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Multidimensional family therapy for adolescent drug users: a systematic review

Abstract: Adolescence is a period in human development during which people are more prone to risk-taking and less prone to impulse control. Some young people experiment with both licit and illicit substances during this time (alcohol, tobacco, cannabis and other drugs) and this can have an impact on their behaviour, their relationships with others and their functioning in society. For the few who develop substance use disorders, family has an important role in addressing this issue. Our report focuses on multidimensional family therapy — a process that includes the young person, their family and their environment. Initial experiments show that this holistic approach delivers promising results during therapy and that these can last after the treatment ends.

Five main studies carried out in the United States and the European Union are the starting point for our analysis and discussions. While initial results provided by the studies are promising, it appears important to assure implementation fidelity and family adherence, which in the most critical cases can be difficult. Furthermore, the relatively high cost of such treatment must be considered before recommending its general use.

Keywords Adolescence Cannabis Multidimensional family therapy Systematic review

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Background

Description of the condition

The majority of individuals who develop substance use problems report that their drug use began in adolescence (von Sydow et al., 2001).

In Europe, among young adults (15–34 years), lifetime prevalence of use is 32 % for cannabis, 6 % for cocaine, 5 % for amphetamines and 6 % for ecstasy (EMCDDA, 2011). In the 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD), 18 % of school students aged 15–16 reported lifetime use of illicit drugs (Hibell et al., 2012). Furthermore, around 58 % of clients entering treatment started using drugs before the age of 20 (EMCDDA, 2012).

Thus, substance experimentation in adolescence increases the risk of persistent substance use and dependence (Bauman and Phongsavan, 1999; Brook et al., 1999; Gil et al., 2004; Timberlake et al., 2007; Winters and Lee, 2008).

Early initiation into substance use appears also to be closely correlated with risky sexual behaviours, delinquency, chronic offending, depression, school failure and unemployment, troubled relationships with peers and family members, and low self-esteem throughout adolescence and adulthood (Guo et al., 2002; Stueve and O'Donnell, 2005). This is particularly true for high-risk subgroups such as runaways and the homeless, adolescents in drug treatment or suffering from mental disorders and those in the juvenile justice system (Malow et al., 2006; Rowe et al., 2010).

Description of the intervention

Multidimensional family therapy (MDFT) is an integrative, family-based, multiple systems-oriented treatment specifically targeted at adolescents who use drugs and exhibit related behaviour problems (Liddle, 2002). The goal is to reduce symptoms and to enhance developmental functioning by facilitating changes in several behavioural domains. Therapists work simultaneously in four interdependent treatment domains depending on the particular risk and protection profile of the individual and his or her family: (1) the adolescent domain helps adolescents to engage in treatment, communicate with, and relate effectively to, their parents and other adults, and to develop social competence and alternative behaviours to drug use; (2) the parent domain engages parents in therapy, increases their behavioural and emotional involvement with their children and improves parental monitoring and limit-setting; (3) the family interactional domain focuses on reducing conflict and improving emotional attachments and patterns of communication and problem-solving using multi-participant family sessions; and (4) the extrafamilial domain fosters family competency within all social systems in which the adolescent participates (e.g. school, the juvenile justice system, recreational facilities). Therapists meet alone with the adolescent, alone with the parent(s) and/or conjointly with the adolescent and parent(s), depending on the treatment domain and specific problem being addressed.

MDFT is a manualised intervention composed of four interdependent modules: (1) the adolescent module addresses developmental issues such as identity formation, peer relations, prosocial involvement and drug use consequences; (2) the parent module enhances parenting skills in the areas of monitoring and limit-setting, rebuilding parents' emotional bonds with the child and fostering parental participation in the teenager's life outside the family; (3) the family module facilitates changes in family relationships by helping family members to develop social and communication skills; and (4) the extrafamilial module seeks to establish positive relationships within all social systems in which the adolescent participates (e.g. family, school, peer group, community).

The overall intervention is administered in three stages. Stage 1 comprises a comprehensive assessment of problem areas to identify which of the multiple domains of the adolescent's life would benefit from intervention, to set goals and to identify specific areas treatment should target. Stage 2, the treatment stage, aims to promote and improve appropriate skills such as communication and problem-solving skills within and across the four domains. Stage 3 focuses on encouraging the family to maintain progress and to practise new behaviours in current and future real-world situations.

MDFT has been recognised and recommended by several agencies and organisations in the USA as a comprehensive, multicomponent, theoretically derived and empirically supported treatment for adolescent drug misuse. First implemented in 1985, the programme has been used at nearly 40 sites in 11 states among young people from diverse ethnic and socioeconomic backgrounds, in urban, suburban and rural settings, and in a variety of contexts (e.g. in home and residential treatment programmes, schools, detention centres, hospitals and mental health centres as well as with young people serving court-mandated programmes as an alternative to detention). MDFT is currently being implemented in several European countries, including Belgium, Germany, France, the Netherlands and Switzerland. These countries are involved in a collaborative evaluation study known as INCANT (International Cannabis Need of Treatment Project; see more at www.incant.eu, which includes a randomised controlled trial of MDFT, funded under Europe's Action Plan for Cannabis Research).

How the intervention works

MDFT brings together the clinical and theoretical approaches of developmental psychology and psychopathology, the ecological perspective and family therapy. Adolescent developmental psychology and psychopathology research have determined that: (1) the greatest influence on healthy identity formation and development is the family; (2) family influence helps to buffer the effect of deviant peer culture; and (3) adolescents need to develop an interdependent rather than an emotionally separated relationship with their parents. A multidimensional perspective holds that symptom reduction and enhancement of prosocial and normative developmental functions in problem adolescents can be achieved by targeting the family as the focus of the intervention. MDFT views family functioning as instrumental in creating new, developmentally adaptive lifestyle alternatives for the adolescent.

MDFT seems also to improve treatment engagement and retention of high-risk adolescents (Jackson-Gilfort et al., 2001; Liddle et al., 2006a). Multiproblem families require an intensive approach that involves the young people, their caregivers and extrafamilial support systems (Cunningham and Henggeler, 1999). Retention rates (i.e. completion of a full course of prescribed treatment) in controlled trials of family-based treatments have been uniformly high, typically from 70 % to 90 % (Liddle et al., 2004). Clients who remain in treatment experience better outcomes.

Family-based therapy appears to be effective in reducing not only drug use, but also problem behaviours associated with substance use such as delinquency and externalising and internalising symptoms. This is particularly relevant during adolescence, when substance misuse typically causes a constellation of problems (e.g. psychiatric symptoms, problems at school, delinquency, high-risk sexual behaviour). MDFT seems to be effective in adolescents of all backgrounds and ethnicity and can be delivered in a variety of routine care settings. Because adolescent substance users are found in numerous care settings (e.g. substance misuse treatment facilities, juvenile correction centres, mental health clinics, child welfare systems, schools), treatments that can be flexible will have great appeal to stakeholders and greater viability within and across sectors. MDFT is an example of family-based therapy that has been adapted and tested as an indicated preventative intervention for high-risk young people (Hogue et al., 2002, 2005), an early intervention for substance-using adolescents (Liddle et al., 2004), an outpatient treatment for adolescent drug misusers with co-occurring psychological problems (Liddle et al., 2001), an adjunctive family intervention integrated within a hospital-based day-treatment programme (Liddle et al., 2002b, 2006b), and an intensive home-based intervention with case management for adolescents in the juvenile justice system who exhibit co-morbid substance use and conduct disorders (Liddle, 2002).

Psychosocial approaches to treating drug-related problems in adolescents compared with MDFT in this review

Adolescent community reinforced approach (ACRA) is a behavioural intervention that aims to replace environmental factors that have supported substance use with activities and behaviours that support recovery.

Adolescent group therapy (AGT) is a group therapy model adapted to adolescents.

Cognitive behavioural therapy (CBT) is a psychotherapeutic treatment modality that can be offered in an individual or group format (Hofmann et al., 2013). It is empirically supported as a treatment for substance use disorders and has been shown to be effective in studies containing samples of primary cannabis users. Based on CBT's effectiveness in adults with addictive behaviours, outpatient CBT is often considered a standard, first-line treatment for adults with substance use disorders, though less evidence is available for adolescents. In general, CBT interventions involve challenging irrational, negative thinking styles that are thought to promote negative affective states, which in turn promote maladaptive behaviours, such as problem cannabis use. In addition to helping patients to develop new ways of thinking, CBT interventions promote the development of alternative coping skills and the implementation of behavioural strategies for reducing and eliminating problem behaviours (e.g. substance abuse). When CBT is used in substance abuse/dependence treatment, it tends to focus on changing maladaptive behaviours and cognitions related to substance abuse by means of self-control training (e.g. stimulus control techniques), social and coping skills training and relapse prevention. CBT practitioners sometimes incorporate motivational elements into the earliest stages of therapy when working with individuals who have substance use disorders; however, these interventions are often derived from motivational interview (MI)/motivational enhancement

treatment (MET) interventions, which will be discussed in more detail later. When CBT is used to treat problem cannabis use specifically, initial treatment sessions often involve developing skills directly related to achieving and maintaining abstinence (e.g. cannabis use self-monitoring, refusal and craving coping skills, increasing social support and non-drug-related activities, problem-solving training, coping with relapse). Later CBT sessions may focus on topics and skills indirectly related to maintaining abstinence (e.g. anger/frustration and anxiety/depression management, delinquent behaviour, impulse control, self-efficacy, effective communication).

Multidimensional family therapy (MDFT) (Liddle et al., 2001) is a family systems-oriented outpatient intervention for adolescents and young adults. It is empirically supported to be an effective treatment for cannabis use disorders. The intervention is designed to address problem cannabis use at four different levels: the adolescent; the adolescent's parents; the adolescent's family; and the adolescent's extrafamilial network, which includes friends, peers and school, work or leisure settings. The fundamental principle underlying MDFT is that the family is instrumental in treating problem cannabis use by helping the adolescent to create new, developmentally adaptive lifestyle alternatives. Thus, interventions are aimed at improving family functioning, communication and accountability. MDFT was originally launched as a cannabis-specific treatment (CST) in five European countries (Belgium, Germany, France, the Netherlands, and Switzerland) as part of the INCANT study (Rigter et al., 2010). The goal of the randomised controlled trial (RCT) was to introduce an evidence-based cannabis use treatment targeting adolescents in European countries. Currently, MDFT is the most widely offered systems-based CST programme in Europe.

Multifamily education intervention (MEI) consists of interventions used in mental health to inform and support patients' relatives.

Motivational enhancement therapy (MET) is a therapy for substance-use disorders that relies heavily upon the principles of MI.

Motivational interviewing (MI) is a client-centred, semi-directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence (Smedslund et al., 2011).

Why this review?

The effectiveness of available treatments for adolescent drug misusers is currently a reason for concern owing to the high rates of treatment drop-out and post-treatment relapse (Austin et al., 2005). Studies assessing the effectiveness of treatments for adolescent illicit drug users have not yet reached conclusive results (Austin et al., 2005; Littell et al., 2005; Waldron and Turner, 2008; Williams and Chang, 2000). The evidence needed to make informed clinical decisions about the most effective interventions for adolescents who misuse substances is still uncertain.

Although family-based therapies represent a promising approach for the treatment of drug misuse, there is a need to determine what family-based interventions work, and for which types of families and adolescent drug users.

Recent overviews of research on family-based treatments for adolescent illicit drug users suggest that MDFT may be effective (Baldwin et al., 2012; Becker and Curry, 2008; Hogue and Liddle, 2009; Rowe et al., 2010; Vaughn and Howard, 2004). However, as these studies do not conform to the standard methodology for systematic reviews, the possibility that their results are biased cannot be excluded. A protocol for a Campbell Collaboration review on 'Multidimensional Family Therapy (MDFT) for young people in treatment for non-opioid drug use' was recently published (Rasmussen et al., 2012).

The overall goal of this review is to systematically appraise the evidence on the effectiveness of MDFT in treating illicit drug misuse in adolescents. More specifically, the aim is to assess the effectiveness of MDFT, compared with other therapies or a placebo, in treating young people who misuse illicit drugs, in retaining patients in treatment and in reducing illicit drug misuse.

Methods

In order to select the studies for inclusion in this review, we set some criteria. We decided to search and include all the studies comparing MDFT with a control intervention for adolescent illicit drug misusers, provided they utilised an experimental design (e.g. RCTs and cluster RCTs).

In terms of participants, the studies were included if they involved adolescents (aged 11–18 years) reporting misuse [1] of illicit drugs and seeking treatment. Here the term 'adolescence' refers to both early (11–13 years of age) and middle (14–18 years of age) adolescence as currently classified by the American Academy of Child and Adolescent Psychiatry. The term 'misuse' refers to regular excessive consumption of and/or dependence on illegal psychoactive substances as defined by each of the studies included. Studies targeting special populations (e.g. drug-misusing incarcerated adolescents, drug-misusing adolescent offenders, drug-misusing adolescents with co-morbid psychiatric disorders) were excluded.

The intervention studied was MDFT as a standalone intervention compared with alternative treatments, no intervention or standard treatment; for example, interventions aimed at primary prevention were excluded.

The primary outcomes of interest were any measure of illicit drug use in the last week, month or year and frequency of consumption, either self-reported or otherwise. Secondary outcomes included any direct or indirect self-reported measures of retention in treatment, drug-related problems, antisocial behaviours, poor school performance and alcohol misuse.

The studies were excluded if they did not focus on illicit drugs, if participants did not seek treatment or if they were not adolescents, if the experimental intervention was not or not only MDFT and if the study design was not experimental.

Search strategy

In order to identify all the studies falling within our inclusion criteria, we performed structured web-based searches using a combination of relevant keywords. These search strategies were adapted to query the different specialised databases available, namely: the Cochrane Central Register of Controlled Trials (CENTRAL), an inventory of studies included in the systematic reviews of evidence; PubMed, the platform of the American National Library of Medicine, also called MEDLINE; and PsycINFO, a database grouping several American databases. The full search strategy for MEDLINE is available in Annex 4. We accepted references in all languages and to all publication statuses (i.e. studies published in scientific journals, dissertations and reports and unpublished studies were all given equal consideration when being assessed). We also inspected the reference lists of topic-related reviews and included and excluded studies in order to identify other potentially relevant studies. Concluding, on-going or unpublished studies were identified by searching the Internet and contacting authors. For example, the website of the developers of MDFT was searched.

Data collection and analysis

Two authors independently screened 107 titles and abstracts identified through the search strategies. When the abstracts suggested that the paper might be potentially relevant, the full text was read and the study was excluded if the focus was not on illicit drug use, if participants in the study were not illicit drug users seeking treatment and/or if the experimental intervention was not MDFT. Studies that were not RCTs were also excluded.

The assessment of the internal quality of the included studies was carried out by two independent reviewers using the Cochrane Collaboration's tool for assessing the risk of bias (Higgins and Green, 2011). Disagreements arising during either screening or quality assessment were resolved through discussion.

Authors of the selected studies were contacted by email, in accordance with the procedure suggested by the Cochrane Collaboration, and asked to provide supplementary information so that this could be included in the analysis and in order to gain related published or unpublished references or papers.

Results

Included studies

We included five studies, which were described in 22 publications (see References 'Studies included in this review'), and we excluded three studies which initially seemed to be eligible. A detailed description of the included studies can be found in Annex 1. The table includes an assessment of the risk of the studies giving distorted results because of methodological inaccuracies (the so-called 'risks of bias').

Study design and location

All five included studies were RCTs (in which the individual adolescent was randomly allocated to receive MDFT or a different intervention). Three trials were conducted at a single site (Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008) and two were multisite studies (Dennis et al., 2004; Rigter et al., 2013). Four of the five studies were conducted in the

[1] There are often cultural and social differences in the definitions of the terms 'abuse', 'use' and 'misuse'. The aim of this review was not limited by imposing an arbitrary distinction between these terms. We relied upon the definitions provided in each identified study.

United States of America (Dennis et al., 2004; Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008) and one in Europe (Rigter et al., 2013).

Participants

The total number of adolescents who participated in the five studies was 1 539, and numbers ranged from 83 (Liddle et al., 2004) to 450 (Rigter et al., 2013) per study. The study participants' mean age at baseline ranged from 13.7 years (Liddle et al., 2004) to 16.3 years (Rigter et al., 2013). In one of the studies, the age of participants was not reported. In all the studies, more boys than girls were included (from 74 % (Liddle et al., 2004) to 86 % (Rigter et al., 2013)). In terms of ethnicity, the participants in the studies conducted in the USA were predominantly white/Caucasian, African American or Hispanic (Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008; Dennis et al., 2004). In one study, the majority of participants were African American (72 %) (Liddle et al., 2008). In two studies, the participants were mainly white/Caucasian (Dennis et al., 2004; Liddle et al., 2001), with 61 % and 51 % respectively. One study (Liddle et al., 2001) included Asian participants and in another (Liddle et al., 2004) 42 % of participants were Hispanic and Haitian/Jamaican. Information on ethnic composition was not reported for the European study (Rigter et al., 2013), but it was specified that 40 % of participants were of first- or second-generation foreign descent. In all included studies, participants were drug users at the start of treatment (Dennis et al., 2004; Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008; Rigter et al., 2013). In one of the studies (Liddle et al., 2001), 51 % of participants were polydrug users while the remainder (49 %) used only marijuana and alcohol. Furthermore, in one of the studies by Liddle et al. (2008), 75 % of participants met criteria for cannabis dependence, 20 % the criteria for alcohol dependence and 13 % the criteria for other drug dependence; 13 %, 4 % and 2 %, met the criteria for cannabis, alcohol and other drug misuse, respectively. Criteria for general substance misuse and substance dependence were present in, respectively, 47 % and 16 % of patients in another study (Liddle et al., 2004).

In another study (Dennis et al., 2004), most participants (75 %) used at least one substance (alcohol included) weekly or daily and 71 % used cannabis weekly or daily. In the INCANT study (Rigter et al., 2013), 84 % of all participants qualified as cannabis dependent, with the remaining 16 % being cannabis users.

Interventions and comparisons ([2])

All the studies compared MDFT with another intervention. The European study, for example, compared MDFT with individual psychotherapy (Rigter et al., 2013). The implementation of individual psychotherapy varied between sites, but always included motivational interviewing and CBT in addition to individual substance misuse counselling. The first of the studies, conducted in 2001 (Liddle et al., 2001), compared MDFT with AGT and MEI in community clinical settings.

In fact, both MDFT and MEI are family-based interventions, but MDFT is applied within an individual family whereas MEI is provided to several families at once. MEI is more structured and more psycho-educationally focused than MDFT. AGT uses an adolescent peer group format and focuses on the individual adolescent and his or her psychosocial development. In another study (Liddle et al., 2008), MDFT was compared with individual CBT in office-based outpatient settings. CBT is an intensive intervention that focuses on increasing coping competence and training skills. It adopts a modular approach whereby the therapist selects treatment strategies based on the individual adolescent's needs.

MDFT was also compared with peer group therapy (Liddle et al., 2004), in which education was combined with skills training and social support. Four to six adolescents participated in each group, and each session was led by one therapist. The CYT study (Dennis et al., 2002) compared MDFT with five sessions of MET/CBT (MET/CBT5) and with the adolescent community reinforcement approach (ACRA) at two different sites. MET/CBT5 was the briefest individual and group approach, without any family involvement, while ACRA was primarily provided on an individual basis to the adolescent with some parent-only and family sessions. The number and duration of MDFT sessions provided was similar in all intervention groups in four trials (Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008; Rigter et al., 2013), and service delivery was also identical in these studies. The majority of the MDFT sessions were conducted in the home, while the peer group therapy was conducted mainly at clinic offices. In the CYT study, each condition focused on different modalities of service, hours of contact, lengths of stay and numbers of days of contact. MET/CBT5 consisted of two individual MET sessions and three group CBT sessions with the total duration of treatment being 6–7 weeks. ACRA comprises 10 individual sessions with the adolescent and four sessions with caregivers (two with the whole family) over a period of 12–14 weeks. MDFT is delivered in 12–15 sessions over a period of 12–14 weeks. In the INCANT study, MDFT and individual psychotherapy did not differ in session duration.

([2]) The characteristics of intervention treatment are reported in Annex 2.

Detailed comparisons

In total, five comparisons were made, as follows:

- MDFT versus family therapy: one study (Liddle et al., 2001)
- MDFT versus individual therapy: two studies (Liddle et al., 2008; Rigter et al., 2013)
- MDFT versus group therapy: two studies (Liddle et al., 2001; Liddle et al., 2004)
- MDFT versus a combination of individual and group therapy: one study (Dennis et al., 2004)
- MDFT versus a combination of individual and family therapy: one study (Dennis et al., 2004)

Around 11 different outcomes were measured in the studies. Four studies measured whether MDFT reduced general drug use; three studies measured the severity of general drug use/problem drug use.

The European study measured the prevalence of cannabis use disorder, whereas frequency of general drug use was measured in three studies (Liddle et al., 2004; Liddle et al., 2008; Dennis et al., 2004) and four studies measured the frequency of cannabis use (Dennis et al., 2004; Liddle et al., 2004; Liddle et al., 2008; Rigter et al., 2013). Three of these also measured the frequency of alcohol use (Dennis et al., 2004; Liddle et al., 2004; Liddle et al., 2008) and two measured the frequency of other drug use (Dennis et al., 2004; Liddle et al., 2008). Beyond drug use, three studies measured problem behaviours (Dennis et al., 2004; Liddle et al., 2001; Liddle et al., 2004) and two the school experience (Liddle et al., 2001; Liddle et al., 2004). Family functioning was measured in four studies (Dennis et al., 2004; Liddle et al., 2001; Liddle et al., 2004; Liddle et al., 2008).

Psychological well-being and possible psychiatric or personality disorders were measured in three studies (Dennis et al., 2004; Liddle et al., 2004; Liddle et al., 2008).

In three studies (Dennis et al., 2004; Liddle et al., 2001; Liddle et al., 2004), information on each adolescent was obtained from multiple sources, comparing self-reporting with parents' reports and, in one case, with urine tests to check for substance use.

In the first of the studies (Liddle et al., 2001), the investigators interviewed the adolescents and their parents separately and asked about the participants' frequency of drug use over the previous 30 days. Information collected from the interviews and urine analyses reports were reviewed by three experienced clinicians, who rated the severity of drug use. Some of the studies used validated checklists to measure the severity of substance use, such as the Personal Involvement with Chemicals (PIC) scale and the Personal Experience Inventory (PEI), a multi–scale self-report measure assessing the severity of a substance use problem and the psychological risks. In another study, adolescents' substance use was measured with the Timeline Follow-back (TLFB) method and the Problem Oriented Screening Instrument for Teenagers (POSIT) Substance Use and Abuse subscale. The TLFB method was used to determine substance use frequency. In this method, a calendar and other memory prompts are used to stimulate recall of previous substance use. Participants retrospectively report use of specific substances on each day over the 30-day period prior to each assessment. The total drug use score is the number of days in the previous 30 days on which participants have used any drug. POSIT is a self-report multi-problem screening instrument designed to screen for substance use and other problems.

Another measure used was the Global Appraisal of Individual Needs (GAIN), a standardised clinical assessment with eight main sections (including substance use). The GAIN was supplemented with additional measures including the Adolescent Reasons for Quitting (ARFQ) Questionnaire adopted from the Marijuana Treatment Project and a similar instrument dealing with tobacco use. Parents were asked to complete the Collateral Assessment Form (CAF), an assessment battery including questions about symptoms of substance use disorders and frequency of using cannabis, alcohol and other drugs.

In the European study, cannabis use disorder was assessed with the Adolescent Diagnostic Interview-Light (ADI-Light for cannabis), a brief, structured interview based on the criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th edition) for substance use disorders in adolescence. The frequency of the adolescents' cannabis use was measured using the TLFB method.

TABLE 1

Periodicity of assessment with the adolescents

Study	Treatment conclusion	3 months	6 months	9 months	12 months
Liddle et al. (2001)	•		•		•
Liddle et al. (2004)	•		•		•
Dennis et al. (2004)	•	•	•	•	•
Liddle et al. (2008)	•		•		•
Rigter et al. (2013)		•	•	•	•

TABLE 2
Summary of main results

Study	Multidimensional Family Therapy	Comparison	Reference
Use of cannabis and other drugs			
MDFT versus group therapy (AGT, peer group therapy)	++	+	Liddle et al. (2001)
MDFT versus family therapy (MEI)	++	+	Liddle et al. (2001)
MDFT versus individual therapy (CBT)	++	+	Liddle et al. (2004)
MDFT versus group therapy	++	+	Liddle et al. (2004)
MDFT versus a combination of individual and group therapy (MET and CBT-5 sessions)	++	+*	Dennis et al. (2004)
MDFT versus a combination of individual and family therapy (ACRA)	+	++	Dennis et al. (2002)
MDFT versus individual psychotherapy (INCANT individual sessions)	++	+	Rigter et al. (2013)
Effects on severity of drug use			
MDFT versus individual therapy (CBT)	++	+	Liddle et al. (2008)
MDFT versus peer group therapy	++	+	Liddle et al. (2004)

++ improvement in the outcomes in comparison with baseline and control group
+ improvement in the outcomes in comparison with baseline only
* the difference of the two groups was not statistically significant

In four studies (Dennis et al., 2004; Liddle et al., 2004; Liddle et al., 2008; Rigter et al., 2013), the instruments used for measuring drug use were validated (or their psychometric properties reported).

The instruments administered were self-report questionnaires in three trials (Liddle et al., 2004; Liddle et al., 2008; Rigter et al., 2013) and structured interviews in two trials (Dennis et al., 2004; Liddle et al., 2001). In some of the studies, the adolescents were interviewed in order to measure all of the aforementioned dimensions three months after initiating the study. In others, they were interviewed up to 12 months later. In particular, four studies assessed the participants at the end of the treatment period, two studies assessed the participants after three months from treatment completion, five studies after six months, two studies after nine months and five studies after 12 months (see Table 1).

Meta-analysis was not possible owing to the heterogeneity in the methods applied to measuring drug use. The main results are shown in Annex 1 and presented here in the form of a narrative systematic review.

Effects on drug use and abstinence

Reduction in drug use (including alcohol, marijuana and other drugs)

MDFT versus AGT

In one study (Liddle et al., 2001), MDFT was compared with AGT. After 12 months, both groups showed a reduction in drug use (including alcohol, marijuana and other drugs) but the MDFT groups obtained better, though not statistically significant, results.

MDFT versus MEI

The same study also compared MDFT with MEI finding similar results. After 12 months, both groups showed a reduction in drug use (including alcohol, marijuana and other drugs), which was greater in the MDFT group (–57 %) than in the MEI group (–27.6 %). The results were considered statistically significant.

MDFT versus CBT

Another study (Liddle et al., 2008) compared MDFT with CBT. In a 12-month assessment, in both groups the adolescents reported having reduced their cannabis use in the last 30 days, with the adolescents in the MDFT group reporting a higher reduction than the comparison group; however, the results were not considered statistically significant. During the same assessment, these adolescents also reported that their use of drugs (other than cannabis and alcohol) was reduced in the MDFT group (–91 %) but increased in the CBT group (+92 %), and the result was statistically significant. Furthermore, the proportion of young people reporting minimal substance use (no use of alcohol or drugs or use on only one occasion) at the 12-month evaluation was significantly higher in the MDFT group (64 %) than in the CBT group (44 %). The authors of the study wanted to check whether the effect of MDFT and CBT on substance use frequency differed according to drug use severity, but they did not find statistically significant differences between treatments in either the high-severity, or low-severity groups.

Alcohol use measured after 12 months was lower in the CBT group (–18 %) than in the MDFT group (+15 %) but the difference between the treatment groups was not significant.

MDFT versus peer group therapy

A further study (Liddle et al., 2004) compared MDFT with peer group therapy. After 12 months, the adolescents in the MDFT group reported a higher reduction in 30-day frequency of substance use (alcohol and drugs) than those in peer group therapy (–85 % and –28 %, respectively), and the difference between the groups was statistically significant. In addition, in both groups the adolescents reported a reduction in the use of any drugs (–72 % and –26 %, respectively); the probability of being abstinent was much higher for those in the MDFT group {2.20 [95 % confidence interval (CI) = 0.77–6.33]}. Furthermore, more adolescents completed the treatment in the MDFT group (97 %) than in the peer group therapy (72 %), and the result was statistically significant.

MDFT versus MET and CBT (5 sessions)

One study (Dennis et al., 2004) compared MDFT with MET/CBT5 and found a slightly higher number of days abstinent from cannabis use during 12 months among the adolescents of the MDFT group (257) than in the MET/CBT5 group (251), however the difference was not statistically significant.

MDFT versus ACRA

One study (Dennis et al., 2004) compared MDFT with ACRA and found that the mean total number of days abstinent from cannabis use over the 12-month follow-up period was slightly lower in the MDFT group.

MDFT versus individual psychotherapy

The European study (INCANT) compared MDFT with individual psychotherapy. At the 12-month assessment, a lower percentage of adolescents in the MDFT group reported dependence on cannabis (38 % vs. 52 % in the individual therapy group). Abuse of cannabis was reported by 33 % of adolescents in the MDFT group and 22 % in the individual psychotherapy group, and a higher percentage of adolescents no longer experienced cannabis use disorder in the MDFT group than in the individual psychotherapy group (18 % and 15 %, respectively). MDFT also obtained better results in terms of the number of dependence symptoms during the 12 months from the beginning of the treatment and mean number of consumption days (these were reduced by 43 % (35 days) in the MDFT group and by 31 % in the individual psychotherapy group). Nevertheless, both treatments reduced the number of cannabis consumption days across assessments. The frequency of cannabis consumption fell more in the high-severity MDFT group than in the individual psychotherapy group.

Effects on severity of drug use

MDFT versus CBT

In the study which compared MDFT with CBT (Liddle et al., 2008), the reduction in the severity of drug use problems was greater in the MDFT group (–59 %) than in the CBT group (–29 %). In both groups, this change from the beginning of the treatment was statistically significant. Nevertheless, the reduction in substance use problem severity was significantly greater in the MDFT group than in the CBT group after the six-month assessment and 12-month follow-up, but not at intake or at treatment completion.

The authors conducted an analysis in the group with the lower severity drug use and did not find differences among the two comparison groups, whereas in the higher severity subgroup, there were statistically significant differences in treatment effects in favour of MDFT.

MDFT versus peer group therapy

The study comparing MDFT with peer group therapy (Liddle et al., 2004) found an equally distributed reduction in the number of substance-related problems at the 12-month follow-up in both the MDFT group and the peer group therapy group (–79 % and –27 %, respectively), with the reduction being significantly higher in the MDFT group. The drop in the number of participants reporting any substance use problems was greater in the MDFT group (–65 %) than in the peer group therapy group (–32 %), but the difference between the groups was not statistically significant.

Discussion

The aim of this systematic review was to evaluate the effectiveness of MDFT. The inclusion criteria led to five RCTs being considered for analysis: four from the USA and one from Europe. All of the studies showed that MDFT and the other treatments considered led to a reduction in substance use.

The studies provide some evidence that MDFT is more effective in reducing drug use (alcohol, marijuana and other drugs) than either MEI or peer group therapy, and more

effective than individual psychotherapy in reducing the risk of cannabis dependence. Compared with CBT, MDFT appears to be more effective in reducing drug problem severity and use of other drugs (i.e. drugs other than cannabis and alcohol), but not in reducing cannabis use or promoting minimal substance use (use of alcohol or drugs on zero or one occasions). On the other hand, MDFT appears to be equivalent to AGT in reducing drug use (alcohol, marijuana and other drugs) and to ACRA and MET/CBT5 in increasing the number of days abstinent from cannabis use. As for secondary outcomes, it appears that MDFT reduces substance use-related problems more than peer group therapy and decreases drug use problem severity more than CBT.

MDFT therefore seems to be an effective treatment option for adolescent cannabis users. MDFT also appears to be more effective in decreasing the number of cannabis consumption days compared with individual psychotherapy and in reducing drug use problem severity compared with CBT in subgroups of high-risk adolescents. Thus, MDFT could be indicated for adolescents who are heavy cannabis users or who have a severe drug use disorder.

The effects of MDFT seem to persist over time and, in most cases, the results at the 12-month follow-up are better than those observed at the previous follow-ups. Positive outcomes at discharge and in the period immediately following treatment end are maintained among MDFT-treated adolescents over time.

These results appear to be sustained by recent meta-analyses suggesting that family therapy has a modest added benefit beyond treatment in comparison with usual and alternative treatments (Baldwin et al., 2012; Waldron and Turner, 2008).

Another result of the review is that MDFT appears to be more acceptable to clients than other treatments, as the adolescents tend to remain in treatment until its completion.

Moreover, several studies have shown that treatment engagement and successful outcomes can be more difficult to achieve in adolescents who have co-occurring substance use and problem behaviours (Cornelius et al., 2003; Grella et al., 2001; Rowe et al., 2004).

The level of engagement and follow-up rates in the MDFT arms of the studies included were good, as was intervention fidelity. The treatments were reasonably acceptable to the adolescents and their families, as evidenced by reported participation and retention rates.

MDFT has been tested against distinct alternatives for adolescent substance misuse in terms of modality (e.g. individual, group, family), orientation (e.g. cognitive, behavioural, educational, family system) and dose (sessions and intensity). Compared with other treatments, MDFT is characterised by its longer duration and higher intensity; the higher treatment dose could explain the added benefits of MDFT compared with less intense treatments and treatments of shorter duration (e.g. CBT).

The quality of included studies was generally acceptable: they were all randomised trials, and most of them incorporated some element of concealment or blinding, even though these are not common characteristics of behavioural interventions. However, although the populations under study were larger than in many pharmacological trials, it was not possible to conduct a meta-analysis because of the considerable variability in outcomes across studies, the lack of numerical information — such as absolute numbers — in many publications and, in particular, the variability in comparison treatments (MEI, AGT, CBT, and so on), all of which prevent any pooling of data.

In conclusion, our results support the use of MDFT as a treatment for established substance misuse and related problems in young people, even if its superiority to all possible alternatives has not been established. The advantages of MDFT are its capacity to reduce substance abuse problems, the low drop-out rate and the long duration of effects. A possible explanation of these effects is that MDFT is delivered at higher intensity than other treatments, suggesting the need for an accurate cost–benefit analysis.

Implications for practice

MDFT can be adopted in practice for the treatment of adolescent illicit drug use, provided local resources can implement such an intensive programme.

As intervention techniques are linked to positive outcomes in adolescents (Hogue et al., 2006, 2008a), it is necessary for professionals to guarantee implementation fidelity. To this end, the creators of MDFT have also developed the Therapist Behaviour Rating Scale (TBRS) — an observational measure of adherence and competence in family-based therapy for adolescent substance abuse (Hogue et al., 2008b), which is recommended as a tool for practice.

Since effectiveness requires all members of the families concerned to engage with the treatment, adherence is another critical issue to be considered in implementation, and this may be an obstacle when offering this intervention to more problematic adolescents (i.e. those whose families are not available to take part in the therapy).

Conclusions

The present review is based on five studies, four of which were carried out by the same investigators in the USA across seven years, the fifth being a multisite study conducted in Europe. Further studies may be needed to confirm the preliminary positive results presented in this paper.

Two specific questions must be addressed: which profile of adolescent substance misusers is most likely to benefit from MDFT, and what is its cost–benefit balance compared with other alternatives?

References

Studies included in this review (bold indicates the major publication for each study)

Study 1: Liddle et al. 2001 (published data)

Liddle, H. A., Dakof, G., Parker, K., Diamond, G., Barrett, K. and Tejeda, M. (2001), 'Multidimensional Family Therapy for adolescent drug abuse: results of a randomized clinical trial', *American Journal of Drug and Alcohol Abuse* 27, pp. 651–688.

Study 2: Liddle et al. 2008 (published data)

Henderson, C., Dakof, G., Greenbaum, P. and Liddle, H. A. (2010), 'Effectiveness of Multidimensional Family Therapy with higher severity substance-abusing adolescents: report from two randomized controlled trials', *Journal of Consulting and Clinical Psychology* 78, pp. 885–897.

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Hogue, A., Dauber, S., Chinchilla, P., et al. (2008b), 'Assessing fidelity in individual and family therapy for adolescent substance abuse', *Journal of Substance Abuse Treatment* 35, pp. 137–147.

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Study 3: Liddle et al. 2004 (published data)

Henderson, C., Rowe, C., Dakof, G., Hawes, S. and Liddle, H. A. (2009), 'Parenting practices as mediators of treatment effects in an early-intervention trial of Multidimensional Family Therapy', *American Journal of Drug and Alcohol Abuse* 35, pp. 220–226.

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Study 4: CYT (Cannabis Youth Treatment) (published data)

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Dennis, M., Godley, S., Diamond, G., et al. (2004), 'The Cannabis Youth Treatment (CYT) study: main findings from two randomized trials', Journal of Substance Abuse Treatment 27, pp. 197–213.

Diamond, G., Godley, S., Liddle, H. A. et al. (2002), 'Five outpatient treatment models for adolescent marijuana use: a description of the Cannabis Youth Treatment Interventions', *Addiction* 97, pp. 70–83.

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Study 5: INCANT (INternational CAnnabis Need for Treatment) (published data)

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Studies not included in this review (bold indicates the major publication for each study)

Study 1: MDFT-DCT (Multidimensional Family Therapy — Detection to Community) (published data)

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Study 2: Rowe and Liddle 2008 (published data)

- **Rowe, C. and Liddle, H. A. (2008), 'When the levee breaks: treating adolescents and families in the aftermath of Hurricane Katrina', Journal of Marital and Family Therapy 34, pp. 132–148.**
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Study 3: Liddle et al. 2002a (unpublished data)

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Annexes

Abbreviations used in the annexes

ACRA	adolescent community reinforcement approach
AGT	adolescent group therapy
CBT	cognitive–behavioural therapy
CI	confidence interval
CYT	Cannabis Youth Treatment
DSM-IV	*Diagnostic and Statistical Manual of Mental Disorders,* 4th edition
FSN	family support network
FU	follow-up
HS	high severity
IP	individual psychotherapy
ITT	intention to treat
LS	low severity
MDFT	multidimensional family therapy
MEI	multifamily educational intervention
MET/CBT5	five sessions of motivational enhancement treatment with CBT
MET/CBT12	12 sessions of MET and CBT
NR	not recorded
NS	not significant
OR	odds ratio
RCT	randomised controlled trial
SD	standard deviation
SE	standard error

Annex 1

Characteristics of included studies

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Methods					
Design	RCT	RCT	RCT	RCT	Multicentre RCT with an open-label, parallel-group design
Follow-up	6 and 12 months after treatment termination	6 and 12 months after treatment termination	6 and 12 months after treatment intake	3, 6, 9 and 12 months	3, 6, 9 and 12 months after treatment termination
Attrition	16 %	22 %	36 %	15 %	NR
Intention to treat	NR	Yes	Yes	Yes	Yes
Unit of randomisation	Individual adolescent	Individual adolescent	Individual adolescent	Individual adolescent	Individual adolescent
Participants					
Number of individuals randomised:					
Intervention	NR	NR	NR	NR	NR
Control	Control 1: NR Control 2: NR	NR	NR	NR	NR
Total	NR	287	130	702	721
Number of individuals participating:					
Intervention	NR	112	40	100 (MDFT)	212
Control	Control 1: NR Control 2: NR	112	43	Control 1 (MET/CBT5): 102 Control 2 (MET/CBT12): 96 Control 3 (FSN): 102 Control 4 (MET/CBT5): 100 Control 5 (ACRA): 100	238
Total	182	224	83	600	450
Number of individuals analysed:					
Intervention	47	112	40	100 (MDFT)	212
Control	Control 1: 53 Control 2: 52	112	43	Control 1 (MET/CBT5): 102 Control 2 (MET/CBT12): 96 Control 3 (FSN): 102 Control 4 (MET/CBT5):100 Control 5 (ACRA): 100	238
Total	152	224	83	600	450
Age (in years)	Mean 15.9 (SD 1.4), range 13–18	Mean 15.4 (SD 1.23), range 12–17.5	Mean 13.73 (SD 1.1), range NR	13–14: 15 %; 15–16: 55 %; 17–18: 30 %	Mean 16.3 (SD 1.2), range 13–18
Sex (male)	80 %	81 %	74 %	83 %	85 %

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Ethnicity	Hispanic: 15 %; African American: 18 %; Asian: 6 %; white non-Hispanic: 51 %; other: 10 %	Hispanic: 10 %; African American: 72 %; white non-Hispanic: 18 %	Hispanic: 42 %; African American: 38 %; Haitian or Jamaican: 11 %; white non-Hispanic: 3 %	White: 61 %, African American: 30 %; Hispanic: 4 %	NR (40 % were of first- or second-generation foreign descent)
Country	USA	USA	USA	USA	Belgium, Germany, France, Netherlands, Switzerland
Illicit drug use	Polydrug users: 51 %; strictly marijuana and alcohol users: 49 %	75 % met DSM-IV criteria for cannabis dependence and 13 % for other drug dependence; 13 % met DSM-IV criteria for cannabis abuse and 2 % for other drug abuse	47 % met criteria for substance use; 16 % met criteria for substance dependence	86 % met criteria for a cannabis-related disorder; 12 % reported substance use disorders	Dependent on cannabis: 84 %
Interventions					
Type	MDFT	MDFT	MDFT	MDFT	MDFT
Treatment retention	30 % did not complete MDFT, 35 % dropped out of MEI, 47 % dropped out of AGT. The percentage of participants completing treatment was higher in the MDFT condition than in the AGT condition (70 % vs. 53 %, $p = 0.03$). Treatment retention rates between the two family-based treatments — MDFT (70 %) and MEI (65 %) — were not significantly different	–	–	–	–
Fidelity	NR	90 % of participants in each condition successfully completed therapy	97 % of young people in MDFT completed treatment compared with 72 % in AGT. None of the MDFT participants, compared with 7 % of the peer group therapy participants, failed to attend at least one treatment session. The percentage of participants completing treatment was higher in the MDFT condition than in the AGT condition (97 % vs. 72 %, $p < 0.05$)	71 % completed treatment	NR
Duration/frequency	Each of the three treatments consisted of a minimum of 14 and a maximum of 16 weekly sessions, which covered a period of 5–6 months in a clinic setting. Treatment dosage and duration were equalised across the three intervention groups	MDFT and CBT were delivered in 60- to 90-minute weekly sessions. Both treatments were designed to be 4–6 months in duration	Both treatments were conducted twice a week (90-minute sessions) for 12–16 weeks	12–14 weeks	5–7 months

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Control	Control 1: AGT Control 2: MEI MDFT was compared with two manualised active treatments, AGT and MEI, with 182 clinically referred marijuana- and alcohol-abusing adolescents. All treatments consisted of 14–16 90-minute sessions conducted over 5–6 months in an outpatient office or clinic. MDFT used a family therapeutic approach with individual families, while MEI served groups of three or four families in a more structured and psycho-educational setting. AGT consisted of groups of six to eight adolescents led by two therapists and emphasised the development of social skills, self-control, self-acceptance and problem-solving skills	Individual CBT MDFT was compared with an empirically supported individual-based adolescent treatment (CBT) with 224 primarily male and African American adolescents referred to a drug treatment clinic. Adolescents who met DSM-IV criteria for cannabis, alcohol and/or other drug dependence were assigned to one of two manual-based treatment conditions — MDFT or CBT — consisting of 60- to 90-minute sessions conducted weekly in an outpatient office setting. Adolescents in the CBT condition received individual therapy, although parents attended the first two treatment sessions. CBT sessions first aimed to prioritise problems and construct a treatment 'contract' and then focused on information/education and providing problem-solving skills training	AGT MDFT was tested as an early intervention for 83 young minority adolescents referred for drug treatment in Miami	Control 1: MET/CBT5 Control 2: MET/CBT12 Control 3: FSN Control 4: ACRA In two trials of a randomised controlled study (CYT), five manual-driven treatment interventions for adolescents with cannabis-related disorders were compared across four sites. Trial 1 compared the following interventions at two sites: MET/CBT5; MET/CBT12; FSN Trial 2 compared the following interventions at two sites: MDFT; ACRA; MET/CBT5	IP
Outcomes	**Drug use from intake to 12-month follow-up (FU) —mean (SD)** *MDFT* Intake: 9.89 (3.79) Termination: 4.79 (3.20) 6-month FU: 5.04 (3.77) 12-month FU: 4.25 (2.98) *AGT* Intake: 8.83 (2.76) Termination: 7.33 (3.41) 6-month FU: 6.21 (3.66) 12-month FU: 5.08 (3.71) *MEI* Intake: 10.03 (3.45) Termination: 7.26 (5.05) 6-month FU: 6.87 (3.79) 12-month FU: 7.26 (3.97)	**Drug use problem severity — mean (SD)** *MDFT* Intake: 28.47 (17.36) Termination: 19.75 (18.18) 6-month FU: 18.88 (17.86) 12-month FU: 11.66 (17.67) *CBT* Intake: 27.41 (15.65) Termination: 27.39 (19.71) 6-month FU: 20.35 (18.73) 12-month FU: 19.43 (20.30) Both treatments showed statistically significant decreases. The greater decrease was associated with MDFT [6-month FU ($t = 2.12$, $p < 0.05$, $d = 0.039$), 12-month FU ($t = 2.32$, $p < 0.05$, $d = 0.59$)]	**Substance use problems — mean (SD)** *MDFT* Intake: 0.63 (0.78) 6-week FU: 0.13 (0.37) Termination: 0.11 (0.28) 6-month FU: 0.08 (0.25) 12-month FU: 0.13 (0.30) *Peer group* Intake: 0.64 (0.71) 6-week FU: 0.37 (0.52) Termination: 0.37 (0.69) 6-month FU: 0.44 (0.70) 12-month FU: 0.47 (0.72) Significant reductions in both treatments in the number of substance-related problems over the 12-month FU ($b = -0.24$, pseudo-$z = -8.35$, $p < 0.001$). Significant treatment effect with greater reduction in MDFT ($b = -0.14$, pseudo-$z = -10.47$, $p < 0.001$, 95 % CI −0.16 to −0.11)	Total days of abstinence over 12 months was not significantly different by site or condition (within and across sites): MET/CBT5 = 251 ACRA = 265 MDFT = 257 Effect size = 0.06 (ns)	**Prevalence of cannabis dependence diagnosis — n (%)** *Belgium* *MDFT* Baseline: 29/30 (97 %) 12-month FU: 13/30 (43 %) Difference: 54 % *IP* Baseline: 28/30 (93 %) 12-month FU: 12/30 (40 %) Difference: 40 % *France* *MDFT* Baseline: 29/38 (76 %) 12-month FU: 13/38 (34 %) Difference: 42 % *IP* Baseline: 46/63 (73 %) 12-month FU: 24/63 (38 %) Difference: 35 %

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Outcomes	Changes across time from intake to termination to the FU periods for all subjects were significant ($F = 31.45$, $p = 000$). The interaction of time × treatment was also significant ($F = 2.68$, $p = 0.05$). At 12 months MDFT was not significantly different from MEI ($t = -3.59$, $p = 0.0006$) and AGT was significantly different from MEI ($t = -2.36$, $p = 0.02$). **Problem behaviour from intake to 12-month FU — mean (SD)** *MDFT* Intake: 83.34 (20.62) Termination: 71.87 (17.59) 6-month FU: 67.22 (17.15) 12-month FU: 63.56 (20.14) *AGT* Intake: 75.80 (26.61) Termination: 72.68 (26.02) 6-month FU: 66.36 (21.11) 12-month FU: 61.80 (16.92) *MEI* Intake: 83.42 (24.09) Termination: 77.45 (22.93) 6-month FU: 75.51 (24.29) 12-month FU: 71.57 (23.44) Changes across time from intake to termination to the FU periods for all subjects were significant ($F = 12.55$, $p = 001$). The interaction of time × treatment was not significant ($F = 1.15$, $p = 0.32$). Comparisons were not statistically different at 12 months	**Cannabis use — mean (SD)** *MDFT* Intake: 10.41 (11.38) Termination: 5.12 (8.30) 6-month FU: 5.77 (8.58) 12-month FU: 4.30 (10.15) *CBT* Intake: 11.89 (12.71) Termination: 9.83 (15.56) 6-month FU: 6.74 (11.95) 12-month FU: 6.41 (11.23) Both treatments showed statistically significant decreases. There were no treatment effects for 30-day frequency of cannabis use **Other drug use — mean (SD)** *MDFT* Intake: 1.63 (5.07) Termination: 0.55 (2.31) 6-month FU: 0.37 (1.56) 12-month FU: 0.14 (0.65) *CBT* Intake: 0.52 (1.41) Termination: 1.43 (5.97) 6-month FU: 0.32 (1.54) 12-month FU: 1.00 (4.00) Significant between-treatment differences (t = −2.14, $p < 0.05$, d = 0.032) **Alcohol use — mean (SD)** *MDFT* Intake: 1.74 (3.20) Termination: 1.43 (3.61) 6-month FU: 1.70 (5.41) 12-month FU: 2.00 (4.64) *CBT* Intake: 2.66 (7.28) Termination: 1.61 (3.94) 6-month FU: 0.96 (2.72) 12-month FU: 2.17 (4.73)	**Any problems — *n* (%)** *MDFT* Intake: 20 (50) 6-week FU: 5 (12) Termination: 6 (15) 6-month FU: 4 (10) 12-month FU: 7 (18) *Peer group* Intake: 22 (51) 6-week FU: 17 (40) Termination: 12 (28) 6-month FU: 14 (33) 12-month FU: 15 (35) Significant reductions in both treatments in the number of youths reporting any substance-related problems over the 12-month follow-up (pseudo-$z = -4.29$, $p < 0.001$). No treatment effect ($b = -0.34$, pseudo-$z = -1.27$, ns). **30-day substance use frequency — mean (SD)** *MDFT* Intake: 0.78 (1.02) 6-week FU: 0.21 (0.56) Termination: 0.14 (0.54) 6-month FU: 0.22 (0.62) 12-month FU: 0.12 (0.35) *Peer group* Intake: 1.20 (0.98) 6-week FU: 0.75 (0.98) Termination: 0.95 (1.13) 6-month FU: 0.85 (0.88) 12-month FU: 0.86 (0.88) Significant reductions in both treatments in substance use frequency over the 12-month follow-up. Significant treatment effect ($b = -0.013$, pseudo-$z = -3.51$, $p < 0.001$, 95 % CI −0.19 to −0.05, $d = 0.77$)		*Germany* *MDFT* Baseline: 51/59 (86 %) 12-month FU: 26/59 (44 %) Difference: 42 % *IP* Baseline: 55/61 (90 %) 12-month FU: 43/61 (71 %) Difference: 19 % *Netherlands* *MDFT* Baseline: 37/55 (66 %) 12-month FU: 16/55 (29 %) Difference: 37 % *IP* Baseline: 37/54 (69 %) 12-month FU: 30/54 (56 %) Difference: 13 % *Switzerland* *MDFT* Baseline: 28/30 (93 %) 12-month FU: 13/30 (43 %) Difference: 50 % *IP* Baseline: 29/30 (97 %) 12-month FU: 15/30 (50 %) Difference: 47 % *Total* *MDFT* Baseline: 173/212 (82 %) 12-month FU: 81/212 (38 %) Difference: 44 % *IP* Baseline: 195/238 (82 %) 12-month FU: 124/238 (56 %) Difference: 30 % **Days of cannabis use in the past 90 days — mean (SD)** *Belgium* *MDFT* Baseline: 68.4 (20.6) 3-month FU: 52.3 (30.6) 6-month FU: 51.1 (30.4) 9-month FU: 46.7 (27.3) 12-month FU: 42.5 (29.69)

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Outcomes		Both treatments showed a small trend associated with decreases in participants as a whole; no significant differences between treatments **30-day minimal use — *n* (%)** *MDFT* Intake: 8 (7) Termination: 27 (42) 6-month FU: 28 (42) 12-month FU: 47 (64) *CBT* Intake: 6 (4) Termination: 23 (39) 6-month FU: 24 (45) 12-month FU: 28 (44) Significant differences between treatments ($\chi^2 = 5.43$, $p = 0.020$). For the LS class of substance use problem severity, results indicated that the two treatments showed similar effects (treatment coefficient for slope = 0.43, SE = 1.17, pseudo-$z = 0.37$, $p = 0.712$, $d = 0.12$). For the HS class, there were significant differences in treatment effects, indicating that MDFT participants decreased their substance use problem severity more than CBT participants did (holding constant the effects of total number of diagnoses and family conflict) (treatment coefficient for slope = 5.63, SE = 1.95, pseudo-$z = 2.89$, $p = 0.004$, 95 % CI 1.73–9.52, $d = 1.58$). For substance use frequency, there were no significant differences in treatment effects in either class: HS, treatment coefficient for slope = 0.32, SE = 0.35, pseudo-$z = 0.91$, $p = 0.907$; LS, treatment coefficient for slope = –0.07, SE = 0.54, pseudo-$z = -0.13$, $p = 0.916$	**Any use — n (%)** *MDFT* Intake: 18 (45) 6-week FU: 6 (15) Termination: 4 (10) 6-month FU: 6 (15) 12-month FU: 5 (13) *Peer group* Intake: 31 (72) 6-week FU: 20 (47) Termination: 21 (49) 6-month FU: 25 (58) 12-month FU: 23 (54) Significant reductions in both treatments in youth reporting any substance use over the 12-month follow-up. Significant treatment effect ($b = -0.073$, pseudo-$z = -2.98$, $p = 0.003$, 95 % CI 0.24–1.23, OR 2.20) **Frequency of delinquent acts in the past 30 days — mean (SD)** *MDFT* Intake: 0.80 (1.01) 6-week FU: 0.19 (0.58) Termination: 0.15 (0.38) 6-month FU: 0.41 (0.73) 12-month FU: 0.36 (0.73) *Peer group* Intake: 0.88 (1.05) 6-week FU: 0.54 (0.95) Termination: 0.58 (1.03) 6-month FU: 0.68 (1.15) 12-month FU: 0.66 (1.04) No significant reduction in both treatments in frequency of delinquency. Significant treatment effect with greater decrease in MDFT ($b = -0.09$, pseudo-$z = -2.43$, $p < 0.05$, 95 % CI –0.17 to –0.02, $d = 0.31$)		*IP* Baseline: 66.7 (23.1) 3-month FU: 60.4 (27.5) 6-month FU: 59.7 (29.5) 9-month FU: 52.7 (29.1) 12-month FU: 62.2 (31.5) *Germany* *MDFT* Baseline: 58.8 (28.2) 3-month FU: 26.4 (30.5) 6-month FU: 20.1 (27.1) 9-month FU: 21.6 (29.5) 12-month FU: 21.3 (27.1) *IP* Baseline: 62.3 (24.1) 3-month FU: 37.5 (27) 6-month FU: 35.3 (29) 9-month FU: 32.6 (30) 12-month FU: 36.7 (33.6) *France* *MDFT* Baseline: 60.2 (24.7) 3-month FU: 38 (31.5) 6-month FU: 39.5 (34.8) 9-month FU: 36.6 (36.1) 12-month FU: 30.9 (32.8) *IP* Baseline: 63.2 (26.8) 3-month FU: 46.4 (31.1) 6-month FU: 36.2 (29.9) 9-month FU: 41.2 (32.9) 12-month FU: 35.2 (29.1) *The Netherlands* *MDFT* Baseline: 62.6 (22.7) 3-month FU: 44.1 (32.5) 6-month FU: 37.0 (29.9) 9-month FU: 48.1 (34.3) 12-month FU: 42.4 (34.2) *IP* Baseline: 60.9 (23.7) 3-month FU: 47.1 (32.3) 6-month FU: 46.4 (32) 9-month FU: 47.9 (29.3) 12-month FU: 49 (34.1)

	Study 1 (Liddle et al., 2001)	Study 2 (Liddle et al., 2008)	Study 3 (Liddle et al., 2004)	Study 4 (CYT)	Study 5 (INCANT)
Outcomes			Any delinquency — *n* (%) *MDFT* Intake: 19 (48) 6-week FU: 4 (10) Termination: 6 (15) 6-month FU: 11 (28) 12-month FU: 9 (23) *Peer group* Intake: 22 (51) 6-week FU: 14 (33) Termination: 14 (33) 6-month FU: 13 (30) 12-month FU: 14 (33) No significant reduction in both treatments in the number of youths reporting any delinquent acts		*Switzerland* *MDFT* Baseline: 47.3 (25) 3-month FU: 47.2 (32.6) 6-month FU: 34.5 (31.7) 9-month FU: 34.8 (32.6) 12-month FU: 39.3 (35.1) *IP* Baseline: 52.2 (29.5) 3-month FU: 44.9 (31.1) 6-month FU: 44.7 (36.1) 9-month FU: 42.3 (35.8) 12-month FU: 39.3 (36.9) *Total* *MDFT* Baseline: 59.8 (25.3) 3-month FU: 39.4 (32.5) 6-month FU: 33.9 (31.5) 9-month FU: 35 (33.5) 12-month FU: 34 (32.6) *IP* Baseline: 61.5 (25.4) 3-month FU: 45.2 (30.2) 6-month FU: 41.8 (31.6) 9-month FU: 40.8 (32) 12-month FU: 42.3 (33.8)
Risk of bias					
Random sequence generation	Unclear* (not described)	Unclear (not described)	Unclear (not described)	Unclear (not described)	Low (block randomisation was used)
Allocation concealment	Unclear (not described)	Low	Low (a URN randomisation programme was used)	Low (a randomly ordered list was used)	Low (computer randomisation was concealed)
Blinding	Low (outcome assessors were blinded to treatment condition and assessment phase)	Unclear (not described)	Low (outcome assessors were blinded to treatment assignment and to study hypotheses)	Unclear (not described)	Low (local researchers were not blinded; central outcome assessors were blinded to treatment condition)
Incomplete outcome data	Unclear (ITT not reported)	Unclear (ITT was done but attrition is > 20 %)	Unclear (ITT was done but attrition was high)	Low (ITT was performed and attrition was low)	Unclear (ITT was done and attrition is not reported)
Selective reporting	Low (outcomes specified in measures section also reported in results section)	Low (outcomes specified in measures section also reported in results section)	Unclear (not all outcomes specified in measures section also reported in results section)	Unclear (not all outcomes specified in measures section also reported in results section)	Low (all outcomes specified in measures section are reported in results section)
Other bias	Low (no other important source of bias could be identified)	Low (no other important source of bias could be identified)	Low (no other important source of bias could be identified)	Low (no other important source of bias could be identified)	Low (no other important source of bias could be identified)

* Where the term 'unclear' is used, it means that insufficient information is provided by the report.

Annex 2

Effects of MDFT compared with other intervention treatments

Outcome	AGT	MEI	CBT	Comparison treatment Peer group therapy	MET/CB5	ACRA	IP
Drug use (alcohol, marijuana and other drugs) at 12-month FU	–14.5 % (ns)	–29.4 % (p = 0.0006)		–57 % (p = 0.001)			
Cannabis use at 12-month FU			–12.6 % (ns)				
Other drug use at 12-month FU			–183 % (p > 0.05)				
Minimal substance use (no or one occasion of alcohol or drug use) at 12-month FU			Relative risk = 1.26 (p = 0.02)				
Abstinence at 12-month FU				Odds ratio = 2.20 (95 % CI 0.77-6.22)			
Days of abstinence from cannabis over 12 months					+6 (ns)	+8 (ns)	
Percentage meeting criteria for cannabis dependence							–14 % (p = 0.015)
Percentage meeting criteria for cannabis abuse							–11 %(p = 0.015)
Number of cannabis consumption days over 12 months							–12 % (p = 0.07)

Annex 3

Characteristics of intervention treatments

Description	Intervention						
	MEI	Peer group therapy	IP	CBT	AGT	MET/CBT5	ACRA
Type of intervention	Family-based, structured and psycho-educationally focused intervention	Manual-guided intervention combining education with skills training and social support	Individual treatment for adolescent cannabis users, usually used in such cases, based on counselling and motivational interviewing	Individual-based intervention over three stages	Peer group-based semi-structured intervention	Five-session intervention combining two sessions of individual MET with three sessions of group CBT	Behavioural intervention based on individual sessions with the adolescent
Aim	Change parenting behaviours and family interactions	Develop individual skills and promote group participation	Improve individual skills and strategies for relapse prevention. Includes elements of CBT	Reduce risky behaviours and improve individual skills	Develop individual social skills such as communication, self-control, self-acceptance and problem solving, as well as building social support among group members	Change risky behaviours and develop individual skills	Teach adolescents new ways of handling life's problems without using drugs and alcohol
Target	Families	Adolescents. Four to six adolescents participate in the groups. Groups are open, in that new members are admitted on a rolling basis as previous members complete the treatment	Adolescents	Adolescents	Adolescents	Adolescents	Adolescents
Intervention format	Content-specific group discussions, didactic presentations that include handouts, skill-building exercises, individual family problem-solving within a group meeting of several families, and homework assignments. In case of emergency, two individual sessions per family are available at the request of the family of the therapist	Worksheets, role-plays, handouts, videotapes and group discussions	Sessions are individual, with the adolescent. Parents may be seen alone, or in groups, purely for reasons of drug education and mutual support	Phase 1 determines and prioritises adolescents' problems and constructs the treatment contract. Phase 2 is aimed at increasing coping competence and reducing risky behaviours. Phase 3 focuses on relapse prevention	Didactic presentations, group discussions, group skill-building exercises and homework assignments	Brief didactic presentations, modelling, role-playing and homework assignments. Intervention begins with two individual MET sessions aimed at explaining treatment expectations, assessing and building motivation for change and preparing the adolescent for the group sessions. In sessions 3, 4 and 5, the adolescent joins a group of five or six adolescents for CBT skills training	Ten sessions with the adolescent alone and four sessions with caregivers (two with the caregivers alone and two with the caregivers along with the adolescent). First, the therapist assesses the adolescent's triggers for substance use and their satisfaction with life. Second, the treatment plan is completed.

Description	Intervention						
	MEI	Peer group therapy	IP	CBT	AGT	MET/CBT5	ACRA
Intervention content	Learning alternative forms of stress reduction, understanding family and individual risk and protective factors, improving family organisation, information on rules and limit-setting, and improving family communication and problem-solving abilities. Each session is structured in three parts: (1) didactic presentation (informal and conversional vs. formal lecture) by the therapist; (2) topic-focused intrafamily and/or interfamily group discussion; and (3) skill-building exercises. Families receive workbooks with content summaries of the session goals and activities	Exploring beliefs about drugs, understanding the roots and triggers of drug use, re-evaluating and eventually avoiding friends who use drugs, improving refusal techniques, recognising automatic thoughts about drug use and increasing prosocial, non-drug-related ways to have fun and feel good and other relapse prevention methods	Coping with stress, managing anger, increasing assertiveness in interpersonal contacts and addressing negative thoughts about substance use	In phase 1 parents attend the first two sessions to support the adolescent's participation in treatment. Phase 2 provides information and education, contingency contracting, information on self-monitoring, problem-solving training, communication skills training, information on identifying cognitive distortions and on increasing healthy recreational activities, and homework assignments	Phase 1 includes two individual family sessions to enlist cooperation and parental support, outline the goals and format of the treatment, and discuss group rules and procedures. The therapists also have an individual meeting with each teenager. Phase 2 has four structured AGT sessions to facilitate trust and self-disclosure among adolescents and establish group identity. Phase 3 is the adolescents' social skills building phase, aimed at developing drug refusal, improving conflict resolution and anger management skills, improving communication and problem solving with parents, peers and other adults, and developing pro social interests and behaviours. Phase 4 focuses on the generalisation and maintenance of new skills	Developing refusal skills and a positive social support network, reducing association with substance-using peers, planning for unanticipated high-risk situations and coping with relapse	Skills training and practice in relapse prevention, communication, problem-solving and prosocial recreation, communication and motivation
Duration	90-minute weekly sessions over a 16-week period	One therapist-led session in the 12–16 weeks of treatment. The intervention includes six modules, each approximately 2 weeks long	Each session is administered once a week over a period of 4–6 months (60- to 90-minute sessions)	Groups of between six and eight adolescents are led by two therapists for 90 minutes			
Therapist's role	Educator and facilitator of inter- and intrafamily communication processes	Active and directive, but not confrontational					

Description	Intervention						
	MEI	Peer group therapy	IP	CBT	AGT	MET/CBT5	ACRA
References	Barrett, K. (1990), *Multi-family educational intervention (MEI) manual*, University of Washington, Seattle (unpublished)	Bandura, A. (1999), 'A sociocognitive analysis of substance abuse: an agentic perspective', *Psychological Science* 10, pp. 214–217. Carroll, K. M. (1998), *A cognitive–behavioral approach: treating cocaine addiction*, NIH publication no 98-4308, National Institute on Drug Abuse, Rockville, MD. Nowinski, J. (1990), *Substance abuse in adolescence and young adults: a guide to treatment*, Norton, New York. Kaminer, Y. (2005), 'Challenges and opportunities of group therapy for adolescent substance abuse: a critical review', *Addictive Behaviors* 30, pp. 1765–1774		Beck, A. T., Wright, F. W., Newman, C. F. and Liese, B. (1993), *Cognitive therapy of substance abuse*, Guilford Press, New York	Concannon, C., McMahon, B. and Parker, K. P. (1990), *Peer group treatment for adolescent drug abuse*, University of California, San Francisco, CA (unpublished)	Sampl, S. and Kadden, R. (2001), *Motivational enhacement therapy and cognitive behavioral therapy (MET-CBT5) for adolescent cannabis users*, DHHS Publication no 01-3486, Cannabis Youth Treatment (CYT) manual series, vol. 1, Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration, Rockville, MD. Available at: http://www.chestnut.org/LI/cyt/products/index.html	Godley, S. H., Meyers, R. J., Smith, J. E., et al. (2001), *The adolescent community reinforcement approach for adolescent cannabis users*, DHHS Publication no 01-3488, Cannabis Youth Treatment (CYT) manual series, vol. 4, Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration, Rockville, MD. Available at: http://www.chestnut.org/LI/acra-acc/

Annex 4

Search strategy for MEDLINE

1. (substance-related disorders) MeSH terms
2. (abus* or use or misuse or depend* or addict*) ti, ab
3. 1 or 2
4. (treatment or therapy) ti, ab
5. (adolescent) MeSH terms
6. (adolescent* or teen* or youth or "young people") ti, ab
7. 5 or 6
8. (MDFT or multidimensional family therapy or multi-dimensional family therapy or multidimensional family therapy) ti, ab
9. 3 and 4 and 7 and 8

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About the EMCDDA

The European Monitoring Centre for Drugs and Drug Addiction is the hub of drug-related information in Europe. Its mission is to provide the European Union and its Member States with 'factual, objective, reliable and comparable information' on drugs and drug addiction and their consequences. Established in 1993, it opened its doors in Lisbon in 1995, and is one of the European Union's decentralised agencies. The Centre offers policymakers the evidence base they need for drawing up drug laws and strategies. It also helps professionals and researchers pinpoint best practice and new areas for analysis.

Related EMCDDA publications and web information

- *Drugs and vulnerable groups of young people,* Selected issue, 2008
- *A cannabis reader: global issues and local experiences,* Monograph, 2008
- *Preventing later substance use disorders in at-risk children and adolescents,* Thematic paper, 2009
- *Children's voices. Experiences and perceptions of European children on drug and alcohol issues,* Thematic paper, 2010
- *North American drug prevention programmes: are they feasible in European cultures and contexts?* Thematic paper, 2013

- Best practice portal: www.emcdda.europa.eu/best-practice
- Characteristics of frequent and high-risk cannabis users: http://www.emcdda.europa.eu/topics/pods/frequent-cannabis-users
- Synthetic cannabinoids in Europe: http://www.emcdda.europa.eu/topics/pods/synthetic-cannabinoids

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