Research Report

European Addiction Research

Eur Addict Res 2016;22:268–276
DOI: 10.1159/000446430

Received: December 15, 2015
Accepted: April 26, 2016
Published online: June 9, 2016

Smoking Cessation Program for Inpatients with Substance Use Disorder: A Quasi-Randomized Controlled Trial of Feasibility and Efficacy

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Key Words
Smoking cessation · Tobacco · Nicotine dependence · Substance abuse population · Inpatient treatment

Abstract
Aims: The present study investigated the feasibility, acceptance and efficacy of a newly developed cognitive behavioral program for smoking cessation/reduction ('Rethink your Smoking' program, RSP) in inpatients with substance use disorder (SUD). ***Method:*** One hundred ninety-nine inpatients with SUD were randomly assigned to either the RSP (n = 101) or a minimal intervention (MI) program (n = 98). In addition, participants were offered optional nicotine replacement therapy. Data from a group of patients with SUD without any intervention (control group, n = 78) were included in the analyses for comparison. Assessments were performed at admission, discharge and follow-up after 3 and 6 months. ***Results:*** RSP proved to be feasible and was well accepted by participants. Patients in both interventions showed lower scores for physical nicotine dependence and number of cigarettes smoked per day and higher scores for various motivational parameters at discharge and 3 months later. Both interventions were superior to no intervention, but no differences were found between the RSP and MI. ***Conclusion:*** A smoking cessation/reduction program is feasible for substance-dependent in-patients undergoing detoxification. Although the RSP appears to be effective in terms of harm reduction in in-patients with SUD, more cost- and time-efficient programs might also be suitable for this population.

Introduction

Smoking is believed to be the single most important preventable cause of death in the industrialized world, and it accounts for a large proportion of cancer-related, cardiovascular and respiratory deaths [1–3].

The association between smoking and mental disorders is well established, and the prevalence of smoking in people with mental illness is 2–4 times higher than in the general population [4–6]. Patients with schizophrenia or substance-related disorders tend to be heavy smokers [6], and up to 80% of the clinical population of alcohol-dependent people smoke [7]. Smokers with a mental illness show higher levels of any dependence [6], more psychiatric symptoms and psychiatric hospitalization and poorer treatment outcome than non-smoking patients [8, 9].

The guidelines of both the American Psychiatric Association and the European Psychiatric Association recommend the treatment of tobacco dependence in people with mental illness [10, 11]. Unfortunately, interventions

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designed especially for patients with substance use disorder (SUD) are rare, probably because of the widespread beliefs among clinicians that these patients are unable or unwilling to quit or that smoking cessation is of secondary importance. However, contrary to common objections, the motivation to quit among patients with SUD has been shown to be comparable to that in the general population [12–14], and Mueller et al. [15] showed that even during detoxification alcohol-dependent smokers show interest in smoking interventions. Also, findings implicate that mental health recovery is not jeopardized by smoking reduction or cessation [14]. In fact, sobriety from other addictions seems to be rather improved by nicotine withdrawal, and participation in smoking cessation programs is recommended during treatment of the primary addiction [5, 16, 17]. This opinion is supported by a larger body of literature, although some studies are contradictory [18, 19].

The aforementioned guidelines for smoking cessation [10, 11] recommend that interventions in tobacco-dependent patients with a mental illness combine psychotherapeutic techniques and supportive medication (e.g., nicotine replacement therapy, NRT). The effectiveness of such programs is widely believed to increase with the intensity (i.e., duration and frequency) of the treatment [11], and cognitive behavioral interventions may be effective, particularly in short-term smoking reduction [15, 16, 20]. However, there is evidence that even minimal counselling (e.g., physician advice) has similar effects on cessation rates, especially as concerns long-term abstinence from cigarettes [21, 22]. In particular, in-patients with SUD without any interest in smoking cessation can be offered short interventions, such as brief advice [23]. These findings indicate that smoking cessation programs should be tailored to the target group and that shorter and more cost-effective programs might be an appropriate option for in-patients with SUD.

In the present study, we compared a cognitive behavioral intervention for smoking cessation ('Rethink your Smoking' program, RSP) with a minimal intervention (MI) in inpatients with SUD. Patients in both intervention groups were offered supplementary NRT. We evaluated both the feasibility and acceptance of the interventions as well as their effects on several variables. Assessments were performed after 2 weeks and 3 and 6 months. Data from another sample of patients without any intervention were used for additional comparisons. We hypothesized that the cognitive behavioral intervention program would be feasible and well accepted by both patients and course instructors. Although both interventions were expected to have positive effects on patients' smoking behavior, we expected the more complex intervention to have superior short-term effects.

Methods

Study Design

This prospective, quasi-randomized, controlled study was conducted from 2010 to 2012 at the Department of Psychiatry and Psychotherapy, Ludwig Maximilian University, Munich, to compare a newly developed cognitive behavioral program for in-patients with SUD, the RSP, with a MI. The study was approved by the Ethics Committee of Ludwig Maximilian University, Munich, and all participants provided written informed consent.

At the beginning of the detoxification and withdrawal treatment, patients who agreed to participate in the study were randomized to the RSP or MI group according to the time of their admission to hospital. Patients admitted in the first 3 months of the study were allocated to RSP; those admitted in the next 3 months, to MI; those admitted in the next 3 months, to RSP; and so on. In the RSP group, patients interested in smoking cessation were invited to an additional individual session and to receive NRT (Nicorette® TX patch, gum and lozenge) for the duration of their hospital stay. NRT was offered only to patients who attended the individual session. In the MI group, participants were not offered individual sessions, but were offered NRT. In case of readmission to hospital during the study period, patients participated again in the group programs, but not in the study. All patients completed an assessment at baseline (t0) and discharge (t1). Both intervention groups were assessed by a telephone interview 3 (t2) and 6 months (t3) after discharge. All interventions were conducted by trained course instructors (1 psychologist and 2 medical students). To evaluate the feasibility and acceptance of the RSP, participants and course instructors completed questionnaires after every session (group and individual). The study was conducted on an open ward specialized in SUDs (legal and illegal substances). The main treatment offered is qualified detoxification, which includes cognitive behavioral therapy that focuses on motivation to stay abstinent. The average time spent in hospital is 2 weeks. Smoking at the hospital was generally only allowed outdoors, that is, on the hospital grounds.

Before the beginning of the study, different patients on the same ward had completed a similar questionnaire at baseline (t0) and discharge (t1). These patients received no intervention for their tobacco dependence and were used as a no-intervention control group (CG).

Participants

A total of 199 participants were recruited from the population of in-patients receiving withdrawal therapy for SUD at the Department of Psychiatry and Psychotherapy. Patients were eligible to participate if they were aged 18 years or older, had a diagnosis of SUD according to ICD-10 criteria [24] and were tobacco smokers with a score ≥1 on the Fagerström Test of Nicotine Dependence (FTND) [25, 26]. The only exclusion criterion was previous participation in the program. Participants were not required to want to quit smoking. Attendance at the different group sessions (RSP or MI) was mandatory for all patients on the SUD ward, but participation in the study was optional.

Table 1. Overview of the RSP

	Procedure	Aim	Content
Group sessions	– Length: 2 weeks – One 60-minute group session every week	Psychoeducation; establish ambivalence about smoking and motivation	– 1st session: smoking, smoke-free life, reasons for smoking – 2nd session: reasons in favor of and against smoking
Individual session (optional)	– One 20-minute session – Requirement: documentation of number of cigarettes smoked in last 3 days	Preparation and stabilization of smoking reduction or cessation	– Overview of smoking profile, CO assessment, and goal setting – Initiation of NRT

Interventions

'Rethink your Smoking' Program

The RSP is a cognitive behavioral program based on an evidence-based smoking cessation program 'Das Rauchfrei-Programm (Kompaktversion)' ('the smoking cessation program [compact version]'), which was designed and evaluated by the IFT (Institut für Therapieforschung) [27] and is aimed at in-patients with SUD who are undergoing detoxification. It consists of one 60-minute group session a week for 2 weeks, and patients can begin the intervention at any time. Participants who are interested in smoking cessation can attend an additional individual counseling session, at which NRT is initiated if wished. Patients can receive NRT only after they have attended the individual session. The intervention is based on a manual; table 1 for a brief overview.

Minimal Intervention

The MI in the study was a group session of about 15 min that briefly addressed the risks of smoking and the possible advantages of successful smoking cessation on abstinence from other addictions. The instructors gave advice on stopping smoking and discussed the possibility of receiving free NRT during the hospital stay. After the group session, interested patients were given brief advice about the appropriate type of NRT.

Assessments

At admission (t0), various self-report data were collected, including demographic characteristics (age, sex, years of education, marital status), comorbid diagnoses and tobacco use history (years of smoking, attempts to quit). Furthermore, the questionnaire included additional items that were recorded also at discharge (t1), and the 3- (t2) and 6-month (t3) follow-ups: the FTND [25, 26], number of cigarettes per day and motivation to quit. Motivation to quit was measured by single items concerning the motivation to change smoking behavior (change of behavior, 'Wie motiviert sind Sie aktuell, Ihr Rauchverhalten zu verändern?' ['How motivated are you currently to change your smoking behavior?'], Likert scale from 1 to 5), how much participants wanted to quit smoking (want, 'Wie gerne wollen Sie Nichtraucher werden/bleiben?' ['How much do you want to become/remain a non-smoker?'], Likert scale from 1 to 4) and how likely they were to do so (likely, 'Wie wahrscheinlich ist es, dass Sie als Nichtraucher die Klinik verlassen warden?' ['How likely is it that you leave hospital as a non-smoker?'], Likert scale from 1 to 4) [28], with higher scores indicating higher levels of motivation. In the individual session, carbon monoxide (CO) levels in expired air were measured by a Bedfont Smokerlyzer to verify participants' information about smoking. Reasons for drop-out were not recorded.

Program feasibility was rated by the instructors after every session on a scale of 1 (low) to 5 (high; 'Die Inhalte waren in der vorgegebenen Zeit gut umsetzbar' ['the content could be easily implemented in the allowed time']). Patient acceptance was rated by patients at discharge on a scale of 1 (very good) to 6 (unsatisfactory; 'Wie zufrieden sind Sie insgesamt mit dem Rauchfreiprogramm?' ['How happy are you overall with the smoking cessation program?']).

In the no-intervention CG, assessments were conducted only at baseline (t0) and discharge (t1). Only a limited data set is available from these 2 assessments that includes age, sex, smoking status, length of regular tobacco consumption, number of cigarettes per day and the items change of behavior, want and likely. The FTND was not assessed.

Data Analysis

Nominal data (drop-outs, demographics) were compared by chi-square tests; and continuous data, by one-way analyses of variance (ANOVAs). Within-group variables were compared with repeated measurement ANOVAs. All tests of significance used an alpha level of 0.05 and were reported as 2-tailed. An effect size of $\eta^2 = 0.14$ indicates a strong effect; $\eta^2 = 0.06$, a medium effect; and $\eta^2 = 0.01$, a weak effect [29]. Statistical analyses were performed with the software SPSS version 23.0 for Windows.

Results

Participants

A total of 204 patients were screened and showed interest in the study, and 199 patients met inclusion criteria and received treatment; 5 patients were excluded due to former participation in the program; 101 patients were randomized to the RSP group and 98 to the MI group. All participants in the RSP group attended both group sessions, and 31 (30.7%) attended an individual session. The post-treatment assessment was completed by 157 partici-

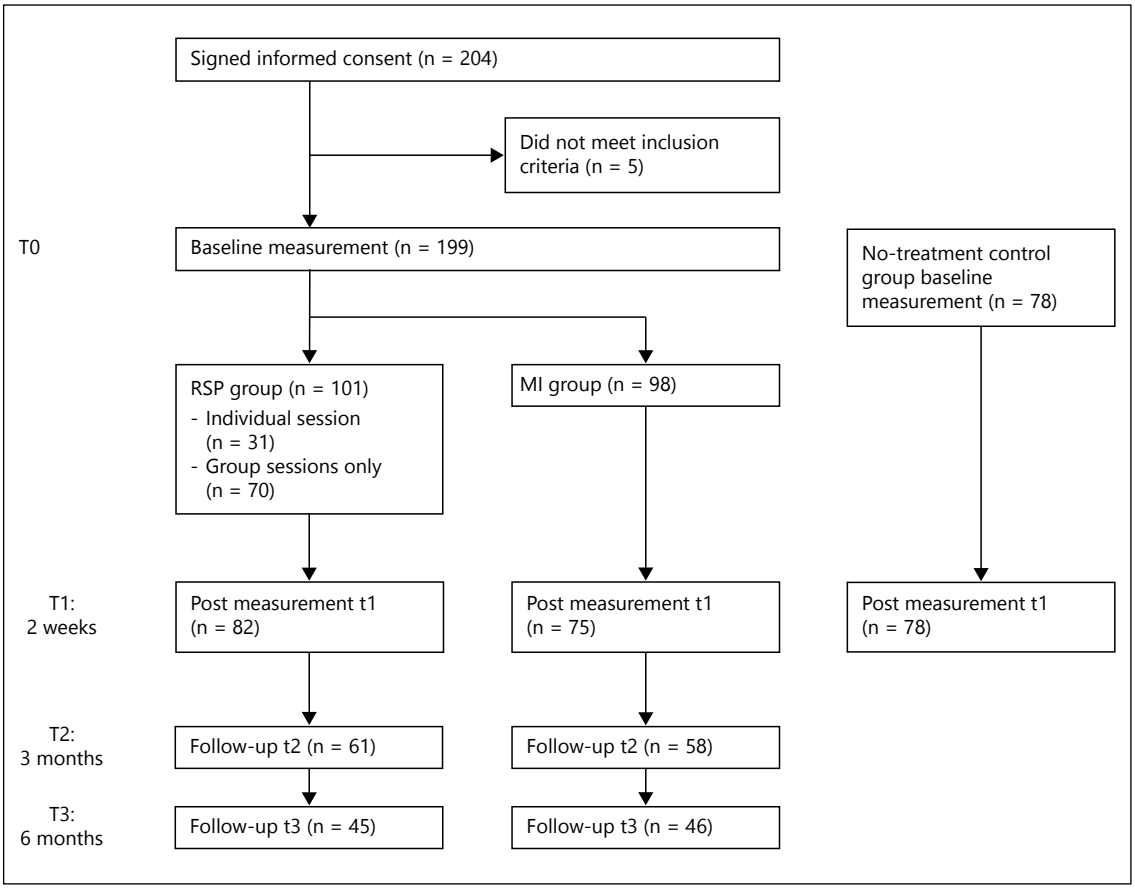

Fig. 1. Flow of participants through treatment and follow-up.

pants (78.9%); the 3-month follow-up, by 119 (59.8%); and the 6-month follow-up, by 91 (45.7%; fig. 1).

The mean age of the sample was 41.7 years (SD 10.7), and neither demographic variables nor any pretreatment variables differed between conditions (ts (197) <1.69, ps > 0.092). Only the item change of behavior showed a statistically significant difference (t (197) = 3.40, p = 0.001) in favor of higher motivation in the MI group. Table 2 shows all demographic variables. Patients in the RSP group who attended an individual session showed significantly higher motivation (i.e., higher scores for change of behavior, likely and want) than patients who did not attend an individual session (ts (197) >44.92, ps < 0.001).

Drop-out rates increased during the study but did not differ significantly between the 2 intervention groups. Patients with missing data at an assessment were considered drop-outs for this assessment. A total of 157 (78.9%) patients completed the first 2 assessments, and 64 (32.2%) completed all 4 assessments (fig. 1; for participant flow). Chi-square and t tests between participants who completed all assessments and those who dropped out at any time showed differences in 'primary SUD' but not in any other demographic or clinical variables. Participants with multiple SUDs dropped out significantly more often than participants with a single SUD (χ^2 (3) = 10.20, p = 0.017).

A limited set of clinical data were available for the CG. Nevertheless, we assumed that the demographic variables were comparable to those in the intervention groups, because all patients were in-patients on the same ward. Number of cigarettes per day and length of regular tobacco consumption did not differ between conditions (Fs <1.15, ps > 0.450), but change of behavior (F (2, 276) = 7.73, p = 0.001) and likely (F (2, 276) = 3.71, p = 0.026) were significantly lower in the CG.

Feasibility and Acceptance

The average feasibility rating of RSP for session 1 was 4.83 (SD 0.39, n = 12); for session 2, 4.42 (SD 1.00, n = 12); and for the individual session, 4.06 (SD 1.15, n = 31). The mean patient acceptance score was 2.35 (SD 1.38, n = 80).

Table 2. Sociodemographic variables of the sample

	RSP (n = 101)	MI (n = 98)	Total (n = 199)	No-intervention CG (n = 72)
Age, years				
Mean ± SD	41.65±10.53	41.69±10.87	41.67±10.64	40.04±10.51
Range	18–71	21–67	18–71	21–60
Sex, n (%)				
Male	71 (70.3)	54 (55.1)	125 (62.8)	56 (74.7)
Female	30 (29.7)	44 (44.9)	74 (37.2)	16 (21.3)
General education, years, n (%)				
0–7	9 (9.0)	5 (5.1)	14 (7.0)	
8–9	42 (41.6)	35 (35.7)	77 (38.7)	
10–11	23 (22.8)	36 (36.7)	59 (29.6)	
12–13	27 (26.7)	21 (21.4)	48 (24.1)	
Missing	0	1 (1.0)	1 (0.5)	
Primary SUD, n (%)				
Alcohol dependence	62 (61.4)	49 (50.0)	111 (55.8)	
Multiple SUD	30 (29.7)	36 (36.7)	66 (33.2)	
Prescription drug abuse	6 (5.9)	5 (5.1)	11 (5.5)	
Other	3 (3.0)	0 (8.2)	11 (5.5)	
Comorbid diagnoses, n (%)				
Affective disorders	44 (43.6)	32 (32.7)	76 (38.2)	
Neurotic, stress and somatoform disorders	4 (4.0)	8 (8.2)	12 (6.0)	
Schizophrenia, schizotypal and delusional disorder	8 (7.9)	2 (2.0)	10 (5.0)	
Other	2 (2.0)	7 (7.1)	9 (4.5)	
No other	43 (42.6)	59 (50.0)	92 (46.2)	
FTND, mean ± SD	5.81±2.24	5.47±2.60	5.65±2.42	
Number of cigarettes per day, mean ± SD	23.99±11.4	23.63±12.87	23.81±12.13	24.35±13.11
Length of regular tobacco consumption				
Mean ± SD	23.44±9.42	22.88±10.06	23.16±9.72	22.69±10.54
Range, years	4–53	5–52	4–53	6–45
Number of cessation attempts				
Mean ± SD	2.36±4.67	2.00±3.08	2.18±3.96	
Range	0–30	0–20	0–30	
NRT, n (%)				
During hospital stay (t1)	23 (28.0)	36 (47.4)	59 (37.6)	
3-Month follow-up (t2)	2 (3.3)	2 (3.5)	4 (3.4)	
6-Month follow-up (t3)	2 (4.4)	1 (2.2)	3 (3.3)	

n (RSP, t1) = 82, n (RSP, t2) = 61, n (RSP, t3) = 45, n (MI, t1) = 76, n (MI, t2) = 58, n (MI, t3) = 46, no significant group differences.

Treatment Outcomes

Short-Term Outcome

At t1, data from 157 participants were available for analysis. Five (6.6%) participants in the MI group and 8 (10%) in the RSP group had stopped smoking. No difference was found between the (intervention) groups regarding stopping smoking (χ^2 (1) = 0.60, p = 0.440). In the RSP group, 5 of the 8 participants who had stopped smoking had received NRT; and in the MI group, 2 of the 5 patients.

There was a statistically significant reduction over time in the FTND score (F (1, 62) = 26.98, p = 0.000, partial η^2 = 0.15) and the number of cigarettes smoked per day (F (1, 62) = 30.49, p = 0.000, partial η^2 = 0.16) and an increase in the likelihood of becoming a non-smoker ('likely', F (1, 155) = 11.46, p = 0.001, partial η^2 = 0.07). No effects of group or interaction were found for any of these variables. Scores for motivation to change smoking behavior (change of behavior) were significantly higher in the MI group than in the RSP group (F (1, 155) = 8.33,

Table 3. Repeated measures ANOVA: RSP vs. MI

Variable	Main effects						Interaction		
	time			group			time × group		
	F	p value	η^2	F	p value	η^2	F	p value	η^2
FTND (t0–t1)	26.98	0.000	0.15	1.72	0.191	0.01	3.21	0.075	0.02
FTND (t0–t3)	16.18	0.000	0.21	0.96	0.330	0.02	1.05	0.372	0.02
Cigarettes/day (t0–t1)	30.49	0.000	0.16	2.14	0.145	0.01	0.92	0.340	0.01
Cigarettes/day (t0–t3)	18.58	0.000	0.23	0.74	0.393	0.01	1.13	0.337	0.02
Change of behavior (t0–t1)	3.14	0.079	0.02	8.33	0.004	0.05	0.21	0.651	0.00
Change of behavior (t0–t3)	2.24	0.114	0.04	0.54	0.466	0.01	0.62	0.532	0.01
Likely (t0–t1)	11.46	0.001	0.07	2.05	0.155	0.01	0.04	0.842	0.00
Likely (t0–t3)	2.61	0.065	0.04	2.11	0.152	0.03	0.49	0.648	0.01
Want (t0–t1)	0.54	0.466	0.00	2.58	0.110	0.02	1.25	0.266	0.01
Want (t0–t3)	4.10	0.015	0.06	0.92	0.342	0.02	0.40	0.698	0.01

t0–t3: n (RSP) = 32, n (MI) = 31; t0–t1: n (RSP) = 81, n (MI) = 76.

p = 0.004, partial η^2 = 0.05), but we found no main effect of time and no interaction (table 3; fig. 2).

In the CG, nobody stopped smoking. When the CG was included in the analyses, a statistically significant difference between the CG and the other 2 groups regarding stopping smoking was found at t1 (χ^2 (2) = 7.752, p = 0.021). In all 3 groups, the number of cigarettes smoked per day decreased significantly over time (F (1, 228) = 17.70, p = 0.000, partial η^2 = 0.07). An interaction between time and group (F (2, 228) = 17.70, p = 0.000, partial η^2 = 0.07) showed that patients in the CG reduced the number of cigarettes smoked per day less than patients in the intervention groups. The likelihood to become a non-smoker (likely) increased significantly over time (F (1, 228) = 8.34, p = 0.004, partial η^2 = 0.04) and differed significantly between groups (F (2, 228) = 8.00, p = 0.000, partial η^2 = 0.07).

Long-Term Outcome

At the 3-month follow-up, only 1 participant in the MI group and none in the RSP group was abstinent from cigarettes, and there was no statistically significant association between group and smoking cessation (χ^2 (2) = 0.97, p = 0.616). However, over time there was a statistically significant reduction in the FTND score (F (3, 183) = 16.18, p = 0.000, partial η^2 = 0.21) and the number of cigarettes smoked per day (F (3, 183) = 18.58, p = 0.000, partial η^2 = 0.23) and an increase in the willingness to stop smoking (want, F (3, 186) = 4.10, p = 0.015, partial η^2 = 0.06). No effects were found for motivation to change smoking behavior (change of behavior) or likelihood to become a non-smoker (likely; fig. 2).

Impact of Individual Sessions/NRT

A total of 23 patients in the RSP group received NRT (74.2% of all those who attended an individual session, n = 31). The differences in motivation between RSP patients who attended an individual session and those who did not were maintained over time. For short-term outcomes, we found a statistically significant interaction between time and group, that is, patients who attended an individual session benefitted even more from RSP in terms of lower scores on the FTND (F (1, 80) = 7.45, p = 0.008, partial η^2 = 0.09), fewer cigarettes smoked per day (F (1, 79) = 19.92, p = 0.000, partial η^2 = 0.20) and increased motivation to change smoking behavior (change of behavior, F (1, 79) = 12.74, p = 0.001, partial η^2 = 0.14) than RSP patients who did not attend an individual session and therefore did not use NRT. There were no significant interaction effects in long-term outcomes.

In the MI group, a total of 36 patients (36.7%) decided to receive NRT. For short-term outcomes, we found a statistically significant interaction between time and group, that is, patients who received NRT showed even lower scores on the number of cigarettes smoked per day (F (1, 74) = 15.55, p = 0.000, partial η^2 = 0.17) and FTND (F (1, 73) = 4.61, p = 0.035, partial η^2 = 0.06). For long-term outcomes, we found statistically significant interactions between time and group for the motivation to change smoking behavior (change of behavior, F (3, 90) = 15.36, p = 0.000, partial η^2 = 0.34) and the likelihood to become a non-smoker (likely F (3, 90) = 4.26, p = 0.007, partial η^2 = 0.12), that is, patients who received NRT showed

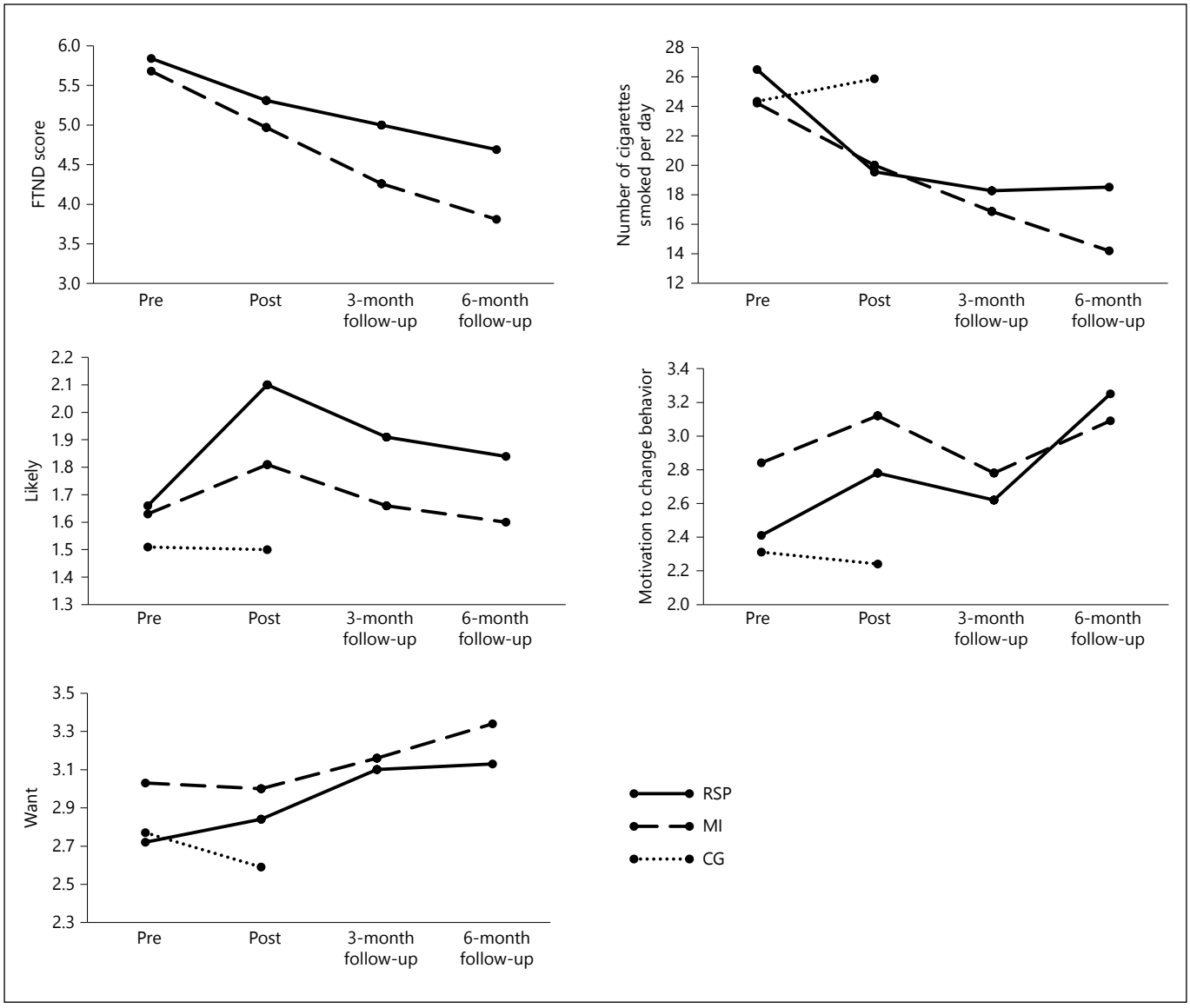

Fig. 2. Repeated measures ANOVA of the RSP group versus the MI group versus the no-intervention CG.

higher motivational scores at the beginning, which decreased over time, while motivation in patients without NRT increased in terms of those 2 motivational scores (change of behavior and likely).

Discussion

The present study investigated the feasibility, acceptance and efficacy of a smoking cessation program for inpatients with SUD undergoing detoxification. This population of patients is generally believed to be either unable or unwilling to stop or reduce smoking. Despite the fact that the program was mandatory for all patients (although participation in the study was optional), it was well accepted and feasible.

In terms of efficacy, the RSP was effective, but it was not superior to MI. Patients of both groups showed less physical nicotine dependence and smoked fewer cigarettes per day at discharge and at 6-month follow-up than at admission. Participants rated the likelihood of becoming a non-smoker higher at discharge, and their willingness to stop smoking was higher even after 6 months. Comparisons with a CG showed that both interventions

were superior to no intervention, and therefore, we conclude that both the RSP and MI had a significant effect on inpatients' smoking behavior and that the mere hospital stay was not responsible for this effect. Patients' assessments of how likely they are to stay off cigarettes after they leave hospital have been shown to be the best predictor for future cessation [28]. Thus, our study shows that such interventions are useful in terms of smoking reduction, even in the difficult-to-treat population of substance-dependent in-patients undergoing detoxification. Consequently, we recommend that at least MI should be applied by default.

This study also showed that additional individual sessions and NRT had only short-term effects on physical nicotine dependence, number of cigarettes smoked per day and motivation to change smoking behavior for the participants in the RSP group. We found no long-term differences in smoking reduction and dependence between patients who received additional counseling and NRT and those who did not. In the MI group, we found short-term effects on physical nicotine dependence and number of cigarettes smoked per day, but not on motivational variables. In the long term, the use of NRT during the hospital stay did not affect smoking reduction and dependence, but it did decrease motivation to change smoking behavior and the likelihood to become a nonsmoker. Because ongoing NRT is generally associated with better smoking cessation outcomes [10], these findings might be due to the fact that NRT was not as easily available after discharge.

The study had several strengths. The RSP was highly structured and based on an extensive manual, and course instructors and ward staff were trained in advance. The study participants of the 2 intervention groups were comparable regarding demographic and pretreatment variables and therefore randomization was successful. However, findings are limited by the high drop-out rate, especially for the long-term comparison. High drop-out rates are not uncommon among substance-dependent patients [30], and a detailed analysis of reasons for drop-out might provide additional information about the efficacy of intervention programs. Furthermore, the assignment to RSP or MI on the basis of the 3-month period in which a patient was admitted to hospital holds the risk of systematic biases such as seasonal effects, staff changes and a changing institutional attitude toward smoking cessation. Another limitation is the lack of a no-intervention CG with a full set of data, including physical nicotine dependence and follow-up comparisons; only limited data were available for the CG used in our study, so we could make only basic comparisons. A better CG in future studies would allow additional conclusions to be drawn. Furthermore, data from all groups were based on self-report, which are vulnerable to bias, and biochemical verification (measurement of CO) was only conducted during individual sessions. Lastly, patients' reasons for participating in the study were not assessed. Assumedly, patients who participated were already more motivated to rethink their smoking than patients who did not.

To conclude, a smoking cessation/reduction program is feasible for substance-dependent in-patients undergoing detoxification. The RSP was well accepted, and both the RSP and MI had positive effects on short-term outcomes of physical nicotine dependence, number of cigarettes smoked per day and motivation to quit smoking. It is to be noted that an effect on actual smoking cessation could not be found. However, while there is no clear evidence that smoking reduction decreases the risks of smoking-related diseases, smoking reduction is associated with a higher probability of future cessation [31, 32]. The more extensive RSP was not superior to MI. Because MI is more time and cost-effective, one can argue that such a low-intensity intervention might be preferable for this population. Fiore et al. [11] found that the length of the cessation treatment is associated with its success, and Stead et al. [33] recommend using NRT for at least 8 weeks. Our findings also suggest that ongoing treatment with NRT should be provided, but that lower intensity cognitive therapy, that is, shorter sessions, might be sufficient. We support the opinion of experts in this field, that is, that treatment of nicotine dependence in patients with comorbid SUD is important and advisable [10, 16, 34]. However, it should be noted that treatment should be maintained after discharge from hospital. Future research on smoking cessation for substance-dependent in-patients should take these findings into consideration. Furthermore, studies should examine different subgroups of this population more closely and shape interventions according to their special needs.

Acknowledgments

The authors thank Dr. Sabine Felten from the IFT Institut für Therapieforschung who, together with the co-author Christoph Kröger, provided the evidence-based smoking cessation program on which the RSP is based, and Julia Pottmeyer, who collected the data on the no-intervention CG. Furthermore, they thank Jacquie Klesing, Board-certified Editor in the Life Sciences, for editing assistance with the manuscript.

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