What Predicts Retention on an In-Prison Drug Treatment Program?

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The effectiveness of treatments for substance use disorders is strongly related to retention, since early dropout from treatment is associated with greater likelihood of relapse. The purpose of this prospective, *ex post facto* study is to analyze the effect of individual variables on retention in a treatment program carried out in a prison drug-free unit. The Addiction Severity Index, motivation and personality profile of fifty inmates were assessed on entry to the prison. Inmates were monitored for a year to identify length of stay. Results: Motivation variables at intake play a vital role in the prediction of retention in a prison drug-free unit; scores on the *Aggressive-Sadistic* and *Narcissistic* scales are also strong predictors of treatment retention.
Keywords: personality, retention, drug, treatment, prison.

La eficacia de los tratamientos para los trastornos por uso de sustancias está altamente relacionada con la retention, pues entre otras cosas el abandono del tratamiento se vincula con una mayor probabilidad de recaída. El propósito de este estudio prospectivo *ex post facto* es analizar el efecto de distintas variables individuales sobre la retención en el tratamiento dispensado en una unidad libre de drogas intrapenitenciaria. Cincuenta internos de este programa fueron evaluados al ingreso en variables relacionadas con el perfil de gravedad de la adicción, la motivación y la personalidad. Resultados: La motivación inicial es una variable fuertemente predictora de la retención en el tratamiento, tanto a los seis meses como al año de estancia. Asimismo, las escalas *Narcisista* y *Agresivo-Sádica* evaluadas por el instrumento MCMI-II también tuvieron capacidad pronóstica en la retención.
Palabras clave: personalidad, retención, drogas, tratamiento, prisión.

Completion of treatment for substance use disorders (SUDs) increases the probability of continuing with a drug-free lifestyle in the future, improves psychological functioning and increases employment opportunities. On the other hand, those who drop out prematurely are more likely not only to relapse into drug use, but also to face legal or employment-related problems (Lang & Belenko, 2000; Prendergast & Anglin, 1995).

Research has also shown how intensive rehabilitation services for prison inmates reduce rates of offending and drug use after release (Gendreau, 1996). In particular, long-term residential treatment programs (such as in-prison therapeutic communities) have proved useful for reducing crime and illicit drug-use behaviors in prisoners after their release (Inciardi, Martin, Butzin, Hooper, & Harrison, 1997; Knight, Simpson, & Hiller, 1999; Wexler, Melnick, Lowe, & Peters, 1999), and have succeeded in reducing the risk of recidivism in those who complete the program (Hiller, Knight, Broome, & Simpson, 1996).

A range of variables have been proposed for predicting retention on in-prison programs and on programs alternative to a prison sentence. As regards patient characteristics, these would include sex, age, associated psychopathology or severity of the affected areas and criminal record (Hartley & Phillips, 2001; Hickert, Boyle, & Tollefson, 2009; Mateyoke-Scrivner, Webster, Staton, & Leukefeld, 2004). Among the program characteristics proposed as linked to retention – and in spite of the dearth of studies on this topic in prison-based treatments – would be staff-patient ratio, satisfaction with the program and the therapeutic alliance (Hawkins, Baer, & Kivlahan, 2008; Villafranca, McKellar, Trafton, & Humphreys, 2006).

Motivation for treatment and legal pressure have emerged as robust predictors of retention on community treatment programs in some research (Brocato & Wagner, 2008; De Weert-Van Oene, Schippers, De Jong, & Schrijvers, 2001), though in other studies the influence of these factors was considerably less (Hiller, Knight, & Simpson, 1999). In spite of this, inmates who remained on treatment programs for more than one year were five times more likely to obtain positive results (Simpson, Joe, & Rowan-Szal, 1997). More specifically, positive results would mean improved relationships with family and friends (Bell, Richard, & Feltz, 1996), a reduction in the number of illegal activities (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997) and lower recidivism rates than in offenders with untreated SUDs or who dropped out of programs early (Cresswell, 2001). Even so, around half of those who begin substance-abuse treatment programs alternative to imprisonment drop out of them in the first three months (Knight, Hiller, Broome, & Simpson, 2000; Messina, Wish, & Nemes, 2000; Nielsen, & Scarpitti, 2002).

Analyzing the predictive role of motivational and treatment variables, De Weert-Van Oene et al. (2001) concluded that the therapeutic alliance was a powerful predictor of retention. Initial motivation and behavioral intention, despite having little impact during the early phases of the programs, take on considerable weight as the treatment advances, and thanks to their association with the therapeutic alliance, emerge as relevant factors in the prediction of how long a person remains on the treatment program.

Another variable proposed in the explanation of retention is the presence of comorbid mental disorders. Although it is known that the proportion of psychiatric problems in samples of prison inmates is higher than in community samples (Abram & Teplin, 1991), the phenomenon of dual diagnosis is not always negatively associated with retention. Thus, like the sociodemographic variables mentioned previously, dual diagnosis has been linked to both remaining on treatment programs (e.g., Joe, Simpson, & Broome, 1998; Veach, Remley, Kippers, & Sorg, 2000) and dropping out of them (e.g., Amodeo, Chassler, Oettinger, Labiosa, & Lundgren, 2008; Hickert et al., 2009; Lang & Belenko, 2000; Sung, Belenko, Feng, & Tabachnick, 2004). In research on the variables that predict retention, Joe et al. (1998) analyzed 37 drug-abuse treatments in 2265 individuals, finding that motivation (recognition of the problem and good disposition toward treatment) and psychiatric comorbidity were related to retention in all the treatment modalities analyzed. In contrast, Lang and Belenko (2000) showed that a history of psychiatric treatment multiplied by four the probability of dropout from treatment in a therapeutic community alternative to imprisonment.

In sum, the variables related to retention on prison-based treatment programs are diverse, and results from the international literature are inconsistent. Therefore, the aim of the present work was to analyze the weights of these variables in a sample of prison inmates with addiction problems receiving treatment in a drug-free unit (*Unidad Terapéutica y Educativa*, UTE) at a Spanish prison. For this purpose we analyzed sociodemographic, medical, legal, family, psychiatric, motivational and drug and alcohol-use data.

Method

The UTE drug-free unit at the Villabona prison applies a treatment program for inmates with substance use disorders based on an alternative prison model involving co-management of the module by inmates and prison staff. The UTE program has some traditional elements of Therapeutic Community models, such as stimulus control strategies, group sessions, occupational therapy and contingency contracts.

Participants

The sample was made up of 50 drug-dependent males who entered the UTE voluntarily in 2006. Mean age of the participants was 31.78 (*SD*: 8.39), and inclusion criteria

were: a current disorder of substance abuse or dependence according to the DSM-IV-TR criteria, Spanish-speaking, and no previous admission to the unit (or, in cases of previous admission, a maximum of one month's stay). All participants signed an informed consent form after being assured of the confidentiality of the data provided.

Instruments

European version of the Addiction Severity Index -EuropASI- (Kokkevi & Hartgers, 1995): This semi-structured interview is designed to obtain information on the different aspects that can contribute to processes of abuse-dependence, for the cases of both alcohol and other drugs. The interview explores the following areas: medical situation, employment/support, alcohol use, drug use, legal situation, family and social relations and psychiatric status. Composite Scores were used for scoring the instrument, given that, in the opinion of its authors, not only do they eliminate the high degree of interviewer subjectivity, but they are also more appropriate for the research context (McLellan et al., 1985). We did not use composite scores for the legal and employment areas, as they were not applicable to prison inmates. This instrument is valid and reliable, as demonstrated in several studies (Chermack et al., 2000; Leonhard, Mulvey, Gastfriend, & Shwartz, 2000).

Millon Clinical Multiaxial Inventory II –MCMI-II- (Millon, 1997): The MCMI-II is a self-applied clinical questionnaire for the assessment of the personality and different clinical syndromes. A BR score >74 indicates suspected presence of a disorder and a BR score >84 indicates the presence and severity of that disorder (Millon, 1997). The inventory has good psychometric properties, with high coefficients in all the scales (Choca & Van Denburg, 1998; Millon, 1999).

Stages of Change Readiness and Treatment Eagerness Scale -SOCRATES- (Miller & Tonigan, 1996): This is a self-applied questionnaire made up of 19 items that rate the degree of readiness for change and the patient's desire to initiate treatment. It is made up of three factors: *Recognition*, *Ambivalence and Taking Steps* (first steps for making changes). The original authors confirm its good psychometric properties, with Cronbach's Alpha between .60 and .96 in the three subscales, and test-retest reliability between .82 and .94.

Procedure

The sample for this prospective *ex post facto* study with one independent variable – length of stay in the unit – was made up of all individuals who were entering the unit (UTE) for the first time and met the inclusion criteria. All filled out the EuropASI and the motivation questionnaire (SOCRATES) during their first week in the unit. To minimize the biases stemming from active use or withdrawal syndrome, the MCMI-II was administered after the individuals had spent a month in the unit. Participants were re-assessed at 1 month, 6 months and 12 months after entering the unit.

Data analysis

In order to achieve the objective of this study, set out very clearly in the final paragraph of the Introduction, we carried out a Cox regression analysis. Through Cox regression we can obtain a linear function of the independent variables previously described, which permits to estimate at both 6 months and 1 year (according to the number of days spent in the unit) the probability that inmates will drop out of the UTE program. Selection of the variables to be entered in the analysis as predictor variables, with a view to avoiding multicollinearity and not entering variables unrelated to the fact of dropping out from or remaining in the UTE, required a sequential and ordered analysis of the data in which, as well as considering those variables found to be relevant in the literature review (as shown in the Introduction) we took into account two other aspects. The first of these is that the possible predictor variables should be related to the fact of remaining on the UTE program or dropping out of it (dichotomous variable). Thus, if the possible predictor variables were qualitative, contingency table analyses were carried out with examination of the χ^2 or Phi coefficient (depending on the number of levels of the possible independent variable). When the independent variables were quantitative we examined whether there were statistically significant differences between the categories of remaining in the UTE and leaving it. The contrast statistic was chosen according to whether or not the distribution of the variables met the criterion of normality (Newman-Keuls). When this criterion was not met, we used the Mann-Whitney U statistic; when it was met we used the Brown-Forsythe statistic if the variances were not homogeneous across the groups (according to Levene's statistic) and the Student t statistic if the variances were homogeneous.

The second aspect we took into account was the relationship of the possible predictor variables with one another, with a view to avoiding multicollinearity. To this end we examined the correlations between them by means of the Spearman statistic.

The result obtained from the above analyses and from the results found by other authors determined the variables entered in the Cox Regression analysis. In order to select the subset of predictor variables that provided most information on the probabilities of belonging to either of the two groups identified by the values of the criterion variable (dropout or retention), we used the Forward selection method and the Rao Efficient Score and Wald statistic criteria for choosing and eliminating variables. For

Table 1

Sociodemographic characteristics of those who dropped out (n = 25) versus those who remained (n = 25)

Variables	Retenti.on	Dropout
Age (M, SD)	34.04 (9.07)	29.52 (7.12)
Chronic illness (*n*, %)	16 (64%)	13 (52%)
Marital status (*n*, %)		
Married or cohabiting	5 (20%)	10 (40%)
Separated or divorced	5(20%)	2 (8%)
Single	15 (60%)	13 (52%)
Job not specified (*n*, %)	15 (60%)	16 (64%)
Employment pattern last 3 years (*n*, %)		
Full-time	18 (72%)	16 (64%)
Part-time	6 (24%)	6 (24%)
Not in work (unemployed, in prison, etc.)	1(4%)	3 (12%)
Main source of income (*n*, %)		
Employment	6 (24%)	2 (8%)
Pension or benefits	4 (16%)	6 (24%)
Family or friends	14 (56%)	14 (56%)
Illegal	1 (4%)	3 (12%)
Years of sentence remaining (M, SD)	4.84 (4.71)	3.91 (3.59)
Sentenced	14 (56%)	12 (48%)
Preventive	11 (44%)	13 (52%)
Type of crime		
Crimes against property	9 (36%)	16 (64%)
Violent crimes	12 (48%)	14 (56%)
Victim of abuse in childhood	12 (48%)	13 (52%)

assessing the model's goodness of fit and analyzing the degree of probability of the results from this sample based on the adjusted model, we examined the -2 Log Likelihood (-2Ll) statistic and the Chi-squared value.

The data analysis was carried out using the SPSS (V.17.0) statistical package. Level of statistical significance used was a = .05.

Results

Sample description

The sample was made up of 50 male prison inmates with addiction problems, a mean age of 31.78 years (*SD* = 8.39) and approximately 4 years of their sentence remaining. Fifty per cent of the participants reported being polydrug users; 26% used mainly heroin, 12% mainly cocaine, 6% mainly cannabis and 6% mainly alcohol. Mean age at first use varied by substance, the earliest being cannabis (14 years) and alcohol (15.76 years), followed by opiates (16 years) and cocaine (18.51 years). Mean of previous treatments for addictive disorders was 2 programs, with a range of 0 to 9 programs.

Table 1 shows other sociodemographic and criminal record data of the sample on entering the UTE unit, according to retention or dropout at 1 year.

Table 2 shows the main differences between the initial assessments of the group of inmates who dropped out and those who remained in the UTE for 12 consecutive months. The same table also provides the summed scores for the instruments administered – EuropASI, SOCRATES and MCMI-II.

As regards the EuropASI, we found statistically significant differences between the group that remained for a year and those who dropped out, mainly in the medical and psychiatric areas, more serious in those who dropped out, and in alcohol use, more serious in those who remained. On the other hand, there are no significant differences between the retention and dropout groups in nominal variables, such as presence of chronic infectious illness (χ^2 = .739, *p* = .567), criminal charges pending (χ^2 = 3.94, *p* = .088), marital status (χ^2 = 3.09, *p* = .213) or substance mainly used (χ^2 = 3.77, *p* = .438).

As far as motivation is concerned, level of *Recognition* of the problem is low in both groups, and medium-high in the early phases of therapeutic change. There are differences in *Ambivalence*, with a medium level in the retention group and a low level in the dropouts (*p* = .035).

Table 2

Differences between dropout and retention groups after 1 year of the program

Variable	Total N = 50 M, SD	Retention group N = 25	Dropout group N = 25	Contrast statistic
EuropASI				
Composite Score medical area	. 265 (.27)	.182 (.237)	.349 (.281)	.038*
Composite Score alcohol use area	. 117 (.13)	.163 (.166)	.056 (.051)	.009**
Composite Score drug use area	.157 (.11)	.157 (.114)	.157 (.116)	.986
Composite Score family area	. 340 (.24)	.288 (.230)	.391 (.247)	.132
Composite Score psychiatric area	. 303 (.23)	.237 (.233)	.369 (.213)	.034*
SOCRATES				
Recognition	29.06 (6.64)	30.28 (4.65)	27.84 (8.08)	.199**
Ambivalence	14.34 (3.83)	15.48 (2.96)	13.20 (4.31)	.035
Taking Steps	34.54 (5.52)	36 (3.317)	33.08 (6.84)	.063**
MCMI-II				
Schizoid	62.06 (22.25)	62.84 (24.20)	61.28 (20.58)	.807
Phobic	57.92 (25.41)	53.60 (29.41)	62.24 (20.36)	.234**
Dependent	61.58 (29.78)	63.72 (25.64)	59.44 (33.83)	.617
Histrionic	58.84 (23.43)	53.96 (19.92)	63.72 (25.96)	.143
Narcissistic	54.18 (25.87)	44.76 (22.56)	63.60 (25.94)	.009
Antisocial	72.96 (33.93)	66.84 (39.34)	79.08 (26.93)	.206**
Aggressive-Sadistic	55.42 (29.74)	47.44 (30.26)	63.40 (27.53)	.057
Compulsive	61.04 (27.51)	66.48 (25.38)	55.69 (28.96)	.164
Passive-aggressive	47.12 (31.98)	40.08 (30.42)	54.16 (32.54)	.121
Self-destructive	56.40 (27.69)	51.52 (31.35)	61.62 (23.08)	.217
Schizotypal	63.06 (26.17)	55.56 (30.58)	70.56 (18.60)	.043**
Borderline	59.90 (30.21)	51.76 (29.85)	68.04 (28.89)	.056
Paranoid	63.68 (26.04)	57.20 (23.87)	70.16 (26.97)	.078
Anxiety	48.62 (30.45)	47.44 (30.87)	49.80 (30.60)	.787
Hysteriform	47.14 (27.45)	46.20 (30.94)	48.08 (24.07)	.812
Hypomania	52.78 (24.36)	43.84 (22.75)	61.72 (22.96)	.008
Depressive neurosis	44.04 (29.41)	40.36 (28.57)	47.72 (30.36)	.382
Alcohol abuse	76.42 (30.69)	75.56 (37.42)	77.28 (22.84)	.845
Drug abuse	75.46 (26.60)	71.76 (27.89)	79.16 (25.26)	.330
Psychotic thinking	60.40 (28.21)	52.56 (30.69)	68.24 (23.56)	.049
Major depression	47.42 (32.09)	41.00 (34.50)	53.84 (28.74)	.160
Psychotic delusions	70.72 (22.12)	65.84 (22.57)	75.40 (21.03)	.128

Note: The contrast statistics used were:

Student t when the normality assumption is fulfilled,

* Mann-Whitney U when the normality assumption is not fulfilled

** Brown-Forsythe Test when homogeneity of variances criterion is not met

Finally, statistically significant differences are found in the raw scores of some personality traits, specifically Narcissism, Schizotypy, Hypomania and Psychotic Thinking, with statistically higher values in those from the dropout group. In the total sample, strong correlations were found between age at first use of some substances and certain altered personality traits, assessed by the MCMI-II. For example, the earlier the age at first heavy drinking, the higher the score on the Psychotic Delusions scale. Likewise, early first use of cocaine is reflected in high scores on the Schizoid, Histrionic, Self-destructive, Schizotypy, Hysteriform, Hypomania, Psychotic Thinking and Major Depression scales. Similarly, early first cannabis use increases scores on the scales: Antisocial, Aggressive-sadistic, Passive-aggressive, Self-destructive, Borderline, Drug abuse, Psychotic Thinking and Psychotic Delusions (see Table 3).

Table 3

Correlations (Spearman's Rho) between age at first use of each substance/years of regular use and score on the MCMI-II scales

	Schizoid	Phobic	Dependent	Histrionic	Narcissistic	Antisocial	Aggressive-sadistic	Compulsive	Passive-aggressive	Self-destructive	Schizotypal	Borderline	Paranoid	Anxiety	Hysteriform	Hypomania	Depressive neurosis	Alcohol abuse	Drug abuse	Psychotic thinking	Major depression
Age alcohol	.205	.198	.020	.077	.143	.162	.137	-.222	.249	.110	.138	.122	.005	-.005	-.012	.183	-.050	.217	.091	.186	.161
Years Alcohol	.072	.119	-.072	.114	.293*	.211	.287*	-.142	.255	.093	.087	.134	.117	-.077	-.112	.200	-.091	.243	.145	.137	.086
Age heroin	-.098	.102	-.185	.045	.234	.270	.289*	.019	.177	.078	.053	.190	.217	-.069	-.106	.099	.031	.206	.294*	.117	.062
Years heroin	-.108	.053	-.331	.097*	.229	.323	.234	-.238*	.209	-.028	-.005	.161	.126	-.115	-.082	.138	-.071	.235	.376**	.028	.028
Age methadone	-.188	-.049	-.276	.167	.144	.215	.126	-.267	.159	-.019	-.056	.098	.035	-.081	-.077	.175	.035	.096	.289*	-.013	.049
Years methadone	-.080	.083	-.348*	.134	.166	.269	.246	-.295*	.278	.049	.039	.153	.023	-.056	-.061	.199	.021	.164	.349*	.080	.063
Age opiates	.116	.284*	-.328*	.001	.173	.321*	.221	-.085	.243	.193	.118	.292*	.258	.131	.127	.031	.223	.267	.274	.328*	.197
Years opiates	.101	.288*	-.327	.008*	.185	.322*	.232	-.073	.251	.195	.127	.298*	.266	.138	.131	.049	.230	.270	.280*	.332*	.204
Age BDZ	-.197	.056	-.248	.000	.093	.231	.292*	.014	.165	.053	-.127	.103	.158	-.068	-.184	.031	.046	.230	.251	-.010	.011
Years BDZ	-.272	-.027	-.494**	-.027	.127	.219	.383**	-.142	.198	-.047	-.233	-.004	-.016	-.228	-.329*	-.004	-.086	.161	.232	-.093	-.091
Age cocaine	-.249	-.256	-.097	-.156	-.097	-.069	-.100	.196	-.263	-.289*	-.293*	-.197	-.111	-.212	-.218	-.254	-.246	-.035	-.075	-.207	-.295*
Years cocaine	.050	.086	-.143	.200	.298*	.260	.189	-.132	.122	.062	.120	.161	.227	-.079	-.081	.280	-.015*	.253	.319*	.182	.032
Age amphetamines	-.422	-.196	-.373	.111	.120	.208	.145	-.273	.108	-.165	-.158	.021	.034	-.163	-.184	.101	-.060	.103	.259	-.039	-.061
Years amphetamines	-.230	-.127	-.385**	.127	.186	.255	.216	-.499**	.192	-.077	-.049	.068	.001	-.160	-.159	.151	-.066	.139	.312*	-.023	.023
Age cannabis	-.118	-.343*	.120	-.197	-.342*	-.302*	-.374**	.167	-.402**	-.389**	-.183	-.332*	-.238	.010	.000	-.209	-.010	-.227	-.215	-.287*	-.200
Years cannabis	-.092	-.020	-.246	.137	.112	.209	.027	-.072	.047	-.105	.045	.092	.133	.073	.049	.126	.096	.085	.305*	.072	.071

* Significant correlation at .05 level; ** Significant correlation at 0.01 level

Table 4
Variables in the Cox Regression equation

		B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
								Lower	Upper
6 months, 183 days									
Step 1	pr	−.095	.036	6.885	1	.009	.910	.848	.976
Step 2	pr	−.120	.040	8.819	1	.003	.887	.820	.960
	TEB	.029	.010	8.649	1	.003	1.029	1.010	1.049
1 year, 365 days									
Step 1	pr	−.094	.034	7.836	1	.005	.910	.852	.972
Step 2	pr	−.097	.031	9.621	1	.002	.907	.853	.965
	TB5	.027	.010	8.091	1	.004	1.028	1.008	1.047

Legend: pr= Taking Steps; TEB= Aggressive-sadistic; B: Values of the model parameters; SE: Standard error of the parameters; Wald: Wald Statistic; df: Degrees of freedom; Sig: Probability under Ho; Exp. (B): Relative risk.

Table 5
Fit statistics of the models at 6 months and 1 year

Step	-2 log likelihood (c)	Global (score)			Change since previous step			Change since previous block		
		Chi-squared	df	Sig.	Chi-squared	df	Sig.	Chi-squared	df	Sig.
6 months, 183 days										
1(a)	114.739(e)	7.269	1	.007	5.104	1	.024	5.104	1	.024
2(b)	105.748	14.555	2	.001	8.991	1	.003	14.096	2	.001
1 year, 365 days										
1(c)	175.008(f)	8.017	1	.005	6.049	1	.014	6.049	1	.014
2(d)	166.274	16.383	2	.000	8.734	1	.003	14.783	2	.001
	TB5	.027	.010	8.091	1	.004	1.028	1.008	1.047	

Legend: a Variables entered in step 1, 6 months: pr; b Variables entered in step 2, 6 months: TEB; e Initial block number 0, initial log-likelihood function: -2 log likelihood: 119,843; c Variables entered in step 1, 1 year: pr; d Variables entered in step 2, 1 year: TB5; f Initial block number 0, initial log-likelihood function: -2 log likelihood: 181,057

Predictive analyses: Cox Regression

a) Prediction of retention on the UTE program at 6 months

Sixteen participants (32%) dropped out of the UTE program prior to the 6-month mark. Table 4 shows the number of steps and the variables selected at each of them in developing the prediction model, the values of the regression model parameters, the standard error and the significance.

Estimation of the Z function on the basis of the variables selected *Taking steps* (SOCRATES motivation scale) and score on the MCMI-II *Aggressive-Sadistic* is $\hat{Z} = −.120pr + .029TBE$. We observe, therefore, that despite both variables being statistically significant, the *Taking Steps* variable is the more important in the prediction of dropout from the UTE, signifying that an increase in one unit in this variable increases the logarithm of rate of risk by -.120 (controlling all the other variables included in the equation). It is important to note column Exp(B), which shows the relative risk of increasing one unit in each of the corresponding covariables, being higher for the score on the *Aggressive-Sadistic* scale than for *Taking Steps.* Thus, the risk function according to the *Exp(B)* values in Table 4 is $\hat{g}(X) = (0.887)^{Pr}(1.029)^{TBE}$.

Therefore, the higher the score in *Taking Steps (pr)*, the lower the risk of dropout, and the higher the score in the *Aggressive-Sadistic (TBE)* personality trait, the greater the risk of dropout.

Table 5 shows the goodness-of-fit indices for the model. We can see how, as variables are entered in the model, the -2 log likelihood statistic decreases in value, indicating better fit of the model. To test the null hypothesis that at each stage, for all the variables in the model, all the associated parameters are null, we observe the chi-squared statistic. An increase in this value indicates better fit.

Table 6 shows survival (probability of not dropping out from the UTE), which is represented graphically in Figure 1.

Table 6

Table showing survival at 6 months and 1 year

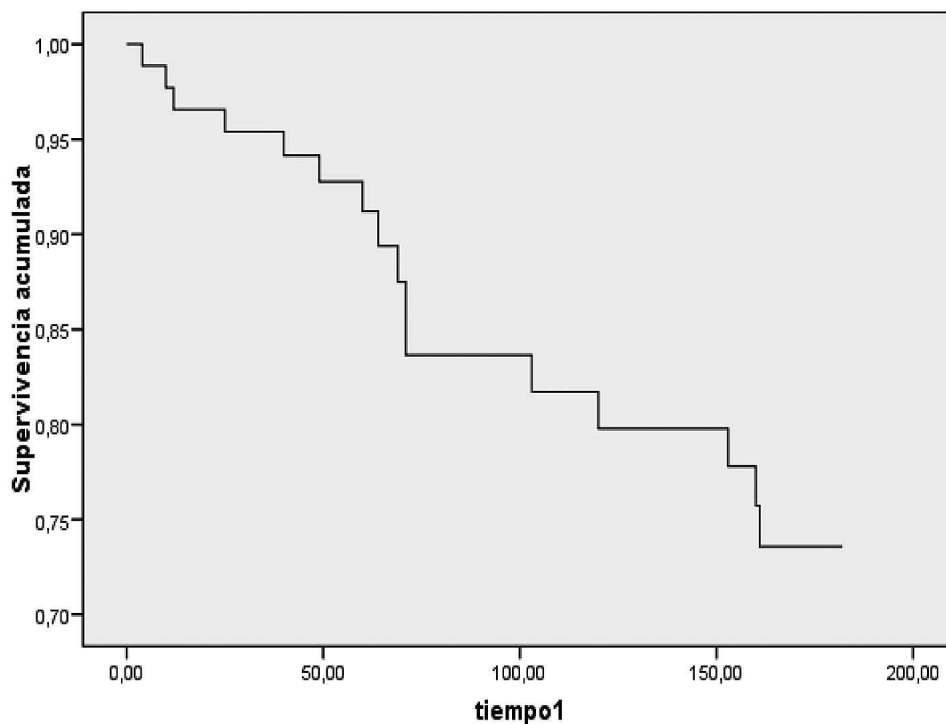|		6 months					1 year		
Time	Accum.	Survival	SE	Accum.	Time	Accum.	Survival	SE	Accum.
4.00	.146	.989	.012	.011	4.00	.082	.988	.013	.012
10.00	.296	.977	.017	.023	10.00	.165	.975	.019	.025
12.00	.448	.966	.022	.035	12.00	.250	.963	.023	.038
25.00	.604	.954	.027	.047	25.00	.336	.951	.028	.051
40.00	.773	.941	.031	.060	40.00	.438	.936	.032	.066
49.00	.960	.928	.035	.075	49.00	.561	.919	.037	.085
60.00	1.178	.912	.039	.092	60.00	.692	.901	.041	.104
64.00	1.436	.894	.044	.112	64.00	.834	.882	.045	.126
69.00	1.708	.875	.048	.134	69.00	.985	.862	.048	.149
71.00	2.285	.836	.055	.179	71.00	1.308	.821	.055	.197
103.00	2.584	.817	.058	.202	103.00	1.475	.801	.057	.223
120.00	2.891	.798	.061	.226	120.00	1.646	.780	.060	.248
153.00	3.212	.778	.064	.251	153.00	1.822	.760	.062	.275
160.00	3.556	.757	.066	.278	160.00	2.010	.738	.064	.303
161.00	3.926	.736	.069	.307	161.00	2.209	.717	.066	.333
					188.00	2.628	.673	.070	.396
					199.00	2.848	.651	.071	.430
					246.00	3.080	.628	.072	.465
					248.00	3.322	.606	.073	.501
					254.00	3.570	.584	.074	.539
					285.00	3.832	.561	.075	.578
					292.00	4.116	.537	.075	.621
					359.00	4.429	.513	.076	.668

Figure 1. Survival function in mean of covariables at 6 months.
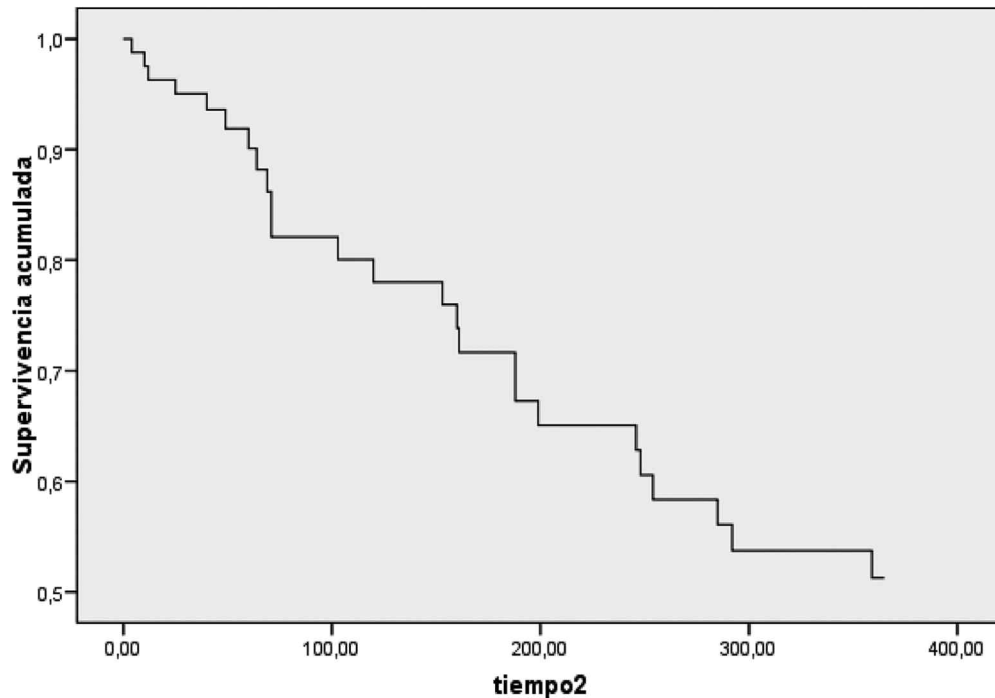
Figure 2. Survival function in mean of covariables at 1 year.

b) Prediction of retention on the UTE program at 12 months

Over a period of 1 year, half (25) of the inmates who began the program dropped out of it. The model includes two variables, score on the *Taking Steps* subscale (the same as at 6 months) and score on the *Narcissistic* scale. Estimation of the Z function based on the selected variables is $\hat{Z} = -.9pr + .027TB5$. We can observe, then, that in spite of the fact that both variables are statistically significant, at 1 year also the variable *Taking Steps* carries more weight in the prediction of dropout from the UTE, and to a greater degree than at 6 months, signifying that an increase in one unit in this variable increases the logarithm of the rate of risk by -.97 (controlling all the other variables in the equation). The relative risk of increasing one unit in each of the corresponding covariables is greater for the *Narcissistic* variable than for *Taking Steps*. Thus, the risk function according to the *Exp(B)* values in Table 4 is $\hat{g}(X) = (0.907)^{Pr}(1.028)^{TBE}$. Therefore, the higher the score in the *Taking Steps (pr)* variable, the lower the risk of dropout, and the higher the score in *Narcissism (TB5)*, the greater the risk of dropout.

The scores obtained by the study sample in the two personality variables emerging as predictors at 6 months and 1 year show high correlations at the $p = .01$ level between one another ($r=.701$, $p < .001$), so that the higher the score on the *Aggressive-Sadistic* scale, the higher the score on the *Narcissistic* scale, and vice versa. Likewise, both scales correlate positively with score in the *Antisocial*

personality trait, $r=.773$, ($p<.001$) in the former case and $r=.630$ ($p < .000$) in the latter.

Table 5 shows how the model's goodness-of-fit indices are also satisfactory. Survival at 1 year (probability of not dropping out of the UTE) is shown in Table 6, and is represented graphically in Figure 2.

Discussion

This study was designed for the purpose of calculating the percentages of retention in a prison-based drug-free unit (UTE) and of identifying the interpersonal variables behind them. We considered variables of motivation, personality and severity of addiction in different areas of the participants' lives. Based on the results obtained we can state that the percentages of retention are 68% of the sample at six months and 50% at 1 year of the treatment.

Moreover, initial motivation toward the treatment emerges as the variable that best predicts retention on this treatment program applied in the UTE unit. This was the case both at 6 months and at 1 year of the intervention. Specifically, we observed that the higher the score on the SOCRATES subscale *Taking Steps*, the greater the probability of retention. High scores on this subscale imply that the person has already acknowledged the problem and resolved his ambivalence, which leads him to seek ways of avoiding a return to drug use. The results coincide with those obtained by Brocato and Wagner (2008), for whom

treatment retention is related to motivation for change and recognition of the problem is linked to the therapeutic relationship, while motivational changes in response to treatment are also positively associated with the therapeutic alliance. Likewise, and using samples similar to our own, initial levels of motivation predicted continuation of treatment after the release from prison of a sample of inmates (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000).

In this study we also observed how the presence of dual diagnosis, or rather, of a diagnosis of addictive disorder added to alterations of personality traits assessed with the MCMI-II, has a negative influence on retention. Specifically, the higher the score in the *Aggressive-sadistic* personality trait, the greater the risk of dropout in the first 6 months. Likewise, the higher the score on the *Narcissistic* scale, the greater the risk of dropout at 1 year.

Recently, Fernández-Montalvo et al. (2004), López and Becoña (2006) and Casares-López et al. (2010) found high percentages of personality disorders in addicts in treatment, observing that such comorbidity was also associated with therapeutic dropout. A total of 72.2% of those with two or more personality disorders dropped out of treatment, as against 33.3% of those without comorbid disorders or with just one (Fernández-Montalvo et al., 2004). Moreover, in that same study, 86.6% of those with two or more personality disorders who dropped out of the treatment did so early – specifically in the first four months of the program.

Previously, other authors had observed relationships between comorbid psychopathology and therapeutic dropout. For example, with a sample of 339 inmates on a treatment program alternative to imprisonment, Hiller et al. (1999) showed that early dropout was associated with high levels of depression, anxiety and hostility, as well as previous treatment for psychiatric disorders. In fact, the *Aggressive-sadistic* personality trait, which shows high predictive value in our study, has a good deal to do with hostility (a risk factor for dropout in the study by Hiller et al., 1999) and with *Antisocial* personality, which is defined by the expression of illegal behaviors aimed at manipulating the context in one's favor. Although, paradoxically, the score on the antisocial personality scale did not emerge as predictive in the analyses carried out in our study, the high correlation between this scale and the *Aggressive-Sadistic* and *Narcissistic* scales – which were indeed strongly predictive – explains why the regression equation did not select this variable.

The presence of antisocial personality disorder in substance users in treatment has been found to be associated with more violent and aggressive behaviors, more serious criminal activity and greater use of illicit substances (Compton, Cottler, Jacobs, Ben-Abdallah, & Spitznagel, 2003; Cottler, Price, Compton, & Mager, 1995). It is easy to understand, therefore, how high levels of aggression and poor anger management make it more difficult to adapt to norms, and also hinder tolerance to the confrontation situations involved in these programs.

As in previous studies (Franken & Hendriks, 2000), chronicity of substance use and age at first use are related to the emergence of altered personality traits and Axis II disorders.

In conclusion, severity profile of the addiction and sociodemographic variables did not emerge as influential variables in retention in a drug-free unit providing treatment for prisoners with substance use disorders, though it is true that those who decide to remain on the program for 12 months present more severity in the area of alcohol use and fewer medical and psychiatric problems. We also confirmed the hypothesis that initial motivation is strongly predictive of retention in prison-based drug-free treatment programs, and that some personality variables have a clear influence on it, specifically those reflected in the *Narcissistic* and *Aggressive-Sadistic* scales, linked to *Antisocial* thinking, and therefore to hostility.

The present work is not without its limitations. It is a naturalistic study, with a procedure that does not permit the random distribution of the sample, and whose sample size is small, so that the possibility for generalization of the results is restricted. Moreover, the literature on retention on drug-treatment programs has found other modulating variables that are not assessed in this research. As examples, some studies have studied the prognostic capacity of certain thinking styles, such as the *criminal thinking style* (Hiller et al., 1999; Walters, 2004; Walters, White, & Denney, 1991), while other have analyzed the different forms in which free time is used, the degree of satisfaction with the program or the individual's social conformity (Hickert et al., 2009; Lang & Belenko, 2000). None of these aspects were considered here, but they may be associated with retention. However, this is a pioneering study in our country as regards the assessment of relevant variables in prison samples, and provides results that can help to improve the management of cases involving prisoners with addictive disorders, and to develop strategies for improving retention rates in prison-based drug-free treatment programs.

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