Available online at www.sciencedirect.com
ScienceDirect
Drug and Alcohol Dependence 90 (2007) 120–127
DRUG and ALCOHOL DEPENDENCE
www.elsevier.com/locate/drugalcdep

Short term impact of same intensity but different duration interventions for cannabis users

Flavia S. Jungerman [a,*], Solange Andreoni [b], Ronaldo Laranjeira [a]

[a] *Alcohol and Drug Research Unit (UNIAD), São Paulo Federal University (UNIFESP), Rua Botucatu 394, 04023-061 São Paulo, Brazil*
[b] *Department of Preventive Medicine, São Paulo Federal University (UNIFESP), Rua Borges Lagoa 1341, 04038-034 São Paulo, Brazil*

Received 17 February 2006; received in revised form 14 February 2007; accepted 14 February 2007

Abstract

The present study evaluates the efficacy of a brief intervention for cannabis users. A randomized controlled trial compared 3 conditions: 4 weekly individual sessions of motivational interviewing and relapse prevention over 1 month (1MIRP); the same 4 sessions over 3 months (3MIRP), and delayed treatment control (DTC). The short term impact of each intervention was followed up 4 months after randomization. Participants were 160 highly educated adults with a long history of frequent cannabis use. Both treatments showed better results than the DTC, and for primary outcomes (i.e., cannabis consumption) there was no difference between treatments, while the 3MIRP scheme showed greater efficacy in reducing dependence symptoms and other drug use according to the ASI drug subscale. There was a tendency for the longer treatment to have better outcomes, regardless of intensity, although the waiting list did have some positive effect. The cohort needs to be followed up for a longer period in order to ascertain whether changes are maintained over time.

Keywords: Marijuana; Cannabis; Randomized controlled trial; Brazil; Brief intervention

1. Introduction

Cannabis is the most widely abused illicit drug in the world (Hall and Solowij, 1998; Hall and Babor, 2000). Experimentation with the drug by teenagers is common in Europe, the USA and Australia (Hall and Pacula, 2003). In the United States, 34.2% of the population (12 years and over) have tried cannabis, of which 8.3% have used it in the last year (Substance Abuse and Mental Health Services Administration (SAMHSA), 2000). Approximately 9% of those who have previously used marijuana meet criteria for dependence at some point (Anthony et al., 1994). A recent study in New Zealand showed that by the age of 21, over 10% of a sample of 1265 people met criteria for cannabis dependence (Fergusson and Horwood, 2000).

In Brazil, cannabis is the most commonly used illicit drug. Despite its use being lower in Brazil compared to other countries, its growth is notable. In a household survey conducted in 107 Brazilian cities on a population aged between 12 and 65, lifetime use was 6.9% (Carlini et al., 2002), which is very similar to rates in Colombia (5.4%) and Germany (4.2%), but much lower than in both the USA (34.2%) and the United Kingdom (25.0%) (Galduróz and Dias, 2005; Ospina, 1997; Consejo Nacional para el Control de Estupefacientes (CONACE), 2005; European Monitoring Centre for Drugs and Drug Addiction (E.M.C.D.D.A.), 2005; SAMHSA, 2001). In São Paulo city, a survey of university students conducted in 2001 found that 35.3% of the sample had tried cannabis; this was only exceeded by alcohol and tobacco. When asked about use in the last 30 days, 16.9% of the sample answered yes (Stempliuk, 2004).

Despite these high rates of cannabis use, in the last 15 years, only 6 randomized controlled trials have been conducted to evaluate the psychological treatment of adult cannabis users (Stephens et al., 1994, 2000; Budney et al., 2000, 2006; Copeland et al., 2001; Marijuana Treatment Project Research Group (MTP), 2004). Two reviews on the treatment of cannabis users were published and concluded that marijuana users respond to the same type of treatment as do other drug users, namely motivational enhancement therapy (MET) and cognitive-behavioral therapy (CBT) (McRae et al., 2003;

* Corresponding author at: Rua Pascoal Vita 342/ap131, 05445-000 São Paulo, Brazil. Tel.: +55 11 99475918; fax: +55 11 38196143.
E-mail address: fla.de@uol.com.br (F.S. Jungerman).

0376-8716/$ – see front matter © 2007 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.drugalcdep.2007.02.019

Copeland, 2004). Moreover, they also observed that rates of positive outcome were very low, showing that marijuana abuse is not easily treated. A recent Cochrane review of psychotherapeutic interventions for cannabis users found a limited number of controlled studies of cannabis treatment, and concluded abstinence was a difficult goal to achieve in outpatient settings (Denis et al., 2006).

The present study aimed to apply well known, effective approaches to drug users, such as motivational interviewing, relapse prevention and coping skills training, to a population of Brazilian marijuana users. Our hypotheses were: (1) treatment would provide more improvement in terms of consumption and secondary difficulties associated with use than no treatment for cannabis users, and (2) 4 sessions of motivational interviewing (MI) + CBT administered over 3 months, would prove more effective than the same 4 sessions, administered over 1 month, because, in our view the key factor is not the intensity of treatment, i.e., the number of sessions, but the link with the service, which will stay in place for a longer period (i.e., 3 months). To this end, there were 3 experimental conditions: 4 sessions of motivational interviewing and relapse prevention over 1 month (1MIRP), the same 4 sessions over 3 months (3MIRP), and a delayed treatment control (DTC) group.

2. Methods

Recruitment was carried out in an outpatient clinic for alcohol and drug users at São Paulo Federal University, between September 2003 and October 2004. Details on the selection process as well as assessment procedures and sample profile are described elsewhere (Jungerman and Laranjeira, submitted for publication). Participants were given transportation and a meal voucher at each study visit.

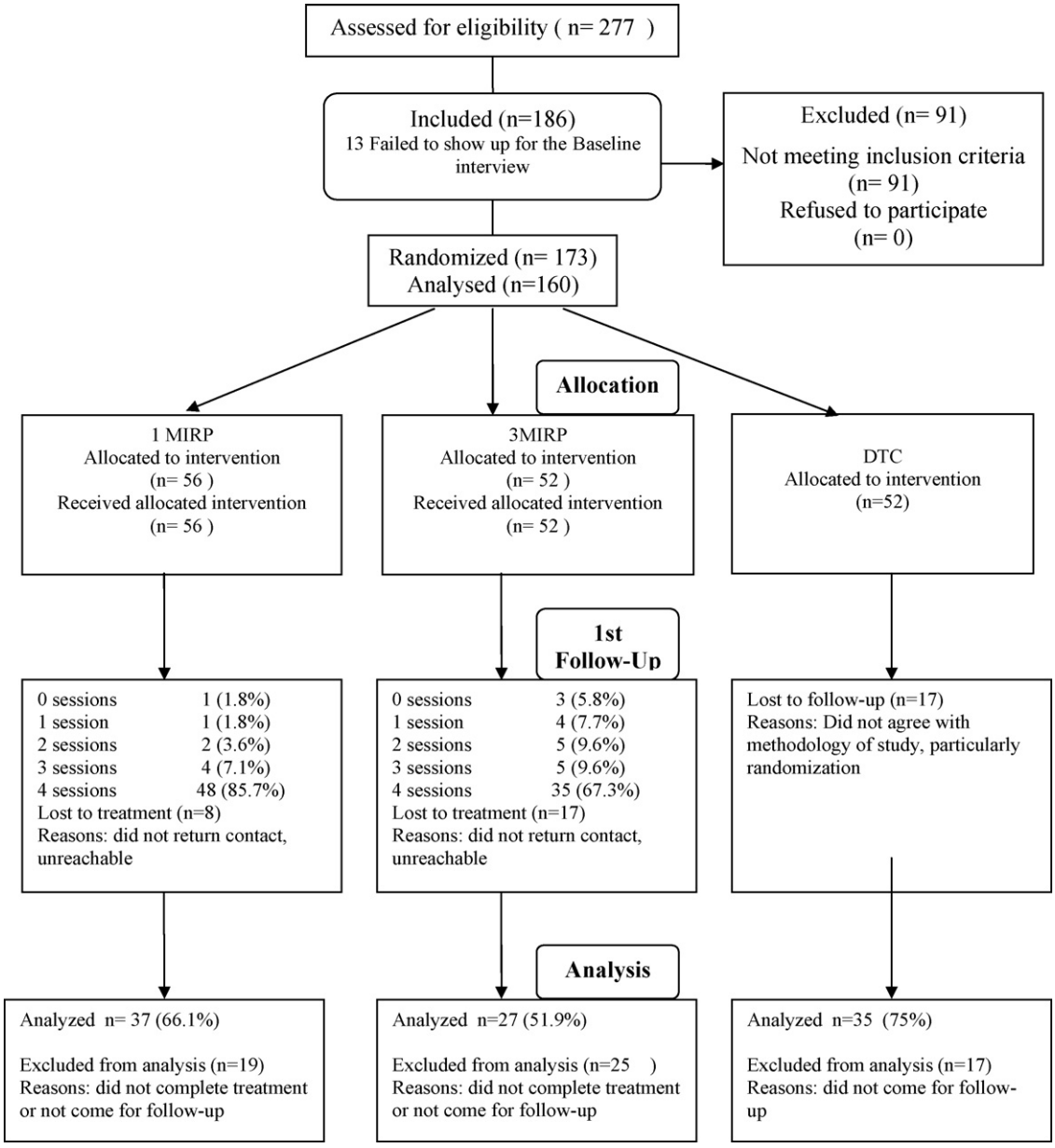

Fig. 1. Scheme of the project.

2.1. Inclusion/exclusion criteria

Patients were included if they were over 18, did not have a serious psychiatric illness, did not fulfill criteria for dependence on any other drug (or alcohol), were not undergoing treatment for their cannabis problem, and had smoked marijuana at least 40 times in the 90 days prior to interview (i.e., 3 times per week). This last criterion was used to exclude sporadic users, who consumed cannabis primarily on weekends (in general, twice a week).

2.2. Participants

A total of 277 patients were assessed for study enrollment (Fig. 1). Of the 91 excluded, the main reasons for that were: 31% had not used enough cannabis in the last 90 days, 11% had some psychiatric diagnosis (primarily depression), 12% were undergoing other treatment for cannabis use at the time, 10% fulfilled criteria for cocaine abuse or dependence, 7% fulfilled criteria for alcohol dependence, and 7% were polydrug users. Of the 186 eligible subjects, 13 failed to come for the baseline interview. Of the 173 eligible subjects, 160 were assessed in the present study. Demographic characteristics of the study population are presented in Table 1. There were no baseline differences between groups, although there was a borderline difference between groups in the number of days marijuana was smoked (Table 2).

2.3. Allocation

Patients were randomly assigned to one of three types of treatment by a random permuted block, which is a conventional method of restricted randomization to ensure exactly equal treatment number at certain equally spaced points in the sequence of patient assignments. If a trial has no stratification the block size should be reasonably large so as to reduce predictability but, if interim analysis is intended, not so large that serious mid-block inequality might occur. For example, in this trial with more than 100 patients, we could use a block size of 20. Then, we used a table of random numbers divided into 3 blocks: A = 1MIRP, from 1 to 5, B = 3MIRP from 6 to 10, C = DCT, from 11 to 15, ignoring numbers from 16 to 19. The randomization was done by a neutral person, not involved in any phase of the clinical work (Pocock, 1990). Subjects were not stratified. All patients were informed about the result of the randomization over the phone, by the coordinator of the study.

2.4. Assessment procedures/measures

Subjects interested in this treatment study called our unit and had a brief screening to check the inclusion criteria by phone. On admission, they had their first appointment for a longer screening interview where they answered a quick questionnaire with demographic data, the Composite International Diagnostic Interview (CIDI) (WHO, 1997) and the Wender Utah Rating Scale (Stein et al., 1995). Once included, they were invited for the baseline interview upon enrolment, when they were first presented the consent form and explained all the research procedures, including the randomization. The University's Ethical Committee granted approval for the trial.

Once subjects had signed the consent, they underwent a structured interview comprising a demographic data questionnaire (including drug history, designed for this specific study) and a time-line follow back (TLFB) (Sobel and Sobel, 1992), which obtained information on the pattern and frequency of marijuana

Table 1
Demographic data and cannabis use at baseline n = 160

Categorical %	DTC	1MIRP	3MIRP	Total	χ^2	p
Male	82.7	82.1	75.0	80.0	1.21	0.546
Female	17.3	17.9	25.0	20.0		
White	92.3	91.1	84.6	89.4	1.88	0.390
Black/'Mulatto'	7.7	8.9	15.4	10.6		
Single	59.6	66.1	67.3	64.4	0.83	0.935
Married	28.9	23.2	23.1	25.0		
Divorced/separated	11.5	10.7	9.6	10.6		
Own home	67.4	51.8	59.7	59.4	3.66	0.454
Rented home	28.8	39.3	36.5	35.0		
Lent home/squatted	3.8	8.9	3.8	5.6		
Work	64.7	60.7	59.6	61.6	5.52	0.479
Work and study	15.7	19.6	13.5	16.4		
No occupation	15.7	7.1	17.3	13.2		
Study	3.9	12.5	9.6	8.8		
Continuous	**DTC**	**1MIRP**	**3MIRP**	**Total**	F	p
Age (years)						
Mean (S.E.)	33.13 (7.45)	31.68 (8.56)	32.21 (9.09)	32.32 (8.52)	0.41	0.663
Min–max	18.0–49.0	19.0–56.0	18.0–58.0	18.0–58.0		
Education (years)						
Mean (S.E.)	16.64 (5.50)	15.43 (4.67)	15.04 (5.09)	15.64 (5.09)	1.12	0.329
Min–max	6.0–34.0	8.0–30.0	5.0–26.0	5.0–34.0		
Cannabis use age at 1st use (years)						
Mean (S.E.)	16.29 (3.39)	16.34 (3.33)	16.75 (4.3)	16.44 (3.67)	0.25	0.782
Min–max	10.0–30.0	8.0–25.0	8.0–35.0	8.0–35.0		
Age at beginning of daily use (years)						
Mean (S.E.)	20.02 (4.59)	21.45 (7.2)	21.75 (5.31)	21.08 (5.85)	1.30	0.274
Min–max	13.0–33.0	14.0–55.0	13.0–35.0	13.0–55.0		
Years of use						
Mean (S.E.)	16.88 (7.05)	15.34 (8.39)	15.85 (9.18)	16.01 (8.23)	0.49	0.616
Min–max	4.0–32.0	4.0–46.0	3.0–45.0	3.0–46.0		

M = mean and S.E. = standard error.

Table 2
Primary outcomes assessed at baseline and at 4-month follow-up according to three study conditions (M = mean and S.E. = standard error)

Variable	Group comparison		Delayed ($n = 52$)		1MIRP ($n = 56$)		3MIRP ($n = 52$)	
	F	p	M	S.E.	M	S.E.	M	S.E.
% Days smoked								
Baseline	3.16	0.0449	94.06	1.95	94.19	1.87	88.17	1.95
4 months	12.39	<0.0001	86.12	4.38	64.90	4.27	56.21	4.38
Change	8.60	0.0003	7.94	4.51	29.29	4.34	31.95	4.51
Periods smoked								
Baseline	0.01	0.9925	2.07	0.13	2.05	0.12	2.05	0.13
4 months	8.33	0.0004	1.93	0.13	1.19	0.13	1.38	0.13
Change	8.70	0.0030	0.14	0.13	0.86	0.12	0.67	0.13
Joints per day								
Baseline	0.21	0.8120	1.84	0.29	2.06	0.28	2.08	0.29
4 months	6.76	0.0015	1.56	0.18	0.78	0.17	0.77	0.18
Change	5.28	0.0060	0.28	0.26	1.28	0.25	1.31	0.26

use in detail along with treatment history. The number and size of joints smoked over the preceding 90 days was measured on a calendar, dividing each day into 4 quarters (12 a.m.–6 a.m.; 6 a.m.–12 p.m.; 12 p.m.–6 p.m.; 6 p.m.–12 a.m.). Number of joints and number of days smoked per week, and number of quarters smoked per day was calculated. The substance-dependence subscale from the DSM-III R checklist (Hudziak et al., 1993) was used to measure the number of criteria fulfilled for a diagnosis of cannabis dependence. The Addiction Severity Index (ASI) (McLellan et al., 1992) measured the severity of problems in 7 different areas, and the Marijuana problem scale (MPS) (Stephens et al., 2000) a 19-item scale measured recent problems associated with marijuana use.

All instruments were translated into Portuguese, and previously tested in a pilot study. The baseline and follow-up measures were conducted by trained interviewers.

2.5. Urine analysis

With the aim of assessing the validity of self-reported drug use, a randomly selected sample of subjects submitted samples for urine testing. One third of the samples were tested at baseline, and 47% in the follow-up period.

2.6. Follow-up procedures

Follow-up assessments were conducted 4 months after randomization. The DTC group was assessed at baseline and 4 months after the waiting time. They were then re-randomized into one of the two types of active treatment, but only reported as subjects in the DTC group here. The same instruments used in the baseline interview were used in follow-up, apart from the demographic data and the marijuana history part of the TLFB. Instead, a questionnaire on treatments performed in the time between assessments was introduced.

2.7. Treatment intervention

The approach was the same for both treatment arms of the study and was manual-based, with 4 individual sessions of approximately 1.5 h each. The treatment was based on motivational interviewing (Miller and Rollnick, 1991), an approach that aims to promote a change in a problematic behavior through recognition and resolution of ambivalence to give up the previous behavior. The treatment also had a relapse prevention component, an approach first elaborated by Marlatt and Gordon (1985), a cognitive-behavior technique based on the notion that people face high risk situations and if able to identify them and create alternatives to cope, might be able to prevent relapse. Although this was an abstinence-focused treatment, many patients arrived wanting to control their use. Therefore, one of our goals was to explain why, for dependents or abusers of a drug, it is so difficult to have 'recreational' use of this substance. To reach abstinence, many patients preferred to slowly decrease consumption over the sessions instead of stopping use abruptly. Subsequently, they were given this option. At the end of each session, they were asked to establish a feasible consumption goal for the next session, because the aim was to stimulate change and a feeling of achievement, and to avoid failure. This consumption goal would be checked at the beginning of the next session with a calendar from the TLFB scale. Patients who did not attain the goal were encouraged to carry on toward that goal or another, more realistic goal.

The first session had the objective of enhancing the empathy between therapist and patient, establishing some points about the drug, working with the myths and the truths about marijuana and then working with motivation through the pros and cons of use. By the end of the first session, the patient was expected to be clear on what the advantages and disadvantages of using marijuana were. In the 2nd session, the Stages of Change theory were explained through the Spiral (Prochaska et al., 1992), where patients placed themselves on a stage and motivational self-statements were explored. In the 3rd session, relapse prevention techniques were used: the high-risk situations rationale was explained and the big figure (Marlatt and Gordon, 1985) was shown and discussed. Individual high-risk situations were identified via the Situational Confidence Questionnaire (Annis and Graham, 1988) and alternative ways of coping with them were discussed. In the 4th and last session, a change plan was devised.

The difference between the 2 arms was that the 1st arm comprised 4 sessions in 1 month, one every week (1MIRP) and the 2nd arm consisted of 4 sessions over 3 months, at weeks 1, 3, 8 and 12 (3MIRP).

The delayed group (DTC) was informed about the randomization and told they would be contacted for the 1st follow-up 4 months later. Subjects were told that should urgent treatment or any other help be required they could contact the clinic. No instructions regarding cannabis use were given. After the 4-month waiting period, patients were randomized again into one of the two treatment options.

2.8. Therapist training

Therapists ($n = 4$) held psychology degrees and had at least 5 years clinical experience in treating substance users. They were trained based on a manual devised for this project. They were then observed in an individual case by the project supervisor. Subsequently, they received weekly supervision. Although this was a manual-based approach, each therapist had her own style and experience. To assess these differences, an instrument was created to assess therapist performance according to both the therapist and the patient, based on the 'therapeutic empathy in cognitive-behavioral therapy' (Burns and Auerbach, 1996). No major discrepancies in assessment and results between different therapists were found.

2.9. Data analysis

The primary outcomes were related to cannabis use, measured by mean change from baseline with respect to the number of joints smoked per day, the percent of days smoked in the last 90 days, the number of quarters smoked per

day, and the abstinence rate. Abstinence rate was calculated as the proportion of subjects with zero days of cannabis use over 90 days according to the TLFB. Secondary outcomes were the mean change from baseline with respect to the number of dependence symptoms measured by the DSM checklist (up to 9), the number of marijuana-related problems according to the MPS (up to 19) and on the 7 ASI subscales (up to 7). We also included the use of alcohol and other drugs, measured by the percentage of days of use in the last 90 days, according to the TLFB calendar.

Subjects were analyzed according to intention to treat rules (ITT). Baseline observations were carried forward for individuals who had missing values at the follow-up assessment. General linear model (GLM) analysis was performed on outcome measures, using SAS proc mixed, where group intervention was the between-subject factor, and time and group × time interaction were the within-subject factors. When the group × time interaction (comparison of group mean changes from baseline to follow-up) was statistically significant, post hoc tests breaking the interaction were performed to verify which comparison between two groups pair were different (1MIRP versus 3MIRP, 1MIRP versus DTC or 3MIRP versus DTC). When the interaction was not statistically different among groups (the profiles were parallel), we examined time and group effects. The significance level used for all tests was 0.05.

3. Results

3.1. Attendance

The overall 4-month follow-up rate was 64%. Attrition differed as a function of treatment ($\chi^2 = 6.146$ and $p = 0.046$), with the DTC having the highest rates of follow-up attendance (75%), followed by the 1MIRP (66.1%) and then 3MIRP (51.9%) (Fig. 1). In the case of 1MIRP, the main point of drop-out was between the last session and the follow-up interview, while for 3MIRP the main time of drop-out occurred during treatment. Those interviewed showed no significant differences in terms of gender, education and cannabis use compared to drop outs. However, those who dropped out tended to be younger ($F = 11.062$ and $p = 0.001$). Thus, with the exception of age, the follow-up sample represented the whole sample.

3.2. Primary outcomes

3.2.1. Cannabis use.

3.2.1.1. Percent of days smoked. Analyses of the percentage of days smoked out of the previous 90 days showed that there was a borderline difference between the three groups ($p = 0.05$) at baseline. Mean changes from baseline were different among groups ($p = 0.0003$), as shown in Table 2. Post hoc analysis showed that there was a significant difference between the 1MIRP and DTC groups ($p = 0.0008$) as well as between the 3MIRP and DTC groups ($p = 0.0002$). However, the 1 and 3MIRP groups did not differ as shown in Table 3.

3.2.1.2. Periods smoked. Analyses of the mean number of periods smoked per day at baseline showed that the three groups were similar ($p = 0.9925$). Mean changes from baseline were different among groups ($p = 0.0030$), as shown in Table 2. Post hoc analysis showed that there was a significant difference between the 1MIRP and DTC groups ($p < 0.0001$) and between the 3MIRP and DTC groups ($p = 0.0037$). However, the 1 and 3MIRP groups did not differ, as shown in Table 3.

Table 3
Comparisons for significantly different variables (M = mean and S.E. = standard error)

Estimates change from baseline	Comparison			
	M	S.E.	*t*	*p*
% Days smoked				
3MIRP vs. 1MIRP	2.66	6.26	0.43	0.6708
Del vs. 3MIRP	−24.01	6.37	−3.77	0.0002
Del vs. 1MIRP	−21.34	6.26	−3.41	0.0008
Periods smoked				
3MIRP vs. 1MIRP	−0.19	0.18	−1.04	0.3007
Del vs. 3MIRP	−0.53	0.18	−2.95	0.0037
Del vs. 1MIRP	−0.72	0.18	−4.04	<0.0001
Joints per day				
3MIRP vs. 1MIRP	0.03	0.36	0.08	0.9366
Del vs. 3MIRP	−1.03	0.36	−2.84	0.0051
Del vs. 1MIRP	−1.00	0.36	−2.81	0.0056
Dependence symptoms				
3MIRP vs. 1MIRP	0.86	0.40	2.13	0.0349
Del vs. 3MIRP	−0.98	0.41	−2.38	0.0184
Del vs. 1MIRP	−0.12	0.40	−0.31	0.7577
ASI drug composite				
3MIRP vs. 1MIRP	0.82	0.32	2.54	0.0121
Del vs. 3MIRP	−0.35	0.33	−1.06	0.2921
Del vs. 1MIRP	0.47	0.32	1.46	0.1460

3.2.1.3. Joints per day. Analyses of the mean number of joints smoked per day at baseline showed that the three groups were similar ($p = 0.8120$). Mean changes from baseline were different among groups ($p = 0.0060$), as shown in Table 2. Post hoc analysis showed that there was a significant difference between the 1MIRP and DTC groups ($p = 0.0056$) as well as between the 3MIRP and DTC groups ($p = 0.0051$). However, the 1 and 3MIRP groups did not differ (Table 3).

Fig. 2 shows how the number of joints smoked per day evolved during the 120-day period between the baseline interview and the 1st follow-up assessment. It is important to note that this period included the treatment period (30 days for 1MIRP, and 90 days for 3MIRP). The DTC patients did not decrease their use, and even increased use slightly, during this time. Both the 1MIRP and 3MIRP groups have a slight decrease in use

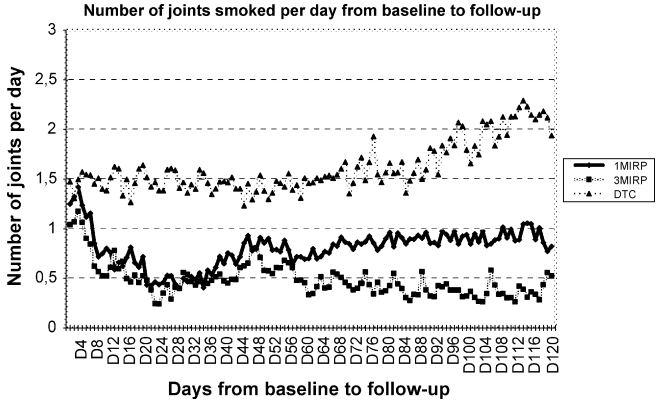

Fig. 2. Effects of 1-month, 3-month motivational interviewing and relapse interventions on cannabis use.

Table 4
Secondary outcomes assessed at baseline and at 4-month follow-up according to three study conditions (M = mean and S.E. = standard error)

Variable	Group comparison		Delayed ($n = 52$)		1MIRP ($n = 56$)		3MIRP ($n = 52$)	
	F	p	M	S.E.	M	S.E.	M	S.E.
Dependence symptoms								
Baseline	0.10	0.9013	5.71	0.31	5.59	0.30	5.78	0.31
4 months	2.00	0.1387	5.10	0.33	4.86	0.32	4.20	0.33
Change	3.40	0.0360	0.61	0.29	0.73	0.28	1.58	0.29
Marijuana problems								
Baseline	0.21	0.8070	9.71	0.58	9.80	0.56	10.21	0.58
4 months	0.68	0.5070	8.92	0.64	9.54	0.61	8.52	0.63
Change	2.63	0.0753	0.79	0.46	0.26	0.43	1.69	0.45
ASI drug composite								
Baseline	1.64	0.1982	3.38	0.21	2.87	0.20	3.02	0.21
4 months	3.83	0.0238	2.81	0.21	2.77	0.20	2.10	0.21
Change	3.26	0.0411	0.57	0.23	0.10	0.22	0.92	0.23
% of days of drinking in the last 90 days								
Baseline	0.09	0.9146	10.06	2.20	11.16	2.12	10.03	2.20
4 months	0.31	0.7340	9.01	2.07	9.13	1.99	7.09	2.07
Change	0.24	0.7908	1.05	1.95	2.03	1.88	2.94	1.95
% of days of drug use in the last 90 days								
Baseline	1.21	0.3004	1.81	0.73	0.32	0.70	0.59	0.73
4 months	1.52	0.2223	1.97	2.19	3.72	2.11	7.25	2.19
Change	2.49	0.0864	−0.16	2.06	−3.40	1.99	−6.66	2.06

For dependence symptoms and problems at both baseline and follow-up: DTC-$n = 51$, 1MIRP-$n = 56$ and 3MIRP-$n = 51$ (for 3MIRP, n for problems = 52). For all measures at both baseline and follow-up: DTC-$n = 52$, 1MIRP-$n = 56$ and 3MIRP-$n = 52$.

and are similar to each other until day 45. However, the 1MIRP group then showed an increase in use whereas the 3MIRP group continued decreasing use until rates stabilized around day 60. None of these differences reached statistical significance (mean number of joints were assessed at points 30, 90 and 120 and showed $p < 0.01$ only when comparing treatment with controls at days 30 and 90, but not at 120).

3.2.1.4. Abstinence rate. Abstinence rates were very low, with only 3.7% of the total sample ($n = 5$) abstinent, 3 (6.5%) for the 3MIRP, and 1 for the 1MIRP (1.9%) and 1 for the DTC (3.7%). There was no difference between groups (Fisher exact test $p = 0.5268$).

3.3. Secondary outcomes

3.3.1. Dependence symptoms. Analyses of the number of dependence symptoms at baseline showed that the three groups were similar ($p = 0.9013$). Mean changes from baseline were different among groups ($p = 0.0360$), as shown in Table 4. Post hoc analysis showed that there was a significant difference between the 3MIRP and DTC groups ($p = 0.0184$) as well as between the 1 and 3MIRP groups ($p = 0.0349$) but not between the 1MIRP and DTC groups (Table 3).

3.3.2. Marijuana-related problems. Analyses of the mean number of marijuana-related problems showed that the three groups were similar ($p = 0.8070$) at baseline. The mean changes from baseline were also similar among the three groups ($p = 0.0753$) as shown in Table 4. The group effect was not significant ($p = 0.8853$) but the time effect was ($p = 0.0005$), showing that the three groups changed over time in the same way.

3.3.3. ASI. In the medical, employment, legal, alcohol, family/social and psychological subscales, there was no interaction between groups and times. Borderline effects for time were seen in the employment ($p = 0.07$), alcohol ($p = 0.09$), and family/social ($p = 0.06$) subscales. Analyses of the drug subscale at baseline showed that the three groups were similar ($p = 0.20$). Mean changes from baseline were different among groups ($p = 0.04$), as shown in Table 4. Post hoc analysis showed that there was a significant difference between the 1 and 3MIRP groups ($p = 0.0121$), but not between the 3MIRP and DTC groups nor between the 1MIRP and DTC groups (Table 4).

3.3.4. Percentage of days of drinking and drug use in the last 90 days. Analyses of the percentage of days of drinking in the last 90 days at baseline showed that the three groups were similar ($p = 0.9146$). The mean changes from baseline were also similar among the three groups ($p = 0.7908$) as Table 4 shows. The group effect was not significant ($p = 0.8340$) nor the time effect ($p = 0.0740$).

Analyses of the percentage of days of drug use in the last 90 days at baseline showed that the three groups were similar ($p = 0.3004$). The mean changes from baseline were also similar among the three groups ($p = 0.0864$) as Table 4 shows. The group effect was not significant ($p = 0.4431$) but the time effect was ($p = 0.0043$), showing that the three groups change across time in the same way.

3.3.5. Results of urine analysis. At baseline, all patients tested positive for cannabis. At the 4-month follow-up, the percentages of positive results were 90% for the 1MIRP, 81.8% for the 3MIRP and 100% for the DTC groups. There was no significant difference between the rates of positive urine samples (91.3%) and non-abstinence self-reports at the 4-month follow-up (93.5%) ($p > 0.999$). The percentage agreement at the 4-month follow-up was 84.8% (Kappa = −0.081, $p = 0.580$). However, the major discrepancy was between positive self-reports of cannabis use and negative urine specimens (8.7%).

4. Discussion

Given the absence of effective pharmacotherapies for marijuana dependence, the treatment of marijuana-related disorders has primarily focused on psychotherapeutic approaches (McRae et al., 2003). Controlled trials have utilized cognitive-behavioral relapse prevention group therapy, social support group treatment, contingency management therapies, motivational individualized assessment and intervention, and motivational enhancement therapy. Unfortunately, it is difficult to discuss comparative efficacy across trials, since the trials differed methodologically (e.g. in the diagnostic criteria and control groups used, the length of treatment and follow-up, the use of urine drug screens to confirm marijuana abstinence, the way in which interventions were delivered). Study samples also differed in their size and ethnic diversity. Thus, it is not surprising that studies of psychosocial approaches show varying efficacy in the treatment of marijuana dependence.

In the present study, the two active treatments showed similar outcomes at the 4-month follow-up for several cannabis use measures (Table 2), and both differed from results for the DTC group. While there was some evidence that the 3MIRP group appeared to have a more sustained improvement compared to the 1MIRP group (Fig. 2), this was not significant.

For the dependence symptoms and for the ASI-drug subscale there was a statistically significant difference between treatments, showing that the 3MIRP had better results than the other two conditions. For marijuana-related problems, all three groups changed similarly across time. This suggests a tendency that the longer treatment exposure may be more beneficial in the treatment of cannabis use disorders, which need further investigation.

Retention in the present study was lower than that found in other studies (64.4% compared to 85% from MTP, 2004), with different rates for the groups: the shorter treatment had higher compliance at follow-up as well as in sessions, and the DTC group had higher rates of attendance at the follow-up than the treatment groups. Comparing the two treatment categories, 1MIRP managed to retain more patients during treatment and had better rates of attendance at the follow-up assessment (Fig. 1). The 3MIRP condition had a lower rate of treatment attendance (versus 1MIRP), but had fewer patients lost between the time of the last treatment session and the follow-up interview. Patients in the 1MIRP condition had shorter periods between sessions, which may have contributed to a better rapport and engagement during treatment. Conversely, the closer the follow-up interview is to end of treatment, the higher the compliance in attending the follow-up interview (i.e., the 3MIRP condition). Finally, the high rates of compliance with the follow-up assessment for the DTC patients may reflect a willingness to come to the interview in order to receive treatment (versus patients from the two treatment groups who had already been exposed to treatment).

These differences in attendance between groups are similar to results of other studies (MTP, 2004): while the longer treatment has slightly better results, the attrition is higher during treatment sessions, as well as in follow-up interviews. However, there was a difference between our methodology and those used in other studies: we did not follow-up patients who did not come for the whole treatment, i.e., all the 4 sessions, who we considered as drop outs. This may have decreased the chances of attaining higher rates at follow-up.

As far as we can ascertain, during the time patients were in treatment, they were decreasing their cannabis use or maintaining their changes in both groups. This could mean that they needed to be followed for a longer period, even if not in treatment, for some kind of support (McLellan, 2005). However, this and other studies have showed that longer treatments are associated with higher drop-out rates. This might be particularly applicable to cannabis users who, as we have seen, have an occupation and are objectively/materially impaired from visiting the treatment unit. Clinicians should assess what ideal quantity of treatment would be enough to help subjects to achieve their goals yet not prove excessive, and then to provide them with just occasional support (not every week).

There are limitations to this study that are important to note. First, this was a selected sample that does not represent the overall Brazilian population. Patients were highly educated and employed. Second, commorbidities were excluded that might limit the generalizability of the results. Third, there was a substantial drop-out rate. Fourth, it should be noted that the 4-month follow-up assessment reflects different time points from initial treatment exposure for the 3MIRP and 1MIRP groups (1 and 3 months, respectively), which might have interfered in the final results. Fifth, the study lacked objective indicators for all subjects' cannabis use. And last, we lacked measures for treatment fidelity (sessions were not taped and rated for treatment adherence and competence).

Despite these limitations, the findings from this study provide useful information that adds to the growing literature on psychotherapeutic treatments for cannabis dependence.

Future directions for this work could include following subjects over a longer period to clarify possible differences between the two treatment conditions and to elucidate the trajectory they have in their marijuana use so as to better assess whether changes last over time, and to then make specific changes in the treatment to better tailor this for the population. The effect of waiting lists could also be further explored. And, the relative efficacy of greater doses of treatment (i.e., more sessions), as a function of period of time delivered, could also be studied.

Acknowledgement

The authors received a grant from the state funding agency Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

References

Annis, H.M., Graham, J.M., 1988. Situational Confidence Questionnaire (SCQ-39) User's Guide. Addiction Research Foundation, Toronto, Canada.

Anthony, J.C., Warner, L.A., Kessler, R.C., 1994. Comparative epidemiology of dependence on tobacco, alcohol, controlled substances and inhabitants: basic findings from the National Comorbidity Study. Clin. Exp. Psychopharmacol. 2, 244–268.

Budney, A.J., Higgins, S.T., Radonovich, K.J., Novy, P.L., 2000. Adding voucher-based incentives to coping skills and motivational enhancement improves outcomes during treatment for marijuana dependence. J. Consult. Clin. Psychol. 68, 1–11.

Budney, A.J., Moore, B.A., Rocha, H.L., Higgins, S.T., 2006. Clinical trial of abstinence-based vouchers and cognitive-behavioral therapy for cannabis dependence. J. Consult. Clin. Psychol. 74, 1–10.

Burns, D.D., Auerbach, A., 1996. The therapeutic empathy in cognitive-behavioral therapy. In: Salkovskis, P. (Ed.), Frontiers of Cognitive Therapy. Guilford Press, New York (Translated to Portuguese by Serra, A. 1997).

Carlini, E.A., Galduróz, J.C.F., Noto, A.R., Nappo, S.A., 2002. I Levantamento Domiciliar Sobre o uso de Drogas Psicotrópicas no Brasil, 2001. CEBRID—Centro Brasileiro de Informações sobre Drogas Psicotrópicas, UNIFESP, 380 p.

Consejo Nacional para el Control de Estupefacientes (CONACE), Ministerio del Interior, 2005. Quinto Informe Anual sobre la Situación de Drogas en Chile. http://conacedrogas.cl/inicio (accessed on February 15, 2007).

Copeland, J., 2004. Developments in the treatment of cannabis use disorder. Curr. Opin. Psychiatry 17, 161–167.

Copeland, J., Swift, W., Roffman, R., Stephens, R., 2001. A randomized controlled trial of brief cognitive-behavioral interventions for cannabis use disorder. J. Subst. Abuse Treat. 21, 55–64.

Denis, C., Lavie, E., Fatséas, M., Auriacombe, M., 2006. Psychotherapeutic interventions for cannabis abuse and/or dependence in outpatient settings. Cochrane Database System. Rev. (3), doi:10.1002/14651858.

European Monitoring Centre for Drugs and Drug Addiction (E.M.C.D.D.A.), 2005. http://www.emcdda.eu.int/index (accessed on February 15, 2007).

Fergusson, D.F., Horwood, L.J., 2000. Does cannabis use encourage other forms of illicit drug use? Addiction 95, 505–520.

Galduróz, J., Dias, J.C., 2005. Epidemiology of marijuana in Brazil, Part of the Consensus on cannabis published by the Psychiatric Brazilian Association.

Hall, W., Babor, T., 2000. Cannabis use and public health: assessing the burden. Addiction 95, 485–490.

Hall, W., Pacula, R.L., 2003. Cannabis Use and Dependence: Public Health and Public Policy. Cambridge University Press, Cambridge, UK.

Hall, W., Solowij, N., 1998. Adverse effects of cannabis. Lancet 352, 1611–1616.

Hudziak, J.J., Helzer, J.E., Wetzel, M.W., Kessel, K.B., McGee, B., Janca, A., Przybeck, T., 1993. The use of the DSM-III-R checklist for initial diagnostic assessments. Compr. Psychiatry 34, 375–383.

Jungerman, F.S., Laranjeira, R. Cannabis users seeking treatment in São Paulo, Brazil. Revista Panamericana de Salud Publica. Submitted for publication.

Marijuana Treatment Project Research Group (MTP), 2004. Brief treatments for cannabis dependence: findings from a randomized multisite trial. J. Consult. Clin. Psychol. 72, 455–466.

Marlatt, G.A., Gordon, J.R. (Eds.), 1985. Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors. Guilford Press, New York.

McLellan, A.T., 2005. Best practices in the treatment of substance abuse. In: Presentation at the Alcohol and Drug Studies Brazilian Association (ABEAD) Conference, Ouro Preto, Brazil.

McLellan, A.T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., Shepard, D.S., 1992. The Fifth Edition of the Addiction Severity Index. J. Subst. Abuse Treat. 9, 199–213.

McRae, A.L., Budney, A.J., Brady, K.T., 2003. Treatment of marijuana dependence: a review of the literature. J. Subst. Abuse Treat. 24, 369–376.

Miller, W.R., Rollnick, S., 1991. Motivational Interviewing: Preparing People to Change Addictive Behavior. The Guilford Press, New York.

Ospina, E.R., 1997. Estudio Nacional sobre Consumo de Sustancias Psicoactivas Colombia, 1996. Fundacion Santa Fe de Bogotá, p. 129.

Pocock, S.J., 1990. Clinical Trials: A Practical Approach. Wiley Medical Publication, UK.

Prochaska, J.O., DiClemente, C.C., Norcross, J.C., 1992. In search of how people change: applications to addictive behaviors. Am. Psychol. 47, 1102–1114.

Sobel, L.C., Sobel, M.B., 1992. Time-line follow back: a technique for assessing self-reported alcohol consumption. In: Allen, J.P., Litten, R.Z. (Eds.), Measuring Alcohol Consumption: Psychosocial and Biochemical Methods. Humana Press, Totawa, New Jersey, pp. 41–72.

Stein, M.A., Sandoval, R., Szumowski, E., Roizen, N., Reinecke, M.A., Blondis, T.A., Klein, Z., 1995. Psychometric characteristics of the Wender Utah Rating Scale (WURS): reliability and factor structure for men and women. Psychopharmacol. Bull. 31, 425–433.

Stempliuk, V.A., 2004. Drug use among students from São Paulo University: 1996 versus 2001. Ph.D. Thesis. Faculdade de Medicina da Universidade de São Paulo.

Stephens, R.S., Roffman, R.A., Curtin, L., 1994. Treating adult marijuana dependence: a test of the relapse prevention model. J. Consult. Clin. Psychol. 62, 92–99.

Stephens, R.S., Roffman, R.A., Curtin, L., 2000. Comparison of extended versus brief treatments for marijuana use. J. Consult. Clin. Psychol. 68, 898–908.

Substance Abuse and Mental Health Services Administration (SAMHSA), 2000. Office of Applied Studies: U.S. Department of Health and Human Services. http://www.samhsa.gov (accessed on February 16, 2007).

Substance Abuse and Mental Health Services Administration (SAMHSA), 2001. Office of Applied Studies: 1999–2000 National Household Survey on Drug Abuse. U.S. Department of Health and Human Services. http://www.samhsa.gov (accessed on February 16, 2007).

World Health Organization (WHO), 1997. The Composite International Diagnostic Interview (CIDI), Version 2.1, Geneva. Translated to Portuguese by Quintana, M.I. in 2005.