Alcohol and Alcoholism, 2016, 51(1) 27–31
doi: 10.1093/alcalc/agv062
Advance Access Publication Date: 12 June 2015
Article

Article

The Role of Psychological Distress in Relapse Prevention of Alcohol Addiction. Can High Scores on the SCL-90-R Predict Alcohol Relapse?

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Received 15 November 2014; Revised 6 May 2015; Accepted 23 May 2015

Abstract

Objective: The aim of this study was to identify if psychological distress may contribute to treatment outcome in alcohol-addicted patients during a follow-up period of 5 months after detoxification.
Methods: As part of a prospective, multicenter, randomized study in relapse prevention, patients' levels of psychological distress were assessed using the Symptome Checklist (SCL-90-R). At study inclusion, all patients were detoxified and showed no more withdrawal symptoms. The patients who relapsed during the 5-month follow-up period were compared with those who remained abstinent. Predictors for relapse were investigated in a logistic regression.
Results: First, a significant difference in initial psychological distress between patients who stayed abstinent and patients who relapsed was found: following detoxification, patients who relapsed scored significantly higher on the SCL-90-R at study inclusion. In addition, psychological distress differed over time in both groups. Second, patients without relapse showed a larger decrease in some SCL-90-R scales between the beginning and the end of the observation period than patients who relapsed. Third, the logistic regression analyses showed that high scores on the overall score GSI (Global Severity Index) of the SCL-90-R can be seen as a predictor for future relapse.
Conclusion: The SCL-90-R may be a useful instrument to predict relapse. As our study indicates that high levels of psychological distress increases the risk of relapse, specific interventions may be targeted at this risk factor.

INTRODUCTION

The treatment of alcohol dependence has focused on the prevention of relapse, prolongation of abstinence, shortening the duration of drinking or reduction of number of drinks per day. Current therapies may be optimized by combining psychosocial and pharmacologic approaches (Clapp, 2012). Relapse prevention therapy is complex because of the many factors that influence relapse: craving (Evren *et al.*, 2010), depressive mood (Heinz *et al.*, 1999), education, age, gender (Evren *et al.*, 2012; Agosti, 2013), marital status, employment status, number of detoxifications and duration of dependence have all been discussed as influencing factors (López-Goñi *et al.*, 2012; Dumais *et al.*, 2013).

Studies have reported an association between psychological distress and relapse (Lucht *et al.*, 2002; Sander and Jux, 2006) which will also be the focus of this study. For the practitioner, a simple instrument to assess the risk of relapse may be helpful to optimize treatment of addiction. The Symptom-Checklist–90 (SCL-90-R; Franke, 1995)

is such an instrument, which can be applied frequently and easily to assess psychological distress. Due to its practicability and simplicity, the SCL-90-R is often used to measure treatment outcome (López-Goñi *et al.*, 2012). It has been shown that the scores of the SCL-90-R are higher in alcohol-addicted patients than in the general American population (Mercier *et al.*, 1992). The overall GSI scores (Global Severity Index) of the SCL-90-R were shown to decrease over time during a clinical relapse prevention trial for alcohol-addicted patients (Martinotti *et al.*, 2010). Interestingly, levels of psychological distress measured by SCL-90-R differed significantly between patients who remained abstinent and patients who relapsed. A higher level of psychological distress at the end of the study increased the risk of relapse after the study (Sander and Jux, 2006). These findings indicate that a high level of psychological distress after detoxification measured by the SCL-90-R might be a useful predictor for the risk of relapse.

We therefore aimed to investigate whether patients who relapse and those who remain abstinent within a timeframe of 20 weeks differ in their levels of psychological distress at the beginning of the study, and whether alterations in levels of psychological distress over the observation period differ between those patients who relapsed and those who remained abstinent. We also explored whether stress levels in patients at study inclusion predict relapse also considering further risk factors such as age and duration of dependence.

METHOD

The present study is a secondary analysis of outcomes from a longitudinal, multicenter, placebo-controlled study of levetiracetam the prevention of alcohol relapse in newly detoxified alcohol-dependent patients (Richter *et al.*, 2012). (The drug was not found to improve outcomes.)

To take part in this study, patients had to be between 18 and 65 years of age. They had to fulfill the criteria for alcohol dependence according to both the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, and the International Classification of Diseases, 10th Revision. They also had to recently (minimal, 3 days ago; maximal, 14 days ago) be detoxified from alcohol (using scales to determine alcohol withdrawal and need of additional medication). At study inclusion, all patients were free of withdrawal medication for at least 3 days, in the case of the use of benzodiazepines 9 days and showed no clinical withdrawal symptoms. Exclusion criteria were a positive breath alcohol test, a positive drug urine for benzodiazepines or other sedative hypnotic, a current diagnosis of any other psychiatric illness according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, by Mini International Neuropsychiatric Interview (Sheehan *et al.*, 1998), suicidal tendencies, pregnancy or lactation period, legal or illegal drug addiction (except nicotine dependence and infrequent, not current, consumption of cannabinoids), and a history of epilepsy. Patients with the following complications of alcoholism (lifetime) were also excluded: Korsakoff's syndrome, a hallucinatory alcoholic state, decompensated liver cirrhosis (Child B, C) (Pugh *et al.*, 1973), Wernicke encephalopathy, as well as a suspected cirrhosis with the following clinical symptoms detected at clinical examination: signs of portal hypertension and signs of hepatocellular failure, thrombocytopenia, and severe medical disorders, such as pneumonia, pancreatitis, heart attack, bleeding gastrointestinal, or severe kidney damage (see also Richter *et al.*, 2012).

A severe relapse was defined as any alcohol consumption of >60 g/day in males and >48 g/day in females for 2 days during the assed period, recorded by a timeline follow-back interview (Cohen and Vinson, 1995). With <2 days relapse, the study could be continued by the participants.

Levels of psychological distress were assessed with the SCL-90-R. The SCL-90-R consists of 90 items. It has one total value score GSI (Global Severity Index) and 9 subscales: Somatic Distress, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. Indication of possible comorbidities are displayed in the subscales (Benjamin *et al.*, 2006).

The SCL-90-R scores from the beginning of the study (not more than 21 days after detoxification) and after a relapse or after a time period of 20 weeks were analyzed. Apart from the GSI, the 9 subscales were also taken into account in the calculations.

Our hypothesis 1 is that those patients who relapse initially show higher levels of psychological distress than those patients who remain abstinent. Hypothesis 2 is that those patients who remained abstinent show a larger decrease of psychological distress over time and that those patients who relapse show an increase of psychological distress.

STATISTICS

Analysis was performed using the statistical program SPSS (Statistic Package for Social Sciences, version 16.0). Drop outs were included as relapsers and were not measured regarding a 2nd measure of SCL-90. In total there were 106 participants to analyze. First, we tested the normal distribution and homogeneity of data (Table 1). Hypotheses 1 and 2 were tested using analysis of variance with and without repeated measures. These allow an investigation of average value differences, which are due to effects between the groups of patients with and without relapse, time effects (between baseline and follow-up), and interaction effects.

A logistic regression was applied to explore the third hypothesis that an increasing number of symptoms in the SCL-90-R at the beginning of the study is a risk factor for the occurrence of relapse. This method allows the prediction of a nominally scaled criterion (relapse yes/no) with interval scaled variables. In the logistic regression we analyzed the predictive power of the standardized GSI score of the SCL-90-R at the beginning of the study, also including predictors of relapse known from previous studies (education, age, gender, marital status, employment status, number of detoxifications and duration of dependence). We used the likelihood ratio (LR) of the Omnibus tests of model coefficients to make a statement about the impact of the included predictors (education, age, gender, marital status, employment status, detoxifications, duration of dependence and GSI of the SCL-90-R). Nagelkerke's R2 was used to measure the goodness of fit of linear regression models.

The raw scores of the SCL-90-R were converted to standard values (*T*-values) which make conclusions possible regarding their position with respect to the normative sample. Furthermore it enables the comparison of values from different distributions (Schmidt-Atzer and Amelang, 2012).

RESULTS

Of the 201 patients in the original study, 106 had filled out the SCL-90-R at the beginning of the study and 76 at the end of the study; 73% were men and 27% women, the average age was 49 years (SD = 10.0); 67% had a job and 33% were unemployed. The mean duration of the dependence was 16.4 years (SD = 10.6). On average, patients had four (SD = 7.2) detoxifications prior to the study. Abstinence until the end of the study was achieved by 42% ($n = 45$). The other patients relapsed or dropped out (all dropouts were counted as

Table 1. Demographic parameter and statistics

	Abstinent	Relapse	Total	
Gender [count (in percent)]				
Men	35 (78%)	42 (69%)	77 (73%)	$\chi^2 = 1.038$
Women	10 (22%)	19 (31%)	29 (27%)	$P = 0.308$
Age [count]				
Mean	51	48	49	$F = 2.531$
Standard deviation	11	9	9	$P = 0.115$
Education [count (in percent)]				
None	1 (3%)	0	1 (1%)	$\chi^2 = 7.277$
CSE (Certificate of Secondary Education)	4 (10%)	16 (28%)	20 (21%)	$P = 0.201$
General certificate of secondary education	13 (33%)	11 (19%)	24 (25%)	
Final secondary school examination	5 (13%)	5 (9%)	10 (10%)	
Vocational school, college, academy	7 (18%)	10 (18%)	17 (18%)	
University degree	9 (23%)	15 (26%)	24 (25%)	
Unemployment [count (in percent)]				
No	12 (29%)	20 (35%)	32 (33%)	$\chi^2 = 2.045$
Yes	29 (71%)	37 (65%)	66 (67%)	$P = 0.360$
Marital status [count (in percent)]				
Married	16 (40%)	22 (39%)	38 (39%)	$\chi^2 = 2.345$
Widowed	2 (5%)	1 (2%)	3 (3%)	$P = 0.673$
Separated	0 (0%)	2 (4%)	2 (2%)	
Divorced	10 (25%)	13 (23%)	23 (24%)	
Unmarried	12 (30%)	19 (33%)	31 (32%)	
Number of detoxifications				
Mean	3.7	4.6	4.2	$F = 0.355$
Standard deviation	5.9	7.9	7.2	$P = 0.553$
Duration of dependence in years				
Mean	17.4	15.6	16.4	$F = 0.688$
Standard deviation	11.1	10.1	10.6	$P = 0.409$

relapses). There were no differences between the groups of patients who relapsed during the study and those patients who stayed abstinent regarding the demographic parameters (Table 1).

Patients who relapsed during treatment had higher values at the beginning of the study in the overall score of the SCL-90-R GSI ($P < .05$) and in the following subscales of the SCL-90-R compared to who remained abstinent: Interpersonal Sensitivity ($P < .05$), Anxiety ($P < .01$) and Psychoticism ($P < .01$) (see also Table 2).

As seen in Table 2 patients without relapse showed larger decrease of SCL-90 scores over time compared to patients with relapse (see also Fig. 1). Significant or nearly significant results can be reported for the GSI ($P < .01$) and the scales Somatic Distress ($P < .05$), Depression ($P < .05$) and Anxiety ($P < .05$) (see also Table 2, 'levels of significance between groups over time of study').

The logistic regression, using the likelihood ratio (LR) of the Omnibus tests of model coefficients, the null hypothesis 'all regression coefficients are zero' can be rejected with $\chi^2 = 4.615$ and $P = .032$. Thus, the combination of the predictors had a significant influence on the occurrence of relapse. It explains 7.2% of variance. The model offers correct predictions in 59.5% of the cases, which is more than by chance and therefore represents an effective prediction of a relapse (Table 3).

Including only the GSI of the SCL-90-R as a single predictor into the logistic regression analysis, the odds ratio indicates that with each higher standardized *T*-score at the beginning of treatment, the odds of relapse increased 1.04. In a separate logistic regression analysis the remaining predictors of relapse (education, age, gender, marital status, employment status, detoxifications and duration of dependence) as well as the number of symptoms in the SCL-90-R provide no additional information to the occurrence of relapse during a period of 20 weeks after detoxification. In summary, the results show that the risk of relapse potentiates only with increasing SCL-90-R values.

DISCUSSION

The main finding of our study was that patients who remained abstinent were characterized in our trial by lower levels of psychological distress already at the beginning of the study compared to patients who relapsed. Also, patients without relapse showed a larger decrease in some SCL-90-R scales between the beginning and the end of the study compared to patients who relapsed. Third, and most importantly, the logistic regression analyses showed that high scores on the overall score GSI of the SCL-90-R after detoxification can be seen as a predictor for a future relapse above and beyond factors like age and duration of disease.

Similar to Martinotti *et al.* (2010) we also found that there is a significant reduction over time in the overall Global Severity Index score of the SCL-90-R concerning all patients.

Our findings confirm the results by Sander and Jux (2006) that the GSI of the SCL-90-R can help predict relapse. However, our data go beyond these prior results as we evaluated scores at study inclusion and not only at the end of the observation period (Sander and Jux, 2006). Second, for better comparison with measurements in this and other studies, the raw scores of the SCL-90-R were converted to standard values (*T*-values). Thus conclusions regarding the position in relation to the norm sample and comparison of values from different distributions are possible in this study for the first time.

Our results are supported by an observation of Kienast *et al.* (2013), who suggest that negative mood states after alcohol detoxification enhance the relapse risk. Negative mood states may also be

Table 2. SCL-90-R scales, mean normalized *T*-scores

	Beginning of the study Mean (SD) Abstinent, $n = 45$ Relapse, $n = 61$	End of the study Mean (SD) Abstinent, $n = 39$ Relapse, $n = 37$	Levels of significance between groups over time of study (interaction hypothesis)
Global Severity Index (GSI)			
Abstinent	48.51 (12.28)	42.38 (15.11)	
Relapse	54.08 (13.24)	50.14 (17.37)	
Levels of significance between groups	<0.05	<0.05	<0.01
Somatic distress			
Abstinent	52.93 (12.54)	49.94 (13.14)	
Relapse	51.66 (12.68)	52.43 (14.92)	
Levels of significance between groups	$P = .607$	$P = .402$	<0.05
Obsessive-compulsive			
Abstinent	48.11 (12.17)	43.70 (11.37)	
Relapse	52.56 (13.80)	51.12 (15.37)	
Levels of significance between groups	$P = 0.088$	<0.05	$P = 0.05$
Interpersonal sensitivity			
Abstinent	47.64 (11.58)	46.33 (11.83)	
Relapse	53.23 (12.18)	51.06 (12.63)	
Levels of significance between groups	<0.05	<0.05	$P = 0.24$
Depression			
Abstinent	53.51 (12.00)	48.39 (13.23)	
Relapse	57.89 (13.03)	54.93 (16.07)	
Levels of significance between groups	$P = 0.08$	<0.05	<0.05
Anxiety			
Abstinent	50.44 (10.68)	46.39 (11.53)	
Relapse	56.74 (12.47)	54.60 (13.68)	
Levels of significance between groups	<0.01	<0.01	<0.05
Hostility			
Abstinent	48.76 (8.83)	47.14 (11.13)	
Relapse	51.30 (10.43)	50.81 (11.67)	
Levels of significance between groups	$P = 0.189$	$P = 0.126$	<0.10
Phobic anxiety			
Abstinent	50.42 (8.87)	50.50 (9.85)	
Relapse	54.25 (11.48)	52.33 (10.42)	
Levels of significance between groups	$P = 0.066$	$P = 0.388$	$P = 0.19$
Paranoid Ideation			
Abstinent	51.27 (10.67)	48.58 (11.05)	
Relapse	54.66 (11.77)	52.72 (10.80)	
Levels of significance between groups	$P = 0.130$	$P = 0.072$	$P = 0.05$
Psychoticism			
Abstinent	49.51 (8.44)	48.80 (9.84)	
Relapse	55.93 (10.82)	52.83 (11.70)	
Levels of significance between groups	<0.01	$P = 0.077$	$P = 0.24$

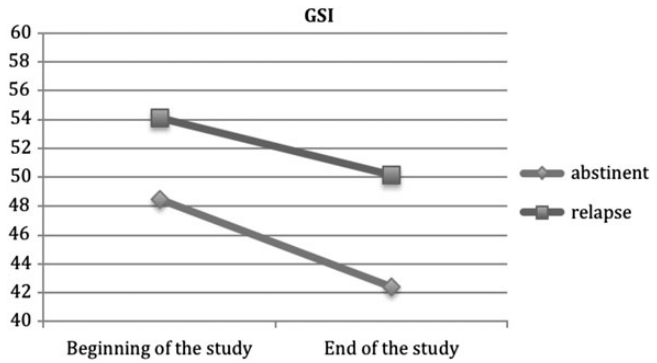

Fig. 1. SCL-90-R/GSI—abstinences and relapses over time.

Table 3. Final model of logistic regression (recorded variables in the equation)

	Regressions coefficient B	Wald	df	Sig.	Odds ratio
Step 1					
GSI	0.039	4.292	1	0.038	1.040
Constant	−1.718	3.029	1	0.082	0.179

enhanced by an activation of the Cortisol-Stress-Axis. It has been shown that corticotrophin-releasing factor type 1 (CRF1) receptor antagonists reduce negative emotional symptoms (psychological stress) and may have therapeutic potential for relapse prevention (Zorrilla *et al.*, 2013).

A strength of the study is its prospective, multicenter and randomized design. Also, the SCL-90-R is easy to fill out and evaluate. It is used not only in research but also in clinical practice. We could show a statistically more accurate likelihood of relapse by SCL-90-t-value-steps.

However, a limitation is that we can only present data on about half the cases of our basic study (Richter *et al.*, 2012). In that trial the study medication had no impact on the relapse rate compared to placebo.

Our sample showed no equal distribution of gender in terms of relapse. Further, the logistic regression could not show gender as a factor of relapse in the SCL-90-R. Also, we did not find that any demographic parameters had an influence on patients' relapse risk.

CONCLUSIONS

Our results suggest that it might be helpful to focus on the reduction of psychological distress in relapse prevention therapies right after detoxification. The SCL-90-R appears to be a useful tool for the clinician to screen patients for distress and assess the likelihood of relapse.

CONFLICT OF INTEREST STATEMENT

None declared.

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