

Psychosocial Predictors of Relapse in Cocaine-Dependent Patients in Treatment

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Relapses in cocaine abusers in treatment are an important problem. The majority of patients are incapable of sustaining abstinence over any length of time. To identify the factors associated to relapses risk in the cocaine use can be an optimal choice to improve the treatment strategies. The aim of this study was to analyze relapse-risk factors in cocaine-dependent patients on treatment. Participants were 102 patients who had begun outpatient treatment at a public health center in Spain. Some functional areas and cocaine use are evaluated for a period of six months. A structural equations model was used to identify possible predictive variables. The results show that social-family environment and economic-employment situation were associated with greater risk of relapse. Likewise, the social-family environment was related to severity of addiction. It is concluded that the incorporation of family intervention strategies and vocational/employment counseling may help to reduce relapse rates in cocaine addicts receiving treatment. *Keywords: cocaine, outpatient treatment, relapse, risk factors, structural equations.*

Las recaídas en el consumo siguen siendo un problema común en el tratamiento de las personas dependientes a la cocaína. La mayoría de los pacientes son incapaces de mantener la abstinencia de forma continuada, por lo que la identificación de factores que se relacionen con un mayor riesgo de recaída en el consumo permite mejorar las estrategias de tratamiento. El objetivo de este estudio fue analizar potenciales factores de riesgo de recaída durante el tratamiento en dependientes a la cocaína. Participaron 102 pacientes que iniciaban tratamiento en una unidad de tipo ambulatorio de la red sanitaria pública de España. Se evaluaron diversas áreas de funcionamiento y el uso de cocaína durante un período de seis meses. Para identificar las posibles variables con valor predictivo se utilizó una modelización matemática con ecuaciones estructurales. Los resultados de este trabajo subrayan que factores psicosociales como el entorno sociofamiliar y la situación económico-laboral tienen capacidad para predecir las recaídas en este tipo de pacientes. También que el entorno sociofamiliar influye en la severidad adictiva. Se concluye que la incorporación de estrategias de intervención familiar y de consejo vocacional puede ayudar a reducir las tasas de recaída en adictos a la cocaína en tratamiento. *Palabras clave: cocaína, tratamiento ambulatorio, recaída, factores de riesgo, ecuaciones estructurales.*

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In the field of addictions, it is accepted that relapses are present in the addictive behavior. A relapse is defined as an interruption in the attempt to change any behavior and it plays an important role in the evaluation of efficacy of treatments designed to promote drug-use cessation (Marlatt, Parks, & Witkiewitz, 2002). It is assumed that the majority of people who wishes to change a behavior (behavior related to smoking, obesity, etc.) will experience relapses (Polivy & Herman, 2002) an certain amount of research in the area of the addictions shows that rates of relapses are very high. Thus, we can assure that relapses are an important challenge in addiction research. The majority of addiction workers recognize that to change a behavior related to drug consumption is difficult to perform but it is more difficult to remain on good behavior.

Despite recent progress in the treatment of drug addiction, relapses continue to be a common problem. The majority of patients are incapable of sustaining abstinence over any length of time (Witkiewitz & Marlatt, 2004). Hence, success rates of treatment programs tend to be moderate, such programs obtaining abstinence rates—according to recent meta-analyses—of around 50 percent, with poorer results in the case of cocaine addiction (Dutra et al., 2008). Therefore, it is necessary to increase this success rates exploring the factors which contribute to treatment efficiency.

Research has identified numerous risk factors that predict cocaine use during or after treatment. Some of these factors include individual aspects, such as sociodemographic characteristics (Heinz, Wu, Witkiewitz, Epstein, & Preston, 2009), psychopathology (McMahon, 2008; Messina, Farabee, & Rawson, 2003; Tate et al., 2008; Waldrop, Back, Verduin, & Brady, 2007), addiction severity (McCamant, Zani, McFarland, & Gabriel, 2007; Poling, Kosten, & Sofuoglu, 2007), low self-efficacy (Dolan, Martin, & Rohsenow, 2008; Hser et al., 2006), craving (Weiss et al., 2003; Lopez et al., 2010), alcohol use (Alterman et al., 2000) or greater presence of psychosocial problems (Simpson, Joe, & Broone, 2002). Also, some treatment-related variables have been seen to be associated with better outcomes, such as greater service intensity and satisfaction (Grella, Hser, & Hsieh, 2003; Hser, Evans, Huang, & Anglin, 2004), use of psychiatric services (Ray, Weisner, & Mertens, 2005) or advice about legal matters (Hser, Joshi, Anglin, & Fletcher, 1999). Sustained self-help participation also appears to be an important factor (McKay, Merikle, Mulvaney, Weiss, & Koppenhaver, 2001).

The influence of psychosocial and environmental factors on relapses risk is shown in (McMahon, 2001; Sun, 2007). Additionally, Dobkin, De Civita, Paraherakis, and Gill (2002), show that the social support is also important to predict the retention in treatment (Dobkin et al., 2002) A comparison of the results obtained from the previous investigation suggests that social interactions, behavior of drug consumption and treatment participation are related (Bohnert, German, Knowlton, & Latkin, 2010; Buchanan & Latkin, 2008). Hence, it is possible to affirm that social

operation is in direct relation to the treatment success (Simpson et al., 2002).

The aim of this study was to generate a model for identifying the psychosocial variables that best predicted the probability of relapse in cocaine-addicted outpatients.

Method

Participants

To be included in this study, individuals had to be at least 18 years of age and meet DSM-IV-TR (American Psychiatric Association, 2000) criteria for cocaine dependence. They were selected randomly from among those that have been in treatment over a two-year period (2007-2009) at the Catarroja Addictive Behaviors Unit [Unidad de Conductas Adictivas de Catarroja], a public outpatient facility run by Dept. 10 of the Valencia Regional Health Ministry (Spain). All of the patients who started the treatment in the Addictive Behaviors Unit and satisfied the requirements could be selected. Patients with severe psychopathological conditions (such as psychoses) were excluded, as were those who, apart from using cocaine, had a principal diagnosis for the use of some other psychoactive substance. .

All patients signed an informed consent document prior to their participation. The final sample was made up of 102 patients (Average age: 31.1 years, Percentage of men: 84.3%, Average time of cocaine consumption: 10 years, Administration-percentage of smoked route: 88%, Average of dependence criteria-DSM-IV: 5.71).

Instruments

During the initial sessions, participants (unaltered by drug effects or abstinence symptoms) had a full medical check-up and subsequently completed several instruments, including a) the Michigan Alcoholism Screening Test (MAST) (Seltzer, 1971), a classical tool to evaluate alcohol dependence. This scale is determined by 25 items and cut-off of more than 4 positive score is accepted to define the alcohol dependence syndrome; b) the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). BDI is use to evaluate the depression. This scale is defined by 21 items and is use to analyze cognitive and conductual alterations; c) the Symptom Check List (SCL-90-R) (Derogatis, Lipman, & Covi, 1973). This tool allows us to evaluate psychopathological problems by percentile scores. It is defined by 90 items and scores of no clinical patients are used; d) the Stages of Change Readiness Treatment Eagerness Scale (SOCRATES) (Miller & Tonigan, 1996). It is a questionnaire with 19 items and is used to study patient motivation. In this work, we consider the direct scores y, e) the European version of the Addiction Severity Index (ASI) (McLellan et al., 1992), the EuropASI (Kokkevi

& Hartgers, 1995). This version of the ASI is a structured interview (one-to-one) with the patient that is performed in order to analyze the consequences of addiction on themselves and their families, medical situation, employment situation, legal situation, social situation, psychiatric aspects, alcohol and drug use. We assume the composite scores because these scores are more reliable than severity ratings (Sánchez-Hervás, Secades, Santonja, Zacarés, & Garcia-Rodriguez, 2009). All of these instruments were administered by a trained staff member.

Assessment of cocaine use during the treatment was made using the *multidrug-cocaine* test (FS Profas, Madrid, Spain), this avoids the problems when evaluated through traditional self-report measures (Rodriguez et al., 2008). This is a chromatographic immunoassay that rapidly detects patients' cocaine use. The reagents in this test detect benzoylecgonine (a cocaine metabolite) at a concentration of 300ng/mL, the value recommended by the NIDA (Hawks & Chiang, 1986) The analytical controls were carried out 2 times per week (Monday and Friday).

Variables

The study's predictor variables were the scores obtained in the instruments mentioned above. Relapse was considered the main dependent variable. It was defined as a categorical variable with seven levels of frequency: without relapses, one relapse, two relapses, three relapses, four relapses, drop-out before the first month and continued consumption-less than 30 days of abstinence, and it was defined according to the classic version of the relapse-prevention model (Marlatt & Gordon, 1985; Marlatt, 1996), as a transitory process that may or not be followed by a return to baseline levels of the target behavior observable prior to the treatment, i.e. the reestablishment of the addictive conduct and its associated behavior after a period of abstinence. One-off cocaine use was defined as a lapse, with relapse being defined as use of the drug for three or more consecutive days in any quantity, detected by means of a marker (toxicological analysis), following the standard criteria of the Project MATCH (1997), modified for measuring cocaine use. A minimum period of 30 days' abstinence from cocaine was required for determining the time elapsed up to the first relapse. Although the length of this period can be considered conservative, it avoids the inclusion of cocaine-use episodes in patients who at admission lack a clear commitment to abstinence, as referred to in previous studies (Tate, Brown, Unrod, & Ramo, 2004).

Procedure

All of the patients received the same psychological intervention consisting in a relapse prevention program focused on abstinence. The basic elements of relapses prevention are subject of the intervention. To be precise,

reduction of the exposure to cocaine and strategies for controlling anxiety or negative moods are included in the program.

Sessions were carried out in individual format once per week during the treatment time (6 months), and patients also received medical assistance and pharmacological treatment where required (for example, for addressing abstinence symptoms at the beginning of the treatment period).

Estimated time duration of each session was 30-45 minutes. Support was also provided to members of the family or significant persons within the patient's environment with specific sessions for members of the family or group sessions with the patients. In order to check abstinence, cocaine use was tested in urine twice a week. All specimens were obtained under direct supervision by a same-sex staff member.

Follow-up of participants was monitored until drop-out or until 180 days after admission, which was the estimated mean treatment period. Depending on the needs, some patients received psychological interventions after the treatment (6 months) but we do not have quantitative information about them. Thus, we only consider the relapses in the treatment period.

Data Analysis

Descriptive and frequency analyses were carried out on the main characteristics of the patients making up the sample. The mathematical model employed, in accordance with the research objectives, was the structural equations model. Such models can be considered as multivariate models of dependence used for causal analysis. They permit dependence at several levels, which is not possible with classical multivariate models. The program used was the EQS 6 for Structural Equations Modeling (Bentler, 2005). To the best of our knowledge, no prior studies have explicitly examined the link between family status, employment situation and relapse using structural equations.

Specification of the structural equations model was carried out based on the correlations shown below. The estimation method used was that of maximum-likelihood (Bentler, 2005; Byrne, 2006). In order to assess the quality of the analysis we used three types of index: (1) measures of absolute fit, such as the Chi-squared statistic, the goodness-of-fit index (GFI) and the Root Mean Square Error of Approximation (RMSEA); (2) measures that rate incremental fit, that is, the comparative fit with respect to a basal model (the adjusted goodness-of-fit index, AGFI); and (3) measures of the model's parsimony (CFI, IFI). Broadly, a good fit of the model is obtained when the χ^2 test allows acceptance of the null hypothesis on the fit of the data, the RMSEA is no higher than .10 (or more strictly, than .08), and the GFI, CFI and AGFI indices approach 1 (Hair, Tatham, Anderson, & Black, 2001).

Results

Sample characteristics and relapse rates during the treatment

Table 1 shows the most important characteristics of the sample.

Six patients (5.9%) left treatment during the first month, thirty patients during the period between first and third

month (29.6%) and fifty and one between first and sixth month (50.0%).

A total of 34 patients (33.3% of the sample) suffered no relapses during the treatment. Of these, 15 patients (14.7%) presented sustained abstinence (no lapses) throughout the six months. Thirty-eight patients (37.4%) had one or more relapse during the follow-up period, the most frequent case being that of a single occurrence (21.6%).

Table 1

Sociodemographic and clinical characteristics of the participants (N = 102)

Sociodemographic	
Age, years ^a	31.1 ± 6.7
Gender (% male)	84.3 (n = 86)
Never married (%)	48.0 (n = 49)
Education, years ^a	9.6 ± 2.5
Chronic medical problem (%)	13.7 (n = 14)
Employed, active (%)	79.4 (n = 80)
Served time in prison (%)	9.8 (n = 10)
Income / € per month ^a	1175 ± 640
Substance abuse	
Years of regular cocaine use ^a	10.05 ± 6.0
Intranasal route (%)	90.2 (n = 92)
Smoked route (%)	8.8 (n = 9)
DSM-IV-TR criteria ^a	5.71 ± 1.1
Alcohol abuse ^b (%)	58.8 (n = 60)
Cannabis abuse ^b (%)	27.5 (n = 29)
MAST score ^a	5.41 ± 5.6
Previous treatments	
Psychiatric treatments (%)	40.2 (n = 41)
Drug abuse treatments (%)	42.2 (n = 43)
Motivation – SOCRATES ^a	
Problem Recognition	31.4 ± 5.3
Ambivalence	54.6 ± 3.3
Taking steps	65.8 ± 4.6
Psychopathological state	
Global Severity Index SCL-90-R ^c	72.57 ± 30.7
Positive Symptom Distress Index SCL-90-R ^c	73.50 ± 30.3
Positive Symptom Total Index SCL-90-R ^c	60.56 ± 30.1
Beck Depression Inventory ^a	15.46 ± 9.7
EuropASI - Composite Scores ^a	
Medical	.12 ± .23
Employment	.21 ± .23
Alcohol	.28 ± .26
Drug	.21 ± .11
Legal	.09 ± .19
Family/social	.28 ± .20
Psychiatric	.33 ± .19

^a Means ± SD ^b Three or more times per week, binges, or problematic irregular use in which normal activities are compromised ^cPercentile

Predictive model

Firstly, all the possible variables such as sociodemographic, toxicological, psychopathological, motivational and related to addictive severity one are considered in the modeling process. Although, in order to get a good fit some of them are not included in the final model. The variables finally considered in the definition of the model are presented in Table 2. This table also shows the study of correlations between the numerical items considered in this study. The categorical variable Employment (Active/Inactive) is also considered in the structural model. This variable is related to Employment Composite Score (Mann-Whitney test = 158.5; $p = .001$). These correlations help to define the predictor variables considered and to specify the estimated structural equations model. As possible predictor variables we considered: number of years of education and family/social EuropASI composite score; active employment pattern and employment EuropASI composite score; and drug EuropASI composite score, alcohol EuropASI composite score and MAST score. The table shows the correlation between the items that define the factors.

The structural equations analysis revealed that the structure of dependent relations, shown in Figure 1, presented a good fit to the data. The χ^2 statistic was equal to 16.65, with an associated p-value equal to .34. The GFI and RSMEA coefficients had values of .94 and .04, respectively. AGFI was .86. The CFI and IFI coefficients had the same value: .97.

The diagram of relations (Figure 1) shows the predictor variables and the “latent factors” generated from those variables, and the relations of influence between them. Also shown is the standardized estimation of each coefficient, which in all cases is statistically significant at 95%. Thus, number of years of education and the “family/social” EuropASI composite score make up what has been called “Social-family environment”; employment record in recent years and the “employment” EuropASI composite score make up the so-called “Economic-employment environment”; and the “drug” and “alcohol” EuropASI composite scores, together with MAST score, make up what is referred to as “Addictive severity”.

As it can be seen, social-family environment and economic-employment environment affect relapse rate.

Table 2
Correlations between predictor variables

	Alcohol Composite Score	Drug Composite Score	MAST Score	Employment Composite Score	Education, years	Family/social Composite Score
Alcohol Composite Score	—					
Drug Composite Score	0.398**	—				
MAST Score	0.575**	0.395**	—			
Employment Composite Score	-0.009	0.065	0.008	—		
Education, years	-0.146	-0.318**	-0.140	0.052	—	
Family/social Composite Score	0.191	0.245*	0.138	0.030	-0.067	—

** Correlation is significant at 99%.

* Correlation is significant at 95%.

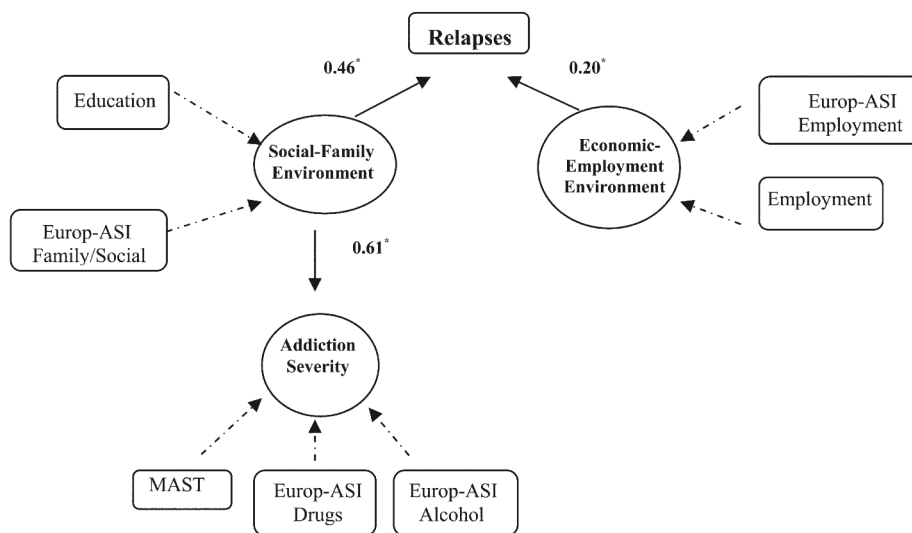


Figure 1. Predictive model of relapse in cocaine addicts.

Additionally, it is shown that social-family environment has also an influence on addictive severity. Taking into account the value of the estimated model coefficients, it can be concluded that the variable with most influence on number of relapses is social-family environment, since it is that which presents the highest associated coefficient (.46). The possible direct influence of Addiction Severity to Relapses was also analyzed in the modeling process but was not significant.

Discussion

The aim of this study was to identify variables with capacity to predict relapses in cocaine use in a group of cocaine addicts attended as outpatients at a public health center in Spain. The results indicated that a broken social-family environment (with problematic family and social relationships, dissatisfaction with home life and low educational level) and a deficient economic-employment situation (low income, lower employment/higher unemployment rate) form two constructs that determine greater risk of relapse in the group of patients studied. Furthermore, the more unfavorable the social-family environment, the greater the severity of addiction, not only for the case of cocaine but also for that of alcohol. Despite attempts to develop other predictive models including variables of a different nature (psychopathological, motivational, etc), no models with the necessary consistency were obtained.

Our findings are important because they suggest a significant influence of social-family status on addiction severity. Previous studies have found that deficient psychosocial functioning may be related to relapse after treatment, both in adolescents (Anderson, Ramo, Schulte, Cummings, & Brown, 2008) and in adult men and women (McMahon, 2001; Sun, 2007). Better social functioning (being married, good education, having a job) is associated with better results in treatment (Simpson et al., 2002). In contrast, lower educational level has been reported as a predictor of poorer results in treatment (Siqueland et al., 1998). In recent studies (Fernández-Montalvo & López-Goñi, 2010; Santonja et al., 2010), it has been found that low educational level and familiar problems are directly related to smaller retention in the treatment. The data provided in this previous research are consistent with our own results. Furthermore, there is evidence that complementing standard attendance at treatment units with additional services that take into account patients' needs can improve treatment results (Hser et al., 2004; Ray et al., 2005, Terra et al., 2008).

A few limitations inherent to the study's design should be mentioned. The fact of studying only relapses during six months restricts the information available, of which there would be more if the measures had also been taken during follow-up. Also, the method of structural equations modeling

could be improved by increasing the number of cases, so that it would be advantageous to increase the sample size in future studies. Finally, the data come from a public outpatient unit in Spain, so that they are not necessarily generalizable to other programs or to other countries. Even so, the present study uses the variables customarily employed in studies on factors that determine relapse.

The detection of factors for predicting treatment results is a difficult task, given the complex dynamic of addictive behavior, in addition to the diversity of variables interacting during interventions. Future studies might consider other types of treatment-related factors, in combination with patient variables, such as type, intensity, duration and format of the treatment, waiting time prior to the treatment program, additional services offered, staff training or staff-patient relations. The results of such studies would permit the assignment of patients to different treatment modalities, maximizing the possibilities of eventual success.

Some therapeutic implications may be derived from these findings. First of all, they highlight the need to incorporate comprehensive services offering counseling and intervention strategies for families, with a view to improving interpersonal and communication skills. And secondly, they underline the importance of incorporating vocational and employment advice and training, with the aim of improving retention and abstinence rates.

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