

Rehabilitation of the Adolescent with a Substance use Disorder: Overview of Treatment Efficacy

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ABSTRACT: *Background:* Several studies have shown that substance use disorder (SUDs) among adolescents is related to multiple behavioural problems and needs specific treatment compared to adults. *Objectives:* The aim of the present paper was to investigate the gold standard of rehabilitation efficacy for SUDs in adolescence. *Methods:* A careful review of the literature was conducted on the treatment and rehabilitation of adolescents with SUDs. A total of 11 articles from peer-reviewed journals was selected for this review. *Results:* Family therapy is the treatment with the strongest evidence of effectiveness for reducing SUDs in adolescents, although other types of treatments appear to be beneficial such as cognitive-behavioural therapy and other psychological approaches. Despite the effectiveness of the treatments, the rate of relapse remains high among adolescents with SUDs. *Conclusion:* Currently, psychological treatments, particularly family therapy, are most frequently applied to adolescents with SUDs. Pharmacotherapy is reserved for adolescents with a SUDs in co-morbidity with other mental disorders and a therapeutic community is suggested for these at-risk adolescents.

INTRODUCTION

Drug use among adolescents represents an important public health problem all over the world. It has been estimated that 1.5 million teenagers meet criteria for at least one substance use disorder (SUDs) (Office of Applied Studies, 2006). Among this population, substances most widely used are alcohol and marijuana/hashish (Hser et al., 2001). The impact of SUDs among youth is very serious considering that SUDs in adolescence is correlated with other significant problems with lifelong implications, including criminal involvement (Rockholz, 2011), physical, sexual and emotional abuse (Hoffman, Abrantes, Anton & Kingston, 2004), academic failure, poly-drug use, mental disorders (Hser et al., 2001), and driving under the influence of drugs (SAMHSA, 2004).

Adolescents have additional vulnerabilities due to their developmental stage. For instance, it has been demonstrated that youths may be more easily influenced by their peers given that individuals often engage in more risk-taking behaviour when in peer groups rather than alone, and peer effects on risk-taking behaviour was higher among adolescents (13-16 years) and youths (18-22 years) than adults (24 years and older) (Gardner & Steinberg, 2005). Moreover, adolescents have higher rates of binge use and psychiatric comorbidity, less awareness of their SUDs (Brown, Anderson, Ramo & Tomlinson, 2005), develop greater cognitive and emotional problems related to the drug use, and have a lower tolerance and experience more adverse effects to drugs due to their developmental stage (Winters, 1999; Brown, Tapert, Granholm & Delis, 2000). An explanation for these differences may be due to the immaturity of the adolescent brain in which the development of cerebral structures that control impulsivity and reasoning and judgment, such as the prefrontal cortex and the nucleus accumbens, are not yet completely formed (Winters, 2004).

The need to investigate specific treatments for SUDs in adolescence is warranted given that this population significantly differs from adults with the same disorder as adolescents not only experience multiple changes during development, but they may also need habilitation and not rehabilitation as well as a parental consent in order to be treated (Winters, 1999), and thus require a different treatment approach. Although the need to develop specific treatment approaches for adolescents with SUDs has been acknowledged since the 1950s, adults and adolescents were treated in the same way until the 1980s when research on this topic was initiated (White, Dennis & Tims, 2002). Therefore, given the public health impact of adolescent SUDs and the relatively recent growing body of research on this issue, the aim of the present review was to evaluate SUDs treatment efficacy in adolescence. We also provide an overview with regards to the relapse rates after treatment.

METHODS

We conducted a Medline and PsycInfo search using the following keywords: "rehabilitation" Or "treatment" And "adolescence" Or "youth" And "Substance Use disorder" specifying all the following names of substances: cocaine, marijuana, hashish, LSD, hallucinogens, amphetamines, phencyclidine, heroine, opiates. We selected only English articles focused on the treatment of adolescents with SUDs that provided specific outcome measures. All the articles (11) are summarized in Table 1. We also collected reviews and meta-analyses published from January 2010 to December 2014 on this topic. The most common outcome measures indicated in the clinical trials were: level of drug use (i.e. abstinence, minor lapse, and relapse) measured by urinalysis, structured and semi-structured interviews, legal and other behavioural problems, school performance, psychological adjustment, and treatment response and recovery.

By reviewing selected articles we identified some specific fields of interest, including effectiveness for all treatment approaches according to different levels of care, levels of SUDs severity, and

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Table 1.

Most relevant studies providing specific outcome measures concerning the treatment of adolescents with SUD

Authors	Setting	Sample	Use of drug	Follow-up	Treatment	Outcomes measures	Results
Killeen, T., et al.	Outpatient	31 subjects	Marijuana	10 weeks	CM	Urinalysis	CM is not useful as adjunctive treatment for outpatients but only for residential patients
*Santisteban, D.A., et al.	Outpatient	28 subjects	Marijuana, cocaine (only two adolescents reported metamphetamine use)	8 months	Family therapy	Drug use, parenting practices, behavioural problems	Family therapy significantly improved parenting practises and drug use
Hendriks, V., et al.	Outpatient	109 subjects	Cannabis	1 year	Multidimensional family therapy (MDFT) vs. CBT	Drug use, behavioural problems, treatment response and recovery	MDTF and CBT are equally effective in reducing drug use and behavioural problems. MDFT is better for patients with higher severity of SUD
Kelly, J.F., et al.	Outpatient	127 subjects	Marijuana (70.9%), alcohol (11.8%), heroin/narcotics (11.1%) and cocaine/ amphetamines (3.2%).	6 months	12-step group	Prior treatment; past 90 days substance use/severity and treatment; 12-step expectancies; treatment staff 12-step encouragement; parent 12-step perceptions; abstinence self-efficacy; biological verification of self-report	The attendance to the group is suggestive of goal of abstinence, prior groups attendance and prior SUD experiences. Participation is less common among less severe patients. Attendance to the groups strengthen and extend benefits of typical community outpatient program
Godley, S.H., et al.	Outpatient	320 subjects	Alcohol and cannabis	1 year	MET/CBT with and without ACC	Days of abstinence, substance use problem, recovery status at 1 year	The most cost-effective treatment is MET/CBT without ACC. ACC may be considered useful only for inpatients
Carroll, K.M., et al.	Outpatient	136 subjects	Marijuana	6 months	MET/CBT with and without CM; drug counseling (DC) with and without CM	Drug use and retention	CBT/MET with CM is superior to MET/CBT without CM and DC with and without CM.
Kaminer, Y., et al.	Outpatient	88 subjects	Alcohol and Marijuana	9 months	CBT/PET	Urinalysis and T-ASI	CBT is more effective than PET in older youths and males at 3-months. Worst outcomes are observed for adolescents with comorbid conduct disorder.
Hser, Y.I., et al.	Outpatient and inpatient (residential treatment, outpatient and short-term inpatient)	1167 subjects	Many of the patients before 25.4% were polydrug abusers (more than 3 drugs), 47.1% reported marijuana as their primary drug used, 20.6% alcohol use and 7.4% cocaine.	1 year	Many kinds of community-based treatment programs	Drug use, legal problems, psychological adjustment, and school performance	All treatments investigated in all the analyzed settings are effective in achieving multiple behavioural and psychological improvements but particular emphasis is placed on family therapy in both residential and outpatient programs
Waldrom, H.B., & Kaminer, Y	Outpatient	114 subjects	63% tobacco and marijuana, 8,7% alcohol, 2,6% cocaine/crack, 1,6% hallucinogens, 1,65 uppers, less than 1% opiates, sedatives, LSD, tranquilizers, inhalant, stimulants and downers	7 months	CBT/individual and group family therapy/group intervention	Days of drug use	Family therapy alone or combined is more effective when compared with the other treatment modalities alone
Winters, K.C., et al.	Outpatient/inpatient	245 subjects	86% cannabis 77% alcohol; 20% amphetamines, and 21% other drugs.	1 year	12-step program	Drug use	Attendance to the 12-step program significantly improves SUD in both settings. Completing treatment is related to improvement
Kaminer, Y., & Burleson, J.A	Outpatient	32 dual diagnosis patients	Alcohol and other drugs not specified	15 months	CBT/interactional treatment (IT)	Drug use, T-ASI	CBT and IT are equally effective in the long term period but CBT is superior in reducing severity of SUD

Cognitive-behavioural therapy = CBT; Contingency management = CM; Assertive continuing care = ACC; Motivational enhancement therapy = MET; Psychoeducation = PET; Teen-addiction severity index = T-ASI; Substance use disorder = SUD; *This study investigated a new family-based intervention called *Culturally Informed and Flexible Family-Based Treatment for Adolescent (CIFFTA)*

predictors and factors related to relapse rates. We also consulted a number of international experts in the field to determine whether studies selected were relevant for discussing the topic of this paper. The authors and experts consulted performed a careful analysis of the literature data and agreed on a number of key participants relevant to the aim of this paper. These are outlined in the sections below.

TREATMENT APPROACHES

In accordance with the American Society of Addiction Medicine patient placement criteria, Winters, Botzet & Fahnhorst (2011) summarized the treatment approaches into different levels of care. For all of these levels of care, the psychological approaches utilized can be summarized as follows: psychological approaches that include family therapy, cognitive-behavioural therapy (CBT), motivational enhancement therapy (MET), psychoeducation therapy (PET), contingency management (CM), twelve-step programs, therapeutic community (TC), and pharmacotherapy.

We present our results below regarding the efficacy for all therapeutic models addressing SUDs in adolescence.

TREATMENT EFFICACY

Twelve-Step Programs of Alcoholics Anonymous

We selected several studies focusing on specific kinds of outpatient and inpatient treatment for adolescents with SUDs. Two studies included in this review investigated the efficacy of twelve-step programs among these patients (Winters et al., 2000; Kelly, Dow, Yeterian & Kahler, 2010). Although this treatment approach is based on the tenets of one of the most common therapeutic interventions for SUDs in the United States (Hoffmann, Mee-Lee & Arrowhead, 1993), Alcoholics Anonymous (AA), only 2.3% of the participants are under the age of 21 (Anonymous, 2007, 2008). In both studies, the 12-step program was found to be efficacious in reducing drug abuse in adolescence among outpatients and inpatients (Winters et al., 2000; Kelly, Dow, Yeterian & Kahler, 2010). Interestingly, a significant and independent effect of AA/NA (Narcotics Anonymous) attendance on percent days abstinent was found, and was persistent after controlling for the effects of baseline percent days abstinent, prior outpatient/inpatient treatment and prior AA/NA participation, drug abstinence and drug abstinence goal, self-efficacy, and concurrent outpatient treatment session (Kelly, Dow, Yeterian & Kahler, 2010). The authors (Kelly, Dow, Yeterian & Kahler, 2010) also observed that participation in the program was less common among adolescent outpatients with less severe SUDs, as assessed using the Timeline Follow-Back (Sobell & Sobell, 1992), Form-90 (Miller & Del Boca, 1994), and substance use and treatment experiences in the past 90 days.

Cognitive-Behavioural Therapy and Motivational Enhancement Therapy

CBT is a promising therapeutic approach for young people with SUDs. CBT is based on the premise that thoughts influence behaviours and there are multiple ways to perceive and react to stressful environments (Beck & Weishaar, 2005). In the context of SUDs treatment, the goal of CBT is to change the adolescent's beliefs that contribute to drug use (Galanter, Glickman & Singer, 2007). We reviewed five studies that evaluated the efficacy of CBT by comparing it to family therapy (Hendriks, van der Schee & Blanken, 2011; Waldron et al., 2001), PET (Kaminer, Burleson & Goldberger, 2002), and interactional treatment (Kaminer & Burleson, 1999). In an addiction study, the authors investigated the effectiveness and cost-effectiveness of combination motivational enhancement therapy (MET) and CBT with and without Assertive Continuing Care (ACC) (Godley et al., 2010). In all studies, CBT was considered effective in reducing drug abuse, delinquent behaviours

(Hendriks, van der Schee & Blanken, 2011), and improved family function and psychiatric status (Kaminer & Burleson, 1999), particularly when combined with family therapy (Waldron et al., 2001) or with MET (Godley et al., 2010). It has also been found that CBT is superior to PET in older youth and males, but only in the short term (Kaminer, Burleson & Goldberger, 2002). Poorer outcomes for CBT were observed for adolescents with concomitant conduct disorder (Kaminer, Burleson & Goldberger, 2002). Finally, in a recent review, Waldron and Kaminer (Waldron & Kaminer, 2004) suggested that both group and individual CBT are associated with clinically significant reductions in adolescent substance use. Motivational enhancement therapy (MET) is a brief intervention in which the adolescent is invited to reflect on possible risks of his/her abuse and encouraged to develop new strategies for his/her lifestyle with respect to the youth's freedom of choice (Rollnick & Miller, 1995).

Behavioural Approaches

Contingency management (CM) is a procedure that reinforces positive behaviour change. It focuses on the notion that reinforced behaviours are more likely to reoccur; whereas, punished ones do not. Of the two studies on CM evaluated in this study, one found that CM, coupled with CBT, MET and family therapy, significantly reduced drug abuse among adolescents with SUDs (Carroll et al., 2006). The second study reviewed here concluded that CM was not an effective adjunct to standard community substance abuse treatment in adolescents with marijuana use disorders due to difficulty integrating into outpatient community substance abuse treatment programs (Killeen et al., 2012), as the CM method, although effective when packaged with some manual-based psychosocial treatments, is not associated with adjunctive benefits in standard community substance abuse treatment among adolescents with marijuana use disorder.

Family Therapy

Family therapy is widely utilized in the treatment of SUDs because of its theoretical approach suggesting that family and social relationships play an important role in the development and maintenance of SUDs (Copello, 2002). Four clinical trials included in this review evaluated the effectiveness of family therapy (Hser et al., 2001; Hendriks, van der Schee & Blanken, 2011; Waldron et al., 2001; Santisteban, Maite & Brian, 2011). All of these trials demonstrated that family therapy reduced drug use in patients involved in residential treatment programs (Hser et al., 2001). In a randomized clinical trial evaluating individual CBT, family therapy, combined individual and family therapy, and a group intervention in a sample of 114 substance-abusing adolescents, Waldron et al. (2001) reported significantly fewer days of use in participants who were treated with 4-month family therapy alone, and the combined interventions as well as reductions in percentage of days of use in those who underwent 7 months of combined and group interventions. However, in another randomized controlled trial of 109 adolescents with SUDs, it was found that family therapy was not superior to CBT on the main outcome measures (e.g., cannabis use, delinquent behaviour, treatment response and recovery at one-year follow-up, and treatment intensity and retention) (Hendriks, van der Schee & Blanken, 2011). Specifically, after 12 months, treatment intensity and retention were significantly higher with family therapy than with CBT. These results are in accord with previous findings which have highlighted the important role of family therapy for SUDs among adolescents (Liddle, 2004). Finally, a meta-analytic study examining the effects of outpatient treatment on substance use outcomes for adolescents with substance use disorders revealed that family therapy demonstrated the strongest evidence of comparative effectiveness when compared with group/mixed counselling, CBT, MET, and PET (Tanner-Smith, Wilson & Lipsey, 2013).

Therapeutic Community, Residential, and Assertive Continuing Care Programs

Residential substance use treatment programs are generally brief and limited interventions (e.g., 20 days) (SAMHSA, 2006). Therefore, adolescents with a severe SUDs and psychiatric comorbidity often benefit from long-term treatment away from home in a therapeutic community (TC). It has been shown that a TC is a potentially effective intervention in reducing substance use, criminality and unemployment experienced by addicted individuals (De Leon, 2004). Multiple large-scale studies (Simpson & Sells, 2002; Simpson, Joe & Brown, 1997; Hubbard et al., 1989) reported significant and persistent improvements after successful completion of a TC, in particular after 6–12 months following the residential treatment (Hubbard et al., 1997).

In a TC, adolescents are treated with different approaches such as individual or group counselling, 12-step program, PET, family therapy and CBT with the aim of reintegrating the young patients back into society, particularly those who have been involved with the criminal justice system. Patients in TC differ significantly from their outpatient counterparts in terms of severity of SUDs. They are usually older, with more psychiatric comorbidities and criminal problems, lower levels of education (Rounds-Bryant, Kristiansen & Hubbard, 1999), and are more likely to have a lifetime history of victimization (Shane et al., 2006). Moreover these patients usually fail to complete the residential program, particularly those with commercial health insurance, family history of SUDs and living with only one biological parent (Neumann et al., 2010).

In many treatment systems, adolescents who were admitted to residential treatment typically have the most severe alcohol or other SUDs and were at high risk of relapse. Thus, these individual may have greater difficulty transitioning back to their communities. Assertive Continuing Care (ACC) may be defined as a home-based continuing care approach lasting from 12 to 14 weeks and is mainly designed to increase linkage and retention. ACC demonstrated to be effective in continuing care for adolescents with less severe SUDs ameliorating short-term substance use outcomes (Godley et al., 2002; Godley et al., 2007). ACC has been less effective in outpatient settings (Godley et al., 2010).

Pharmacotherapy

With regard to pharmacotherapy for adolescents with SUDs, the evidence for effectiveness is weak. Bukstein and Cornelius (Bukstein & Cornelius, 2006) posited that this field needs further exploration before any conclusions about efficacy can be drawn. SUDs typically occur around the mid-20s when the maturation of adolescent brain has not been still completely achieved (Casey, Getz & Galvan, 2008; Luna & Sweeney, 2004). In a recent review conducted by Simkin and Grenoble (Simkin & Grenoble, 2010), the authors suggested that there is a paucity of research about pharmacotherapies for SUDs in adolescence because most participants with substance dependence were not diagnosed until early adulthood (e.g., after the age of 18 years). Changes in both volume and structure as well as individual differences in neural responses to reward may predispose some adolescent participants in this period to take more risks, exposing them to greater risk for negative outcomes (Casey, Getz & Galvan, 2008). Limited knowledge about efficacious pharmacotherapeutic interventions may stem from the fact that pharmacotherapy is usually reserved for adolescents with SUDs and a concomitant psychiatric disorder, particularly conduct disorder (King et al., 2000), and the Food and Drug Administration (FDA) has only approved medications for alcohol and opioids dependence in adolescence (Simkin & Grenoble, 2010).

In conclusion, our findings replicated the mentioned results of Tanner-Smith and colleagues who, in their 2013 meta-analysis,

established that family therapy is associated with the greatest effectiveness for adolescent outpatients in treatment for SUDs (Tanner-Smith, Wilson & Lipsey, 2013). They also documented that a reduction in substance use was better for marijuana/hashish than for alcohol and other drugs (e.g. heroin and cocaine) and that improvements were lower in males, in cases of high levels of psychiatric co-morbidities, and higher levels of alcohol related problems (Tanner-Smith, Wilson & Lipsey, 2013). However, the same authors stated that any definitive conclusions concerning the general advantages of family therapy cannot be drawn as there were some treatments with which family therapy has not been still compared and others for which there are too few studies to draw reliable findings.

RELAPSE RATES

Despite the fact that studies demonstrated the effectiveness of several kinds of treatments in different settings applied to patients with various levels of severity, relapse rates remain high in adolescents with SUDs. It has been established that 66% of patients relapsed 6 months after treatment, and the majority occurred sooner, within 3 months after the completion of treatment. The most common reasons for relapse were social pressure, negative affect and withdrawal (Cornelius et al., 2003). White and colleagues (White et al., 2004) examined possible predictors of relapse in 59 marijuana dependent adolescents and found that relapse occurred very frequently, especially for young people with SUDs and comorbid depression or ADHD. They also noted that a maternal history of substance abuse decreased the probability of completing treatment; however, the role of paternal abuse on treatment completion was marginal (White et al., 2004). Neuman and colleagues found that a family history of substance and/or alcohol abuse was associated with failure to complete treatment among SUDs adolescents (Neumann et al., 2010).

Strategies to avoid relapse include active aftercare, interchangeably mentioned as continuing care, (McKay, 2005; Scott, Foss & Dennis, 2005) as highlighted by Kaminer, Burleson & Burke (2008) who investigated the relation between active aftercare and relapse in adolescents treated for alcohol use disorders. Specifically, Continuing Care may be defined as: “the provision of a treatment plan and organizational structure that will ensure that a patient receives whatever kind of care he or she needs at the time. Thus, the continuing care program is flexible and tailored to the shifting needs of the patient’s level of readiness to change” (American Society of Addiction Medicine, 2001). They administered active aftercare to 177 adolescents with alcohol use disorders and demonstrated that active aftercare maintains or improves treatment outcomes by slowing down the expected post-treatment relapse.

In the evaluation of relapse risks in adolescents with SUDs, two variables have been studied: treatment variables and individual variables. The most relevant treatment variables are the status of discharge, the aftercare plan, the relationship with the therapist, and the alliance with the patient (Whitney, Kelly, Myers & Brown, 2002); whereas, the individual variables include psychiatric comorbidity, contact with drug-using peers, poor coping skills, and a lack of family support (Williams & Chang, 2000; Anderson et al., 2007). Anderson and colleagues (Anderson et al., 2007) also found that one of the most important factors that increase the incidence of relapse is the family environment and family history, including family history of alcohol and drug use disorders. Awareness of these individual and treatment factors has implications for SUDs treatment.

LIMITATIONS

The present review should be considered in light of some limitations. Our data did not permit us to carry out a meta-analysis due to the fact that the studies considered in this review assessed

patients at different time points and included different measurements, therefore relevant studies may have been inadvertently not included. Although the current review offers an overview on the phenomenon of SUDs among adolescents, the inclusion and exclusion of studies cited in this paper may reflect the authors' choice, both according to their expertise and the consultations that they engaged in with experts in the field. Moreover, some studies included in this review have several shortcomings. First, small sample sizes in some studies may have reduced the power to detect real effects. Second, interpretation of results may be difficult due to a number of methodological problems (e.g., the heterogeneity of the included studies in terms of different diagnostic criteria, changes related to the treatment of adolescent substance abuse, inclusion of highly selected clinical samples as well as the variability of the different medications which were used over time).

CONCLUSIONS

Adolescents with SUDs should be considered a separate group from adults with SUDs due to a number of factors and challenges associated with the developmental stage. Different therapies have been investigated showing the general efficacy of treatment when compared to no treatment. Also, psychological approaches, such as family therapy, behavioural therapy, CBT, and motivational enhancement therapy/motivational interviewing resulted among the treatment types associated with the most relevant substance use reductions. Family therapy and social support reduces the development and maintenance of SUDs. Consideration should also be given to other co-morbid diagnoses and specific needs related to adolescent development as this stage is vulnerable to the development of multiple behaviour problems than can persist without intervention. Given the high rates of relapse after treatment, it is important to evaluate a careful strategy even following treatment discharge. In this field, active aftercare approaches appear critical in reducing relapses. Special attention should be paid to the family and social environment of these youths in order to treat SUDs as well as to reduce the risk of relapses in this at-risk population.

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