who try marijuana become dependent while, for example, 15% of people who try cocaine and 24% of those who try heroin develop dependence. Although lower in relative terms, marijuana's 9% conditional dependence rate is still concerning given the relatively large number of people who try the drug.

During the past decade in the US, the prevalence of marijuana use disorders (abuse and dependence) has increased across age groups, despite stabilization of rates of use. Such increased prevalence of marijuana use disorders may be a result of several contributing factors [12]. First, analysis of marijuana confiscated by the police suggests that the potency of marijuana has increased by 66% over the past decade, which may increase its potential for addiction. Second, the increase in use of marijuana among younger individuals may increase risk of addiction because earlier onset of marijuana use is clearly related to risk of developing abuse or dependence. Of particular concern is the observed increase in prevalence of abuse and dependence among young adult African American and Hispanic males and African American females [12]. The reasons for this upward trend in disorders among minority youth are not clear. Speculation has pointed to the deleterious effects of acculturation on Hispanic youth; growing numbers of minority youth attending college where they may experience increased exposure to marijuana use; and environmental and economic factors, such as higher prices and stricter policies related to tobacco products and alcohol, which may impact minority youth more than Caucasians.

Paralleling the rise in marijuana use disorders, treatment admissions for primary marijuana dependence has increased both in absolute numbers and as a percentage of total admissions, from 12% in 1996 to 16% in 2006 [13]. Figure 2 below illustrates that this increase in admissions ranks marijuana third, behind only alcohol (40%) and opiates (18%), among primary substances of abuse reported by individuals seeking treatment. The increase may reflect a number of factors. First, the growing number of individuals experiencing marijuana use disorders simply may be increasing the demand for treatment. Second, it may be that, as more marijuana-specific treatments become available, the "acceptability" of seeking and providing treatment for marijuana may have increased, resulting in more individuals presenting for treatment. The fact that there are now interventions for marijuana dependence may raise awareness of marijuana's addictive potential, resulting in users being more likely to consider the possibility that marijuana could be causing them problems (see section on Treatment below).

U.S. Treatment Admissions by Primary Substance of Abuse



Among adolescents seeking treatment for substance abuse, marijuana is by far the most frequently mentioned substance reported as the primary problem (see Figure 2). The number of adolescents receiving treatment for marijuana abuse or dependence more than tripled from 1992 to 2002, and the majority of all adolescents in substance abuse treatment report marijuana as their primary substance [13]. Over 40% of all admissions for marijuana are under 20 years of age. Thus, the adolescent population clearly shows a tendency for developing problems with marijuana and treatment services for this group are in demand. Adolescent patients show a distinctive profile of associated problems, perhaps due to their age and involvement in other risky behaviors [14]. Adolescents who smoke marijuana are at enhanced risk of adverse health and psychosocial consequences including sexually transmitted diseases and pregnancies, early school drop out, delinquency, legal problems, and lowered educational and occupational expectations.

In summary, there is a clear need for effective, easily accessible treatments specifically for marijuana use disorders. Marijuana dependence as experienced in clinical populations, while possibly less severe, appears highly similar to other substance dependence disorders. Adults seeking treatment for a marijuana use disorder average more than 10 years of near-daily use and more than six serious attempts at quitting [cf. 5, 15, 16]. They report continuing to smoke marijuana despite experiencing social, psychological, and physical problems related to their use. Commonly reported

consequences include relationship and family problems, guilt associated with use of the drug, financial difficulties, low energy and self esteem, dissatisfaction with productivity levels, sleep and memory problems, and low life satisfaction [17, 18]. Most perceive themselves as unable to stop, and most experience withdrawal upon cessation.

Marijuana Withdrawal?

Many who question whether you can truly become dependent on marijuana are really asking whether one experiences significant withdrawal when they quit. In other words, the basis for skepticism is focused on whether marijuana use can produce “physiological” dependence. Research over the past 10-15 years has now provided a clear answer to this question: a true, clinically important marijuana withdrawal syndrome is experienced by many heavy users of marijuana [cf. 7, 19]. Although a thorough review of the literature relevant to this issue is beyond the scope of this paper, here we provide some highlights of this body of research.

Neurobiology. First, research has established a neurobiological basis for marijuana withdrawal via discovery of an endogenous cannabinoid system in the central nervous system including identification of endogenous cannabinoids and localization of cannabinoid receptors that are the sites of action for the direct effects of marijuana and other cannabinoids. Studies with animals have shown that a cannabinoid antagonist can precipitate withdrawal. Studies with humans have demonstrated that deprivation of THC causes withdrawal symptoms, and that symptoms abate with re-administration of THC, clearly establishing the pharmacological specificity of marijuana withdrawal [e.g., 20, 21].

Behavioral and Clinical Phenomenology. Second, research has established the reliability, validity, and time course of a marijuana withdrawal syndrome through human laboratory and clinical studies (cf. Budney et al., 2004). Carefully conducted inpatient and outpatient laboratory studies have produced concordant findings, and demonstrated that the magnitude and timecourse of marijuana abstinence effects are indicative of typical substance withdrawal syndromes. That is, most effects onset within 24-48 hours post cessation, peak during days 2-4, and return to baseline within 1-3 weeks. Survey studies have been consistent with the experimental studies, providing convergent validity for the withdrawal syndrome. Substantial proportions (25-95% across studies) of heavy marijuana users report withdrawal symptoms, with individuals seeking treatment for marijuana abuse or dependence showing the highest rates of withdrawal.

Last and perhaps most controversial has been whether or not this withdrawal syndrome has *clinical importance*. Concern about the clinical significance of the syndrome was a primary reason for its omission from the DSM-IV. Evidence supporting the contention that the syndrome is clinically important has since emerged. First, direct comparisons of marijuana withdrawal with tobacco withdrawal have consistently found that the magnitude and timecourse of the marijuana withdrawal syndrome appear comparable to the well-established tobacco withdrawal syndrome [22-24]. Second, many marijuana users report that these symptoms adversely impact their attempts to quit, and motivate use of marijuana or other drugs to relieve withdrawal symptoms [25]. Third, a substantial proportion of adults and adolescents in treatment for marijuana dependence acknowledge moderate to severe withdrawal symptoms and complain that they make cessation more difficult. Fourth, marijuana abstinence symptoms are observable to persons living with users who report withdrawal, and the comments of these observers suggest that symptoms are disruptive to daily living. Last, two studies have shown some evidence of the predictive validity of marijuana withdrawal (worse outcomes

associated with greater withdrawal), which may also be considered as support for the syndrome's clinical import [26, 27].

In summary, the marijuana withdrawal syndrome does not typically include major medical or psychiatric consequences, and may be considered mild compared with heroin and severe alcohol withdrawal. However, experimental and clinical research about the magnitude and severity of the syndrome among marijuana users who abruptly stop using indicates that the development of effective clinical responses to withdrawal may enhance outcomes and promote successful cessation attempts. Indeed, the increased recognition of the marijuana withdrawal syndrome and the rapid accumulation of knowledge about the structure and functioning of the endogenous cannabinoid system has spawned research on the potential use of medications to treat marijuana withdrawal and dependence [28]. For example, the cannabinoid receptor antagonist, SR141617A (Rimonabant), has been shown to block the drug's subjective and physiologic effects [29]. A cannabinoid agonist (oral preparations of THC) has been shown to suppress or alleviate withdrawal symptoms [20, 21], and is currently being tested in clinical trials as an adjunct to behavioral interventions for marijuana dependence.

Behavioral Interventions: Approaches and Efficacy

Randomized trials for primary adult marijuana abuse and dependence have consistently demonstrated that outpatient treatments can reduce marijuana consumption and bring about abstinence. The most commonly tested interventions are adaptations of those initially developed for alcohol or cocaine dependence, in particular cognitive-behavioral therapy (CBT; also known as coping skills training) and motivational enhancement therapy (MET). Recently, trials have examined the use of contingency management (CM) to enhance the potency of CBT- and MET-based treatments. The cumulative findings indicate that (1) each of these interventions represents a reasonable and efficacious treatment approach; (2) combining MET and CBT is probably more potent than providing MET alone; and (3) an intervention that integrates all three approaches, MET/CBT/CM, is most likely to produce positive outcomes, especially as measured by rates of abstinence from marijuana. Following is a brief description of each treatment approach as well as a brief review of studies evaluating their effectiveness.

CBT and MET. CBT focuses on teaching skills relevant to quitting marijuana and avoiding or coping with other problems that might interfere with good outcomes. The skills taught usually include: functional analysis of marijuana use and cravings, self-management planning to avoid or cope with drug-use triggers, drug refusal skills, problem-solving skills, and lifestyle management. CBT is typically delivered in 45-60 minute weekly individual or group counseling sessions and treatment typically ranges from 6-14 sessions. Each session involves analysis of recent marijuana use or cravings, planning for coping with situations that might trigger use or craving, brief training on a coping skill, role-playing or other interactive exercises, and practice assignments. Detailed and instructional description of CBT sessions for marijuana dependence is available on-line in a published treatment manual, *Brief Counseling for Marijuana Dependence* [30].

MET is based on the motivational interviewing theory and technique described by Miller and Rollnick [31]. MET addresses ambivalence about quitting and seeks to strengthen motivation to change. Therapists use a non-confrontational style of counseling to guide the patient towards commitment to and action towards change. MET techniques include: strategic expression of empathy, reflection, summarization, affirmation, reinforcement of self-efficacy, exploration of pros and cons of drug use, rolling with resistance, and developing a change plan when ready. MET is typically

delivered in 45-90 minute individual sessions and involves fewer 1-4 sessions. Again, a more detailed illustration of MET for marijuana dependence is found in the Brief Counseling for Marijuana Dependence manual cited above.

A series of four trials have demonstrated the efficacy of both CBT and MET for adult marijuana dependence [32]. In general, these trials demonstrate that many adults with marijuana abuse and dependence problems respond positively to several variants of MET and CBT, including group- and individually-delivered CBT, CBT of varying length, and even very brief, 1-2 session MET interventions. Reduced marijuana use, rather than abstinence is the more common outcome observed in these trials. The reduction in frequency and quantity of use appears clinically important as concomitant reductions in related problems and symptoms of dependence are reported. The findings also suggest that longer MET/CBT interventions treatments may produce more robust outcomes, and more experienced therapists may be associated with greater potency of these types of treatments.

Contingency Management (CM). Although effective, CBT and MET for marijuana dependence does not work for everyone; approximately 50% or more of those who received treatment in the aforementioned studies did not have a clear positive outcome. Thus, as is the case for other substance dependence disorders, researchers have begun to examine the use of CM for treating marijuana dependence [33]. CM involves the systematic use of positive and negative consequences (reward and punishment) following a target behavior [33]. In the case of treatments for marijuana dependence, two types of incentive-based programs have been tested to date, i.e., abstinence- and attendance-based vouchers. The abstinence-based voucher program was adapted from an effective program developed for cocaine dependence [34, 35]. The program provides tangible incentives contingent on marijuana abstinence documented via once or twice-weekly drug-testing program. Vouchers with a monetary value are earned and escalate with each consecutive negative drug test. Earned vouchers are then exchanged for pro-social retail items or services that will hopefully serve as alternative reinforcers to marijuana use.

Four CM studies have reported positive effects on marijuana use outcomes with adult or young adult outpatients [36]. The trials have produced clear and consistent evidence for the efficacy of abstinence-based incentive programs engendering high rates of initial and during treatment abstinence, and have produced evidence suggesting that combining MET/CBT with CM engenders the most enduring positive effects on marijuana abstinence when assessed out to one year post-treatment. Excellent short-term results were observed even when CM was delivered without counseling in two of the studies. Thus, MET, CBT, and CM each have empirical support for their efficacy, and CM in combination with MET/CBT has demonstrated the greatest potency in outpatient treatment for adult marijuana dependence, particularly for engendering periods of abstinence.

Adolescents. Most information on marijuana treatment efficacy among teens comes from trials that have included users of various drugs, and have not focused specifically on marijuana. Nonetheless, most adolescents in these studies have been primary marijuana users. Empirical support for group or individual CBT and family-based treatments has begun to emerge [37]. The CBT interventions studied have been similar to CBT for adults in scope and duration. Specific forms of family-based treatment that have been tested include Functional Family Therapy [38], Multidimensional Family Therapy [39], Multisystemic Therapy [40], Family Support Network intervention [41], Behavioral Family Therapy [42, 43]; and Brief Strategic Family Therapy [44, 45].

Description of these models is beyond the scope of this paper. However, they each involve structured, skills-based interventions for family members and are well described in their respective manuals. Note that, as with treatments for adults, the majority of teens receiving these interventions do not achieve robust outcomes. Hence, researchers are attempting to enhance outcomes by adding CM interventions to MET/CBT-type interventions, and promising results have begun to emerge [46]. In summary, a number of behavioral interventions appear efficacious for adolescent marijuana abuse, and combining interventions like MET, CBT, CM, and family-based programs is likely to enhance efficacy.

Secondary Prevention. Of the approximate 14 million persons in the US who used marijuana during the past month, more than 4 million report problems related to marijuana consistent with abuse or dependence, yet only about 10% of these individuals received treatment [47]. In response to the low rate of treatment seeking, “Check-Up” (CU) interventions have been developed that are designed to reach users who have not sought treatment because they are ambivalent about stopping or do not perceive their use to be a problem that warrants treatment [48, 49].

In an initial trial, adult marijuana users responded to advertisements which stated that up to date information on marijuana use and its effects was available [50]. Those who responded were told that this was not a treatment study and were invited in for an assessment that was followed by either a 1-session personalized CU session, a 1-session multi-media session (providing information on marijuana and its effects) or a delayed session (choice of either CU or multi-media delayed by seven weeks). Responders were near-daily marijuana users, ambivalent about changing their marijuana use as evidenced by two-thirds scoring in the pre-contemplation or contemplation range on a readiness to change measure. The CU condition resulted in greater reductions in marijuana use and associated problems over the course of 12 months than the multi-media condition; however, absolute levels of change were relatively small. A second study sought to enhance outcomes by adding 4 sessions of MET/CBT following the 2 CU sessions [51]. The 6-session intervention successfully engaged participants, but unfortunately did not result in greater reductions in marijuana use. These studies showed that this intervention model attracted a “unique” sample of ambivalent marijuana users who may be ideal candidates for secondary interventions like the CU, but alternative CU models are needed to obtain more robust effects.

A similar CU model was developed and tested with adolescents [49]. Adolescents in grades 9-12 who had used marijuana at least 9 times in the past month and who volunteered to participate were randomized to either a 2 session MET intervention or a 3-month delayed treatment condition. Just as with the adult CU participants, two-thirds of these adolescents were precontemplators or contemplators regarding their readiness to change their marijuana use. Results from a 3-month follow up revealed a significant reduction in marijuana use across both groups, but there were no differences in use between the conditions at the follow-up.

In summary, while outcomes from these CU studies leave much room for improvement, this type of intervention holds promise as a method for reaching marijuana using adults and adolescents who would otherwise not have contacted the typical treatment system, at least not at this stage of their use. Such interventions offer a unique opportunity for secondary prevention efforts among a population of marijuana users who may already be experiencing problems related to their use.

Treatment Goals: Is Moderation Plausible? Because marijuana is perceived as less harmful than cocaine or heroin, some wonder whether reducing use, instead of abstinence, might be an acceptable clinical goal. Indeed, many individuals who enter treatment are ambivalent about giving up marijuana completely. The only study that systematically assessed the goals of adults enrolling in marijuana treatment reported that 71% sought abstinence, 28% wanted to moderate their use to 3 days or less per week, and 1 percent wished only to incur fewer adverse consequences from their smoking [52]. Over the course of treatment and follow-up, the portion with an abstinence goal declined to 49%, while the number wishing only for fewer negative effects increased to 26%. Most notably, patient goals predicted outcomes. Approximately 40-65% of those aiming for abstinence or moderation had achieved their desired outcome at the following assessment. Abstinence goals predicted better outcomes, however, the focus of treatment in this study was abstinence, and thus with moderation goals were not necessarily provided with treatment that best matched their goals.

Contemplating the idea of assisting patients with moderation goals for marijuana will certainly incite more controversy. Little is known about what constitutes non-harmful use of marijuana, and if and when moderation represents an appropriate clinical goal for treatment. Clinical epidemiological studies clearly demonstrate that many individuals experiment with marijuana, and some even use the drug regularly without reporting significant consequences. This finding clearly parallels what is observed with alcohol use. Likewise, the sparse data available on goals discussed above are fairly consistent with what is observed in the alcohol treatment literature. Moderation-focused treatments for marijuana, unlike alcohol, have yet to be tested. Thus, no guidelines or predictors exist concerning which patients might succeed with this approach. Moreover, marijuana's illicit status complicates consideration of treatment goals other than abstinence.

Summary and Future Directions

Advances in research have provided clear evidence that marijuana is a substance with significant potential for addiction, with a considerable number of both adults and adolescents experiencing marijuana abuse and dependence disorders. Discoveries related to the neurobiology of marijuana's effects and the endogenous cannabinoid system, and experimental demonstrations of a significant marijuana withdrawal syndrome should put to rest any controversy over whether or not marijuana can produce an addiction similar to other substance use addictions. Fortunately, the increased recognition that marijuana can cause dependence and significant negative consequences in a subset of users has prompted the development of marijuana-specific interventions and treatment materials paralleling those for other substance use disorders. These advances have increased users' and caregivers' perceptions that seeking and providing treatment for marijuana is acceptable, and have contributed to an increase in the number of individuals seeking help.

Research also has demonstrated the effectiveness of specific outpatient treatments for helping these individuals with marijuana abuse or dependence. However, significant limitations to this area of clinical research continue to exist. Even with the most highly efficacious treatment, e.g., MET/CBT+CM, the rates of "success" remain modest. Only about half of those who enroll in treatment achieve an initial period of abstinence, and among those who do, approximately half return to use within a year [53, 54]. An additional proportion of adults report a reduction in use and problems associated with use, however, there still remain a substantial proportion that do not show evidence of

progress. Clearly, there remains much room for improvement in rates of change in marijuana use for individuals who enter outpatient treatment.

Optimistic expectations for enhancements to current treatment approaches appears warranted as our growing understanding of the principles underlying behavioral treatments continues to produce innovative applications that demonstrate incremental gains in efficacy. Rapid advances in the neurobiology of marijuana and the cannabinoid system provide avenues for development of effective treatment medications to complement the behavioral approaches. In addition, the acceptance and potential efficacy of “check-up” type interventions holds promise for preventing more severe cases of marijuana dependence as well as increasing therapeutic contacts with more marijuana abusers who might benefit. Additional areas of exploration and development that warrant focus include tests of continuing care protocols to prevent or reduce the severity of lapses or relapse and use of innovative technologies such as computer, internet, and telephone to assist in delivery of treatment or continued care.

In conclusion, controversial issues surrounding marijuana, particularly those pertaining to legalization, severity of marijuana addiction, its physical or medical consequences, and moderation goals will continue to incite debate. However, controversy over whether marijuana is “addictive” should be put to rest. Marijuana addiction and misuse are real and relatively common; moreover, they reflect a significant public health problem that requires continued attention and resources.

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(Pies De figura)

Figure 1. Percent of 12th graders reporting marijuana use in past 12 months and percent perceiving great risk of harm from occasional marijuana use. Monitoring the Future Data Set, 2007.

Figure 2. Percent of total substance abuse treatment admissions by primary substance of abuse and by 15-19 year olds in 2006. Treatment Episode Data Set, SAMHSA, 2007