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## Factors associated with discharge against medical advice from an alcohol and drug inpatient detoxification unit in Barcelona between 1993 and 2006

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### Summary

Records from 1,228 consecutively admitted patients (74.5% male) to an inpatient detoxification unit in Barcelona between 1993 and 2006 were examined to determine factors associated with discharge against medical advice (AMA). 21.5% of admissions were discharged AMA. In multiple logistic regression and compared with patients who were medically discharged, those discharged AMA were younger, more likely to be dependent on heroin, other opiates, cocaine or psychostimulants, or to be experiencing reduction or elimination methadone maintenance therapy [reference category: alcohol]. The provision of assistance to clinicians in identifying the patients who are most at risk of leaving inpatient detoxification AMA will enhance their ability to motivate such patients to stay in treatment.

**Key Words:** Discharge against medical advice (AMA), detoxification.

### 1. Introduction

Inpatient detoxification is a common treatment modality for substance-dependent individuals. Studies report that around 13%-64% leave treatment against medical advice (AMA) or do not complete treatment [1]; more precisely, the range is 13%-33% among alcohol abusers [8,10] and 18%-64% among heroin abusers [1,2,6,9,11,12]. Despite these elevated rates, the reasons for this remain poorly understood [12].

Sociodemographic factors associated with being discharged AMA or failing to complete

inpatient detoxification for substance abuse include being younger [1,2,9,10], single [1,6], unemployed [9], having a criminal history [2,4], having a lower level of education [2] and having State health insurance or no health insurance at all [3]. Studies do not report differences in discharge AMA by sex of the patient [1,5,6,10,13]. Results on the ethnicity of the patient are inconclusive [3,8].

Being in inpatient detoxification treatment for drugs rather than alcohol [3,5] predicted discharge AMA. Opiate abusers, especially injectors [2,9], were more likely not to complete detoxifi-

cation than other substance abusers [1,5,8,10,13]. In addition, several studies reported that cocaine or amphetamine use [4,6,10], recent cannabis use, or concurrent benzodiazepine dependence [10], were associated with being discharged AMA. Those that had more severe medical and substance use problems [12], had fewer months of abstinence prior to hospitalization [6], began heavy drinking at an earlier age [10] and believed that drug use did not impair their health [9], were also more likely not to complete detoxification. Antisocial or borderline personality disorder and hepatitis C infection were found to be associated with being discharged AMA in one study on alcohol abusers [10].

Treatment incompleteness is a predictor of readmission to inpatient detoxification [12-16]. Thus, patients who leave inpatient detoxification AMA present a significant challenge to detoxification programmes [9], and incur greater health care costs. The preliminary identification of patients at risk of leaving inpatient detoxification, would enhance interventions and strategies to reduce discharges AMA among patients at increased risk [17].

Remarkably, few studies examining the factors associated with being discharged AMA from inpatient detoxification have been carried out. Most have been conducted in the US and Canada, many include small samples of females and none have examined sex differences. Risk factors for discharge AMA were ascertained on the basis of medical records on consecutive admissions from an inpatient drug and alcohol detoxification unit in Barcelona from 1993 to 2006. Sex differences were also examined.

## 2. Materials and Methods

### 2.1 Sample

Records from all consecutive admissions to an inpatient alcohol and drug detoxification unit between 1993 and 2006 were included.

### 2.2 Setting

The mixed sex inpatient detoxification unit was located in the psychiatric department of a general teaching hospital in Barcelona, Spain. This was a six-bed unit providing assessment and medically assisted withdrawal to individuals with drug and alcohol dependence disorders. All patients were admitted on a voluntary and planned

basis. Patients were eligible for admission if they were substance-dependent, with a risk of severe or medically complicated withdrawal symptoms (e.g. polysubstance abuse), co-morbid general medical conditions that made ambulatory detoxification unsafe, and/or a documented history of not engaging in or benefiting from treatment in outpatient facilities [18]. Inpatient methadone suppression was following methadone maintenance therapy and not where methadone was a substance of abuse. Services were provided free of charge to the patient.

### 2.3 Variables assessed

Data were collected using a standardized questionnaire on all consecutive admissions including: sociodemographic data, substance abuse history, number of overdoses, treatment history, reason for admission, type of discharge (medical discharge, against medical advice, administrative discharge), dates of admission and discharge for each detoxification, personality disorders, HIV and hepatitis C status, and functioning level was assessed using the Global Assessment of Functioning scale (GAF) (DSM-IV, Axis V) [19]. The GAF is a numeric scale that assesses the social, occupational, and psychological functioning of adults. The scale ranges from 0 to 100. Higher scores related to greater functioning.

### 2.4 Outcomes

Data are presented for first admission covering the years 1993-2006 for each patient. Length of stay and discharge type were recorded for each admission. Length of stay was patient-specific and depended on patients' needs, as determined by a psychiatrist. "Medical discharge" was the description applied whenever a patient completed his/her detoxification treatment. Patients leaving the detoxification treatment without medical consent prior to treatment completion were classified as "discharged AMA". Patients received an administrative discharge from the unit if they had violated treatment rules (e.g. by resorting to drug trafficking or violence). Patients who were administratively discharged were excluded from the analysis presented in Tables 1-3.

### 2.5 Statistical Analysis

For the analyses, only data from a patient's first admission were used (n=1,228). Data were

analysed using the “R” software package [20]. Simple descriptive statistics were calculated using frequencies and percentages for categorical data, and means and standard deviations for continuous data. T-tests, ANOVA (for continuous variables) and chi-square tests (for categorical variables) were performed to examine sex differences in baseline patient characteristics (Table 1) and by type of discharge (Table 2).

Multiple logistic regression was carried out to determine factors associated with discharge AMA. For this purpose, the procedure proposed by Hosmer and Lemeshow [21] was used; at a univariate level, all variables with a significance level of less than 0.2 (in Table 2) were included in the multivariate model. Subsequently, step by step, variables were removed from the model if they failed to reach a significance level of 0.05, and as long as the parameter estimates of the remaining variables did not change substantially. This ensured that potential confounders were not excluded from the model. Once the model had been reformulated to include only significant independent variables, it was checked to determine whether previously excluded variables were now significant. In addition, possible interactions of the remaining variables were evaluated. Lastly, the global goodness of fit was checked using the test proposed by le Cessie and van Houwelingen [22]. The model parameters were interpreted in terms of adjusted odds ratios.

Length of stay and GAF scores were omitted from the model, due to the fact that they were assessed on discharge.

### 3. Results

During 1993-2006, there were a total of 2024 admissions (26.1% by females) by 1511 patients (25.7% female) to the inpatient detoxification unit. The majority of patients had been admitted once (68.1%), however 18.9% had been admitted twice during this time period and 13% three or more times. On average, the mean number of admissions per patient was 1.6 (SD: 1.3).

Of all admissions, 67.8% led to medical discharges, 21.5% were discharged AMA, 8.7% were followed by an administrative discharge, and 34 patients (1.7%) were subsequently transferred to other services. Six cases (0.3%) were listed as “other discharges”, but no further information was available. There was no significant difference in the proportion of male and female

patients that were discharged “AMA” (23.9% [219/915] versus 20.8% [65/313],  $p=0.28$ ), respectively.

#### 3.1 Baseline characteristics by sex of patient

The majority of patients were polydrug users and had never injected (Table 1). The main abused substances for which patients were admitted to the inpatient unit for detoxification were: heroin and other opiates (including methadone); cocaine or other stimulants; and alcohol. Almost a third were HIV-seropositive (30.3%) and 62.8% were hepatitis C-seropositive. Almost 40% had a history of psychopathology and 19.3% had been diagnosed with a personality disorder. Patient characteristics are shown separately for males and females in Table 1. Briefly, males were older than females and a significantly greater proportion of males than females were single. A significantly greater proportion of females than males lived with a drug user, were assessed as having some kind of psychopathology or were HIV-seropositive. The average length of stay in the detoxification unit was 12.5 days (SD 6.2). Females stayed in detoxification significantly longer than males (13.1 days versus 12.3 days,  $p=0.03$ ).

#### 3.2 Baseline characteristics associated with medical discharge between 1993 and 2006 by sex of patient (Table 2)

Males who were discharged AMA were younger than those who were medically discharged. The length of stay in inpatient detoxification treatment was significantly shorter for patients who were discharged AMA, whether male or female. Among males, a significantly greater proportion of those who were discharged AMA reported that heroin was their principal drug of abuse, were currently injecting and were polydrug users. A significantly greater proportion of males who were medically discharged reported alcohol as their main substance of abuse and were hepatitis C-seropositive. Among females, a significantly greater proportion of those who were discharged AMA reported heroin as their main drug of abuse. A significantly greater proportion of females who were medically discharged reported alcohol or sedatives as their main substance of abuse.

### 3.3 Multiple logistic regression for discharge against medical advice

Compared with patients who were medically discharged, patients discharged AMA were younger (OR 0.98; 95% CI 0.96-0.995), were more likely to be taking heroin and other opiates (OR 2.94; 95% CI 1.77-4.91), or cocaine or other psychostimulants (OR 1.13; 95% CI 0.54-2.39) as their main substance of abuse, and to be experiencing reduction or elimination of methadone maintenance therapy (OR 1.98; 95% CI 1.13-3.39) (rather than taking alcohol as their main substance of abuse). Having a personality disorder was almost significantly associated with being discharged AMA (OR 1.38; 95% CI 0.98-1.93). The risk of discharge AMA was significantly higher for male polydrug users compared with

both male non-polydrug users (OR 1.63; 95% CI 1.14-2.32) and female polydrug users (OR 1.67; 95% CI 1.12-2.50). Compared with female non-polydrug users, no significant difference was detected (OR 1.12; 95% CI 0.67-1.87) (Table 3).

## 4. Discussion

The current study determined the variables associated with discharge AMA from an inpatient drug and alcohol detoxification unit in Barcelona between 1993 and 2006.

As with other studies, no significant difference was reported in the proportions of male and female patients that were discharged AMA [1,5,6,10,13]. Almost a quarter of patients (21.5%) were discharged AMA. This proportion,

**Table 1. Baseline characteristics by sex of patient**

	Missing N	Total (N=1228)		Males (N=915)		Females (N=313)		p
		N	%	N	%	N	%	
<b>Sociodemographics</b>								
Age [mean, (SD)]	12	33.6	(8.4)	34.1	(8.5)	32.2	(7.9)	<0.001
<b>Civil status</b>								
Single		569	47.1	460	51.2	109	35.2	
Married/ partner		395	32.7	257	28.6	138	44.5	
Widowed/ separated/ divorced		245	20.3	182	20.2	63	20.3	
<b>Highest education level attained</b>								
Primary studies or less	52	870	74.0	652	74.6	218	72.2	0.454
Secondary/ tertiary studies		306	26.0	222	25.4	84	27.8	
<b>Employment status</b>								
Unemployed	71	645	55.7	467	54.2	178	60.1	0.124
Receiving pension/ benefits		204	17.6	152	17.7	52	17.6	
Employed/ studying/ military service		308	26.6	242	28.1	66	22.3	
<b>Lives with drug user</b>								
Lives with drug user	49	237	20.1	153	17.3	84	28.3	<0.001
<b>Substance abuse</b>								
Age first drug use [mean, (SD)]	202	20.6	(7.4)	20.4	(7.4)	21.1	(7.4)	0.224
Number drug overdoses [mean, (SD)]	109	1.0	(2.4)	1.0	(2.6)	0.9	(1.8)	0.418
<b>Principal drug of abuse</b>								
Heroin & other opiates	22	481	39.9	370	41.2	111	36.0	0.15
Methadone		174	14.4	124	13.8	50	16.2	
Cocaine & psychostimulants		262	21.7	195	21.7	67	21.8	
Alcohol		197	16.3	149	16.6	48	15.6	
Sedatives		92	7.6	60	6.7	32	10.4	
Polydrug-use	0	811	66.0	603	65.9	208	66.5	0.915
<b>Intravenous drug use</b>								
Ever	0	658	53.6	501	54.8	157	50.2	0.18
Current route of administration	11	476	39.1	369	40.6	107	34.6	0.071

**Table 1. Baseline characteristics by sex of patient (cnt)**

	Missing		Total (N=1228)		Males (N=915)		Females (N=313)		p
	N		N	%	N	%	N	%	
Treatment									
Length of stay in inpatient detoxification unit (days) [mean, (SD)]	0		12.5	(6.2)	12.3	(6.1)	13.1	(6.5)	0.031
Psychological									
Any psychopathology	49		465	39.3	329	37.4	136	44.9	0.038
DSM Personality Disorders	8		235	19.3	166	18.3	69	22.1	0.162
DSM Axis IV Psychosocial and Environmental Problems	41								0.506
Low			454	38.2	346	39.1	108	35.6	
Moderate			537	45.2	392	44.3	145	47.9	
Severe			182	15.3	134	15.2	48	15.8	
Extreme			14	1.2	12	1.4	2	0.7	
Biological									
HIV seropositive	81		347	30.3	244	28.7	103	34.6	0.07
Hepatitis C seropositive	104		706	62.8	519	62.1	187	64.9	0.428

while similar to that indicated in some studies carried out on substance users [1,6,9], proved to be considerably lower [2,11,12] or greater than that found in other studies [8]. These differences could be attributed to the patient mix (i.e. percentages of males and females) and different substances of abuse (e.g. heroin versus alcohol) in each study. We found that 29% of the males and 26% of the females admitted for detoxification for heroin and opiates other than methadone were discharged AMA, compared with 12% and 8% of those admitted for alcohol detoxification, respectively. The proportion of discharges AMA for heroin users was similar to that found in one study on opiate users [4]. However, other studies on heroin users reported far greater proportions of discharge AMA (51-64%) [2,11,12]. The reason for these variations could be due to these studies having a larger proportion of injecting drug users in their samples; to the different definitions attributed to treatment completion in different studies (e.g. transfer from the detoxification unit to prolonged treatment, staying a minimum of 14 days, negative drug-screening urine analysis, absence of withdrawal symptoms and completion of the psychotherapeutic programme [2], or planned discharge [10,11]; or else to the differing length of treatments for each inpatient detoxification, ranging from three [1] to 42 days [10]. In the current study, females stayed around a day longer on

average than males, which may be the result of greater psychopathology at admission as studies have reported that planned discharge is associated with depression [10].

Supporting results from other studies, patients who were discharged AMA were younger [1,9,10] compared with those who were medically discharged. Previous studies have not examined sex differences in risk factors for discharge AMA. Interestingly, the current study reported that males discharged AMA were younger than males who were medically discharged. This was not found for females. Substance abuse is a chronic relapsing condition [23], with most users having to go through multiple treatment episodes and modalities before successfully stopping all forms of abuse. The phenomenology of discharge against medical advice among younger patients could be viewed as a reflection of this. It is also possible that some patients may not be sufficiently motivated to stop their substance use, as some studies have reported higher levels of discharge AMA among those who were not in counselling, who did not report plans for entering follow-up treatment following discharge, or who did not believe such treatment would be suitable for them [2,12]. Means et al. [24] suggest that older patients with longer substance abuse careers have had more experience with treatment, and therefore believe there are benefits attached to the

**Table 2. Baseline characteristics associated with medical discharge during 1993-2006 by sex of patient**

	Males (N=915)		p	Females (N=313)		p
	DAMA N=219	MD N=696		DAMA N=65	MD N=248	
	N (%)	N (%)		N (%)	N (%)	
<b>Sociodemographics</b>						
Age [mean, (SD)]	31.9 (7.7)	34.8 (8.6)	<0.001	30.8 (8.2)	32.5 (7.8)	0.13
Civil status			0.243			0.455
Single	114 (24.8)	346 (75.2)		26 (23.9)	83 (76.1)	
Married/ partner	62 (24.1)	195 (75.9)		24 (17.4)	114 (82.6)	
Widowed/ separated/ divorced	34 (18.7)	148 (81.3)		13 (20.6)	50 (79.4)	
Highest education level attained			0.275			0.595
Primary studies or less	145 (22.2)	507 (77.8)		44 (20.2)	174 (79.8)	
Secondary/ tertiary studies	41 (18.5)	181 (81.5)		14 (16.7)	70 (83.3)	
Employment status			0.673			0.962
Unemployed	99 (21.2)	368 (78.8)		37 (20.8)	141 (79.2)	
Receiving pension/ benefits	37 (24.3)	115 (75.7)		10 (19.2)	42 (80.8)	
Employed/ studying/ military service	56 (23.1)	186 (76.9)		13 (19.7)	53 (80.3)	
Lives with drug user			0.432			0.81
No	177 (24.3)	552 (75.7)		45 (21.1)	168 (78.9)	
Yes	32 (20.9)	121 (79.1)		16 (19.0)	68 (81.0)	
<b>Substance abuse</b>						
Number drug overdoses [mean, (SD)]	1.1 (1.9)	1.0 (2.8)	0.609	0.6 (1.4)	0.9 (1.9)	0.313
Principal drug of abuse			<0.001			0.021
Heroin & other opiates	118 (31.9)	252 (68.1)		32 (28.8)	79 (71.2)	
Methadone	28 (22.6)	96 (77.4)		10 (20.0)	40 (80.0)	
Cocaine & psychostimulants	41 (21.0)	154 (79.0)		14 (20.9)	53 (79.1)	
Alcohol	18 (12.1)	131 (87.9)		4 (8.3)	44 (91.7)	
Sedatives	11 (18.3)	49 (81.7)		3 (9.4)	29 (90.6)	
Polydrug-use	163 (27.0)	440 (73.0)	0.003	39 (18.8)	169 (81.2)	0.276
<b>Intravenous drug use</b>						
Ever	129 (25.7)	372 (74.3)	0.181	34 (21.7)	123 (78.3)	0.803
Current route of administration	101 (27.4)	268 (72.6)	0.044	26 (24.3)	81 (75.7)	0.274

DAMA= Discharge against medical advice MD= Medical discharge

completion of treatment.

For both males and females, a significantly greater proportion of those who were discharged AMA reported heroin as their principal drug of abuse [where alcohol was the reference category]. For males only, injecting and polydrug use were additional factors associated with being discharged AMA. This could be accounted for by the profile of alcohol and opiate patients, as the former tend to be older, while the latter present a higher likelihood of axis II comorbidity (data not

shown).

In multiple logistic regression, patients discharged AMA turned out to be younger, were almost three times as likely to have heroin and other opiates as their principal substance of abuse, or twice as likely to have cocaine as their principal substance of abuse, or to be experiencing the reduction or elimination of methadone maintenance therapy. Poorer treatment outcomes and craving have been associated with higher levels of impulsivity among cocaine users [25,26].

**Table 2. Baseline characteristics associated with medical discharge during 1993-2006 by sex of patient (cnt)**

	DAMA N=219	MD N=696		DAMA N=65	MD N=248	
	N (%)	N (%)	p	N (%)	N (%)	p
Treatment						
Length of stay in inpatient detoxification unit (days) [mean, (SD)]	6.3 (4.5)	14.2 (5.2)	<0.001	6.7 (4.8)	14.8 (5.8)	<0.001
Psychological						
Any psychopathology	72 (21.9)	257 (78.1)	0.617	31 (22.8)	105 (77.2)	0.444
DSM Personality Disorders	48 (28.9)	118 (71.1)	0.115	17 (24.6)	52 (75.4)	0.475
DSM Axis IV Psychosocial and Environmental Problems			0.694			0.105
Low	74 (21.4)	272 (78.6)		15 (13.9)	93 (86.1)	
Moderate	97 (24.7)	295 (75.3)		36 (24.8)	109 (75.2)	
Severe	31 (23.1)	103 (76.9)		8 (16.7)	40 (83.3)	
Extreme	2 (16.7)	10 (83.3)		1 (50)	1 (50)	
Biological						
HIV seropositive	59 (24.2)	185 (75.8)	0.252	27 (26.2)	76 (73.8)	0.102
Hepatitis C seropositive	119 (22.9)	400 (77.1)	0.039	38 (20.3)	149 (79.7)	0.879

DAMA= Discharge against medical advice MD= Medical discharge

Very few studies have investigated the role of psychopathology or the completion of inpatient detoxification treatment. In line with others [10], we found that personality disorders were closely associated with leaving treatment AMA.

Contrary to Martínez-Raga et al. [10], no association was found between hepatitis C infection and discharge AMA for all patients, although

an association was found for males. One reason could be the lower proportion of hepatitis C-infected patients in that study compared with ours.

Although the topic was not considered in the current study, a previous study reported that being treated by a specific doctor was associated with being discharged AMA [3]. Negative attitudes towards substance users in treatment set-

**Table 3. Logistic regression for discharge against medical advice**

	OR	95% CI
Age	0.98	0.96 - 0.99
Principal drug of abuse (ref.: alcohol )		
Heroin and other opiates	2.94	1.77 - 4.91
Methadone	1.98	1.10 - 3.58
Cocaine and Psychostimulants	1.96	1.13 - 3.39
Sedatives	1.13	0.54 - 2.39
Any personality disorder	1.38	0.98 - 1.93
Males vs. females		
Among polydrug user	1.67	1.12 - 2.50
Among non-polydrug user	0.69	0.30 - 1.20
Polydrug user		
Among males	1.63	1.14 - 2.32
Among females	0.67	0.37 - 1.21



tings [27] have a potential impact on the quality of the care provided [28] and on patients' decisions on whether to stay in treatment [29,30]. Priority should be given to ensuring that the staff recruited for inpatient detoxification programmes have the competence and the motivation required for working with substance-abusing patients.

## 5. Study limitations

The variables included in the model were restricted to the questions included in the routine questionnaire completed for all consecutive admissions.

## 6 Implications for treatment

Patients discharged AMA are more likely to be readmitted to inpatient detoxification. Thus, patients who discharge themselves AMA accrue to significant financial health and social care expenditures. Understanding the reasons for AMA discharge is vital to assist clinicians identify those patients most at risk for leaving inpatient detoxification AMA and enhance their ability to motivate such patients to remain in treatment [31]. Further qualitative research is required with patients who have discharged themselves from inpatient detoxification units to inform the development of strategies to reduce the risks of discharge AMA. The provision of adequate information would insure that patients had realistic expectations of what to expect from inpatient detoxification treatment, and motivational sessions prior to being admitted could reduce discharge AMA.

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## Conflict of Interest

None.

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