TREATMENT

Predictive Factors for Relapse after an Integrated Inpatient Treatment Programme for Unipolar Depressed and Bipolar Alcoholics

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Abstract — Aim: The aim of this study was to examine prospectively examined predictors of relapse in alcohol dependence with comorbid affective disorder. **Methods:** One hundred and eighty-three unipolar depressed or bipolar alcoholics who completed an integrated inpatient treatment programme for dual diagnosis were assessed at baseline, post-treatment discharge and at 3 and 6 months post treatment. Backwards stepwise likelihood ratio multiple logistic regression was used to investigate the impact of multiple covariates on relapse to alcohol in the 0–3- and 3–6-month period post discharge. **Results:** The retention rate at 3 months post discharge was 95.3% (177 patients) and at 6 months it was 87.4% (162 patients). Higher level of anxiety at baseline and discharge was significantly associated with relapse at 3, but not at 6 months, in all subjects. Higher baseline alcohol use disorder identification test scores were associated with relapse at 3 and at 6 months. Intention and planning to attend aftercare after discharge from the hospital were associated with non-relapse at 3 and 6 months, respectively. Levels of depression, of elation and of craving at baseline were not significantly predictive of relapse. Those who had relapsed at 3 months were significantly more likely to remain drinking at 6 months. Rehospitalization within the first 3 months post discharge appeared to be protective against further relapse. **Conclusions:** Baseline patient factors, including levels of anxiety, appear to play a significant role in relapse to alcohol in this difficult to treat population.

INTRODUCTION

Alcohol dependence is relatively common, with recent figures suggesting a lifetime rate of 12.5% in the USA (Hasin *et al.*, 2007). There is a significant comorbidity associated with it, and mood disorders including depression and bipolar affective disorders have a lifetime rate of 13.5 and 3.3%, respectively (Grant *et al.*, 2005; Hasin *et al.*, 2005). This produces an increased adjusted odds ratio of 2.2 for lifetime major depression in alcohol dependence, and a ratio of 4.6 for bipolar 1 disorder and of 3.0 for bipolar 2 disorder in alcohol dependence (Hasin *et al.*, 2007). (The Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV) (American Psychiatric Association, 1994) defines Bipolar 1 Disorder as characterized by one or more manic or mixed episodes, usually accompanied by major depressive episodes; the patient may become delusional and may suffer hallucinations. DSM-IV characterizes Bipolar 2 as one or more major depressive episodes accompanied by at least one hypomanic episode. The main difference between bipolar 1 and bipolar 2 is that bipolar 2 has *hypomanic* but not *manic* episodes, meaning the symptoms of mania are generally less severe in bipolar 2 and patients with bipolar 2 cannot have psychotic features.) Subjects with a dual diagnosis of both alcohol dependence and an affective disorder have a worse prognosis (Mueller *et al.*, 1994), are more difficult to treat and are more costly to treat than those with either disorder alone (Hoff and Rosenheck, 1999; Hasin *et al.*, 2002; Burns *et al.*, 2005). There is evidence that comorbidity of alcohol dependence with affective disorders has a negative impact upon prognosis measured in terms of rates of remission, relapse and risk of suicide (Potash *et al.*, 2000; Dreissen *et al.*, 2001; Burns *et al.*, 2005).

Relapse to substance abuse is one of the most significant difficulties facing addiction and dual diagnosis patients. Estimated rates of relapse among individuals with substance use disorders alone have varied widely in relation to follow-up interval and definition of relapse, typically ranging from 40 to 60% within the first few months after treatment and as high as 70–80% by the end of 1 year (Bradizza *et al.*, 2006; McKay *et al.*, 2006; Walitzer and Dearing, 2006). Some longer follow-up studies of specific treatments for alcohol dependence have noted a 30% abstinence rate after 3 years (Project MATCH Research Group, 1998) and up to 50% abstinence over 9 years with ongoing outpatient care utilizing disulfiram (Krampe *et al.*, 2006) A 20-year alcohol dependence treatment follow-up found that from 393 patients interviewed, 277 (32.6%) were abstinent from alcohol; however, 32% of the original 850 patients had died (Gual *et al.*, 2009). Predictive factors for relapse in alcoholism include treatment drop out (Bottlender and Soyka, 2005), anxiety symptoms (Driessen *et al.*, 2001; Kushner *et al.*, 2005), depressive symptoms (Hasin *et al.*, 2002; Gamble *et al.*, 2010) and high craving for alcohol (Bottlender and Soyka 2004; Gordon *et al.*, 2006).

Treatment response of dually diagnosed alcoholic and affective-disordered subjects after specific interventions has been studied by Farren and McElroy (2008), Nunes and Levin (2004), Torrens *et al.* (2005) and Weiss *et al.* (2007)). Pharmacotherapy trials in depressed alcoholics have shown both significant or moderate treatment response (Cornelius *et al.*, 1997; Mason *et al.*, 1996; Pettinati *et al.*, 2010) and some with no added benefit for the pharmacotherapy (Pettinati *et al.*, 2001; Kranzler *et al.*, 2006). There appears to be more evidence for a depression treatment response than an alcohol treatment response (Nunes and Levin, 2004) in depressed alcoholics. For bipolar alcoholics, there has been some evidence for pharmacotherapy treatment efficacy (Salloum *et al.*, 2005; Brown *et al.*, 2008), but there are few well-controlled studies. Some of the research problems in dually diagnosed alcoholic patients include: poor measurement of substance abuse or psychiatric outcomes, small sample sizes and low completion rates (Tiet and Mausbach, 2007).

A review of findings on substance use disorder programmes has indicated that longer episodes of care are associated with improved outcomes in individuals with substance use disorder (McKay, 2005) and for individuals with co-occurring psychiatric disorders (Brunette *et al.*, 2001). Research on aftercare programmes such as 12-step programmes including Alcoholics Anonymous have given mixed results. A Cochrane review recommended that people considering attending AA or a 12-step treatment programme should be made aware that there is a lack of experimental evidence on the effectiveness of such programmes (Ferri *et al.*, 2006). Nevertheless, there is research indicating optimal treatment outcomes when individuals attend such programmes (Kaskutas, 2009; Moos and Moos, 2006; Project MATCH Research Group, 1998).

Some studies have linked craving, either generalized or cue-induced, to relapse in a substance-dependent population (Bottlender and Soyka, 2004; Breese *et al.*, 2005; Gordon *et al.*, 2006). A literature review also suggested that the degree of craving a person with alcohol dependence experiences when confronted with a high-risk situation ('stress induced craving') after treatment can predict subsequent drinking (Rohsenow and Monti, 1999; Sinha and Li, 2007). Neuroimaging has identified certain circuitry abnormalities associated with craving in alcoholism that predict resumption of alcohol drinking following treatment for alcohol dependence (Durazzo *et al.*, 2008). To our knowledge, no studies examining the role of craving in a dually diagnosed alcohol-dependent and affective-disordered cohort have been published.

This prospective study was designed to determine the predictors of treatment outcome following an inpatient programme in a group of alcohol-dependent subjects with either bipolar or unipolar affective disorder.

MATERIALS AND METHODS

St Patrick's Hospital is a 250-bed private psychiatric inpatient facility in Dublin, Ireland. The dual diagnosis programme for those with addictive disorders co-existing with other psychiatric illness was founded in 2003 and followed the FIRESIDE principles for integrated dual diagnosis treatment (Farren and McElroy, 2008). The programme consists of three stages:

(a) Detoxification and mood stabilization (reduction of psychotic symptoms and suicidal ideation to enable them participate safely in the programme). This can take from 3 days to 2 weeks.
(b) Engagement with a 4-week inpatient programme with a cognitive behavioural, relapse prevention approach to both affective and substance use disorder.
(c) An after care programme for up to 6 months post discharge.

Recruitment and assessments

The study received approval from the St Patrick's Hospital ethics committee. All consecutive referrals to St Patricks Hospital, either from outside General Practitioners or internal referrals, were assessed for eligibility for the research by a psychologist using Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID) criteria. Patients were eligible if they met the criteria for either major depression or hypomania/mania, and for alcohol dependence as determined by the SCID, Research Version. All subjects were inpatients in hospital and met criteria (defined by SCID as being symptomatic in past month) for current mood disorder and substance dependence; 74% met lifetime criteria for mood disorders (47.5% of patients had previously been hospitalized for mood disorder and/or substance abuse treatment). Patients with substance-induced mood disorder (based on SCID criteria) and primary anxiety disorder were excluded from the study (35%).

All were asked to sign informed consent for the programme, and for the parallel research monitoring protocol. All subjects were current inpatients. All eligible patients recruited over the first year of the programme from June 2004 to June 2005 were included. All subjects were free from alcohol for a period of at least 7 days prior to baseline assessments. Table 1 illustrates the study design and participant retention. Upon completion of alcohol withdrawal and initial stabilization of mood, patients underwent a baseline assessment by a psychologist (one psychologist completed assessments for all research participants), who completed the SCID Research version and other assessments including the time line follow back (TLFB) for the preceding 90 days (Sobell *et al.*, 1988), Young Mania Rating Scale (YMRS; Young *et al.*, 1978), the Beck Depression Inventory (BDI; Beck *et al.*, 1961), the Beck Anxiety Inventory (BAI; Beck *et al.*, 1988), the Obsessive Compulsive Drinking Scale (OCDS; Anton *et al.*, 1996), Drug Abuse Screening Test (DAST; Skinner, 1982), Alcohol Use Disorder Identification Test (AUDIT; Saunders *et al.*, 1993), a urinary drug screen and blood tests. Medication prescribed at each time point was noted.

Patients then underwent the 4-week programme as outlined. Patients were assessed twice weekly by a psychiatrist to monitor mood and medications. Upon completion of the 4-week course, the patients were discharged. At 3 and 6 months post discharge from the 4-week programme, patients were contacted and returned to the hospital to complete the discharge assessments (BDI, YMRS, BAI, OCDS) plus the TLFB for the preceding 3 months. Note was made of group attendance, illicit drug use, medication use and any change in employment status (Table 2).

Statistical analysis

Patients were divided according to whether they met criteria for bipolar or major depressive disorder for analysis purposes. Preliminary univariate analyses using the Statistical

Table 1. Flow chart of participant retention

Baseline assessments completed for 187 participants on admission to the DDX programme

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183 participants (97.9%) completed the programme and were discharged, as 4 participants failed to complete the programme

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177 participants (94.7%) were retained at 3 months, as 1 person died, 1 went abroad, 2 could not be contacted and 2 refused to participate

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162 participants (86.6%) were retained at 6 months, as 7 participants could not be contacted, 1 died and 7 refused to participate

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Table 2. Characteristics of the dual diagnosis sample at discharge ($n = 183$)

Characteristics	$n = 183$ (M = 91; F = 92)
Bipolar 1	49 (26.6%)
Bipolar 2	36 (19.7%)
Major depression	99 (53.6%)
Length of stay (days)	42.04 (±SD 24.7)
Age (years)	43.2 (±13.7)
Years in education	14 (±2.5)
Previous admission	1.33 (±2.3)
F. HX of alcohol abuse	114 (62.3%)
F. HX of psychiatric disorder	108 (59%)
Illegal drug user	53 (29%)
Prescription drug user	45 (24.6%)
Suicide attempt	62 (33.9%)
Occupational status	
Employed	95 (51.9%)
Unemployed	65 (35.5%)
Retired	10 (5.5%)
Student	10 (5.5%)
Housewife	3 (1.6%)
Marital status	
Single	99 (54.1%)
Married	45 (24.6%)
Separated/divorced	30 (16.3%)
Widowed	9 (4.9%)

There were no statistical differences between the demographic characteristics of the 21 participants that dropped out of the study compared with the 162 that were retained at 6 months.

Package for Social Services version 14.0 for Windows were applied across comparison groups regarding baseline demographic information, and comparisons between groups (e.g. relapsers vs. those who remained abstinent: those hospitalized vs. those who were not) made using χ^2 analysis for categorical variables and analysis of variance (ANOVA) for numeric variables. Backwards stepwise likelihood ratio multiple logistic regression was used to investigate the impact of the independent variables on relapse to alcohol in the 0–3- and 3–6-month period post discharge from treatment. Another multiple logistic regression was completed to examine factors associated with rehospitalization within the first 3 months and between the 3- and 6-month period post discharge. Hosmer–Lemeshow χ^2 was used to ensure the model fitted the data. To determine how much variance was explained by each model, Cox–Snell r^2 and Nagelkerke r^2 were applied.

RESULTS

One hundred and eighty-seven patients completed baseline evaluations, and at 6 months the retention rate was 86.6% (Table 1). Thus, the sample analysed for logistic regression consisted of 162 (male = 78, female = 84) dually diagnosed individuals (Table 2). There was no significant difference in baseline characteristics between the 162 retained in the study and those who dropped out. All were alcohol dependent, 49 (30.1%) were bipolar 1, 27 (16.7%) bipolar II and 86 (53.1) had major depressive disorder. Forty-one (25.3%) also abused illegal drugs and 39 (24%) abused prescription drugs. (Table 2 shows the characteristics of the sample.)

Treatment outcomes

Both the depressed and bipolar substance-dependent groups significantly reduced their number of drinking days, average units consumed and drug use during follow-up (Table 3). Rates of relapse to alcohol and rehospitalization are presented in Table 3. There were no significant differences between the depressed or bipolar groups in relapse to alcohol or drugs, number of units consumed, number of drinking days and rehospitalization rate.

Differences in medication prescription were analysed. The χ^2 test indicated that the depressed group was on significantly more antidepressants than the bipolar group at baseline (67 vs. 38%), discharge (59 vs. 41%) ($P < 0.001$) and 3-month follow-up (51 vs. 46%) $P < 0.05$. The bipolar group was on statistically significant more mood stabilizers on the programme at baseline (82.4 vs. 50.8%), discharge (80.4 vs. 48.4%), 3-month (75.5 vs. 48.4%) and 6-month follow-ups (78.4 vs. 44.2%), $P < 0.001$. More bipolar clients were on sleeping agents at 6 months, $P < 0.05$ (46 vs. 33%). Also there were significantly more females than males on sleeping agents at baseline and discharge in both groups, $P < 0.01$. Medication utilization was not associated with relapse to alcohol in neither depressed nor bipolar groups.

Relapse to alcohol between discharge and 3 months

There were no significant differences between demographic characteristics of those who relapsed to alcohol and those who remained abstinent in the 0–3-month period.

The significant differences in the abstinent and relapsed groups were in anxiety and craving. Relapsers had statistically significant higher OCDS scores at 3 months (3.7 ± 3.4 (SD) vs. 9.5 ± 7.1, $P < 0.001$), no one who had a score >16 remained abstinent.

A logistic regression was conducted to investigate the impact of co-variates on relapse to alcohol (Table 4). This model predicts abstinence correctly in 93.4% and relapse in 67.9%, with an overall correct prediction of 84.6% which is significantly greater than by chance (initial model) for which overall predictivity is 65.4%.

Relapse to alcohol between 3 and 6 months

There were no significant differences in diagnosis, age, marital status, employment and previous admissions among those who relapsed and those who remained abstinent at 6 months. Those who had been rated as illegal drug users at baseline were more likely to relapse to alcohol at 6 months ($P < 0.03$).

A logistic regression was conducted to investigate the impact of predictors on relapse to alcohol in the 3–6 months post discharge from hospital (Table 5). This model predicts abstinence correctly in 83% and relapse in 73%, its overall correct prediction being 78% which is significantly greater than by chance (initial model) for which the overall predictivity is 50%. The variance explained by this model was 25–33% (Cox–Snell R^2–Nagelkerke r^2).

Anxiety

The baseline level of anxiety was a significant predictor of relapse at 3 months (Table 4). Pearson's χ^2 showed that

Table 3. Treatment outcomes: alcohol consumption, rate of abstinence and rehospitalization, anxiety, depression, craving and mania scores at 3 months and 6 months for depression and bipolar groups ($n = 162$)

Time	Depression ($n = 86$)			Bipolar ($n = 76$)		
	Baseline	3 months	6 months	Baseline	3 months	6 months
No. drinking days	41.65 (29.3)	3.09 (7.3)	7.6 (17.3)	37.9 (32.5)	3.8 (7.6)	7.5 (16)[a]
Average units per drinking day	10.9 (7.4)	2.74 (5.5)	3.7 (5.5)	11.2 (8.6)	3.3 (6.3)	3.4 (6.2)[b]
Time to first drink		12.4 (23.7)	30.4 (53.4)		12.9 (24)	21.1 (47)
Drug use	19.8%	2.3%	3.5%	31.6%[c]	5.3%	3.9%
BAI	25.2 (12.2)	8.7 (8)	6.9 (7.2)	23.9 (13.1)	9.1 (8.7)	8.1 (7.5)[d]
BDI	25.5 (8.7)	11.2 (8.3)	9.4 (8)	23.7 (11.8)	10.5 (7.4)	10.3 (8.4)[e]
OCDS	16.2 (8.5)	5.5 (5.7)	5.7 (6.2)	16.1 (9.1)	5.9 (5.6)	6.3 (6.2)[f]
YMRS	0.71 (2)	0.33 (1.6)	0.25 (1.8)	9.9 (7.7)	2.1 (4.3)	2.3 (4.6)[g]
% abstinent	0%	68.6%	50%	0%	61.8%	52.6%
% rehospitalized		18.6%	9.3%		14.5%	15.8%

[a]ANOVA showed significant effect of time on number of drinking days in both groups, $F(2, 158) = 184.8$, $P < 0.001$; partial eta squared = 0.54. Group differences were not significant $F(1, 158) = 0.108$, $P > 0.05$.
[b]The number of drinks per drinking day was significantly reduced over time in both groups, $F(2, 158) = 83.81$, $P < 0.001$; partial eta squared = 0.35. There were no significant between groups effect.
[c]The bipolar group had a higher baseline rate of illicit drug use than the depression group ($P < 0.05$) and there was a significant reduction in drug use over time in both groups, $P < 0.01$.
[d]ANOVA showed significant effect of time on BAI scores in both groups $F(2, 158) = 240$, $P < 0.001$; partial eta squared = 0.60. There were no significant between group effects.
[e]ANOVA showed significant effect of time on BDI scores in both groups $F(2, 158) = 240$, $P < 0.001$; partial eta squared = 0.60. There were no significant between group effects.
[f]ANOVA showed significant effect of time on OCDS scores in both groups $F(2, 158) = 92.4$, $P < 0.001$; partial eta squared = 0.565. There were no significant between group effects.
[g]ANOVA showed significant effect of time on YMRS scores in both groups $F(2, 158) = 75$, $P < 0.001$; partial eta squared = 0.325. There was a significant between group effect $F (2, 158) = 80.8$, $P < 0.001$; partial eta squared = 0.341.

Table 4. Table of final regression model for predicting relapse between discharge and 3 months

	B	SE	Exp (B)	95% CI for EXP (B) lower–upper	Sig.
Organized aftercare on discharge	2.200	0.466	0.111	0.045–0.277	**<0.01**
BAI on admission	−0.040	0.020	0.961	0.924–0.998	**<0.05**
Audit score at admission	0.062	0.030	1.064	1.001–1.128	**<0.05**
Family psych history	−0.660	0.418	0.517	0.228–1.172	NS
BDI score at admission	−0.040	0.026	0.961	0.910–1.022	NS
Unemployed	2.241	1.718	0.106	0.004–3.620	NS

Table 5. Table of final regression model for predicting relapse between 3 and 6 months

	B	SE	Exp (B)	95% CI for EXP (B) lower–upper	Sig.
Organized aftercare on discharge	1.766	0.459	0.171	0.070–0.421	**<0.01**
BAI on admission	−0.010	0.017	0.990	0.958–1.02	NS
Audit score on admission	0.060	0.030	1.06	1.01–1.13	**<0.05**
Family psychiatric history	−0.813	0.414	0.444	0.197–1.00	**<0.05**
BDI score Discharge	0.036	0.027	1.04	0.984–1.09	NS
OCDS score on admission	−0.040	0.031	0.961	0.903–1.02	NS
DAST score on admission	−0.061	0.053	0.941	0.848–1.04	NS
Drug history	1.417	0.653	4.13	1.15–14.8	**<0.05**

those who relapsed at 3 months had statistically significant more severe anxiety at discharge ($P < 0.021$) from hospital.

Depression

The BDI score at 3 months was significantly associated with rehospitalization at 3 months [$B = 0.075$ (s.e. 0.032), $P < 0.02$], and also at 6 months [$B = 0.212$ (s.e. 0.06), $P < 0.001$].

Alcohol outcomes

AUDIT score at baseline was significantly associated with relapse to alcohol at 3 and 6 months and was a predictor variable in each of the regression models (Tables 4 and 5). There were no differences between abstainers and relapsers at 3 months and at 6 months in their baseline alcohol drinking characteristics.

Abstinence at 3 months protected against relapse at 6 months [$B = -4.316$ (s.e. 0.87), $P < 0.001$]. Rehospitalization at 3 months also predicted abstinence at 6 months [$B = -2.47$ (s.e. 0.97), $P < 0.011$]. Those who had relapsed at 3 months were significantly more likely to remain drinking at 6 months ($P < 0.001$) and their drinking appeared to escalate non-significantly. Their average number of drinking days for the 0–3-month period was 6.3 (±9.5) drinking days and 4.8 (±6.3) average units per drinking day compared with 17.03 (±25.4) and 7.3 (±6.0), respectively, for the 3–6-month period. Nine patients who were drinking in the period 0–3 months had stopped drinking in the period 3–6 months, five of whom had been inpatients in the 0–3-month period, suggesting rehospitalization may have prevented further

escalation of drinking. Also, eight out of the nine who stopped drinking were attending aftercare, suggesting that aftercare may be a protective factor.

Drug use

Drug use reduced significantly from baseline to discharge and 3- and 6-month follow up intervals in both the depressed and bipolar groups (Table 3). However, having an illegal drug use history was a significant predictor of relapse at 6 months.

Rehospitalization

Twenty-seven patients were rehospitalized in the first 3 months post treatment. The rehospitalization length was on average 28 days (±17) for this period. A total of 27.6% of relapsers to alcohol were rehospitalized at 3 months, vs. 9% of non-relapsers ($P < 0.05$). Statistically significant differences between those readmitted to hospital and those who were not were: the rehospitalized group had higher BDI ($P < 0.01$) and OCDS scores at 3 months ($P < 0.05$); higher average units at baseline and 3 months ($P < 0.01$); higher number of drinking days at 3 months and higher unemployment at 3 months ($P < 0.001$).

Twenty patients were readmitted to hospital in the 3–6-month period. The duration of hospitalization during this period was on average 25 days (±14). The χ^2 test showed statistically significant differences between those readmitted and those who were not. Those who were readmitted were more likely to be unemployed at baseline ($P < 0.05$). Those readmitted also had higher severity ratings in BDI at 3 months ($P < 0.01$) and 6 months ($P < 0.01$), BAI at 3 months ($P < 0.018$) and 6 months ($P < 0.01$). Patients readmitted to hospital had higher OCDS scores at 6 months ($P < 0.001$), higher number of drinking days ($P < 0.01$) and average units ($P < 0.01$) in the 3–6-month period and had a higher number of previous admissions ($P < 0.01$).

Aftercare

Those who organized to attend aftercare before they were discharged were significantly less likely to relapse to alcohol at 3 and 6 months, respectively (Tables 4 and 5). At 3 months, 71% of attendees at aftercare were abstinent, and at 3 months, 46% of non-attendees had relapsed. At 6 months, 61% of attendees at aftercare were abstinent, and at 6 months, 59.5 % of non-attendees had relapsed to alcohol. There was a statistical difference between attendees and non-attendees at 3 and 6 months regarding relapse to alcohol ($P < 0.01$). There was no significant difference in the number of bipolar or depressed patients attending aftercare at 3 or 6 months follow-up.

DISCUSSION

Baseline mental state, particularly level of anxiety, may play a significant role in relapse to alcohol particularly in the first 3 months post-discharge from the hospital. Anxiety is a significantly comorbid factor for affective disorder patients, particularly bipolar patients with or without alcoholism, and is increased in those with alcoholism (Levander et al., 2007).

Anxiety may play a role in relapse to alcohol in dually diagnosed alcoholics with depression (Dreissen et al., 2001), particularly in subjects with trait anxiety that persists into early abstinence. Anxiety has also been characterized as a negative prognostic factor for patients with alcoholism alone, and this anxiety may be responsive to treatment intervention such as cognitive behavioural therapy (Schade et al., 2007). Laboratory-based exposure to stress that induces anxiety is associated with an increase in alcohol craving in alcoholics, suggesting a mechanism for relapse to alcohol (Fox et al., 2007). It is possible that patients may turn to alcohol to self-medicate their anxiety, or it may be that anxiety promotes alcohol craving. This study suggests that a higher level of anxiety predicts relapse to alcohol, and thus opens up an additional treatment focus for dually diagnosed alcoholic and affective-disordered patients, even those without a diagnosed anxiety disorder. Our treatment programme did not include a focus on anxiety as part of its central education or treatment components. While caution would have to be exercised in choice of anxiety management therapies, avoiding any potentially addictive pharmacotherapy, it would be possible to incorporate anxiety management therapy such as CBT or to consider non-addictive anti anxiety pharmacotherapy (Kranzler et al., 2006) for this population.

Illegal drug history on admission to the treatment programme was a significant predictor of relapse to alcohol at 6 months. This suggests that dual diagnosis treatment programmes should address both alcohol and drug use to reduce risk of relapse to substances. Additionally, illegal drug use may indicate the presence of antisocial behaviour or the possibility of a personality disorder. This should be screened for in treatment programmes.

Baseline and discharge depression levels as measured by the BDI were not predictive of relapse to alcohol at 3 or 6 months. It might be expected that severely depressed individuals whose depression persisted would have a significantly increased rate of relapse (Gopalakrishnan et al., 2009). However, it may have been the case that as the specifically designed dual diagnosis programme achieved significantly lower depression levels on discharge from the programme for both the depressed and bipolar group (see Farren and McElroy, 2008), that depression severity remained significantly lower than baseline at discharge, 3- and 6-month follow-up, and therefore was not a predictive factor in this study. Interestingly, in the project MATCH, pre-treatment levels of depression predicted relapse to drinking, but not when post-treatment depression levels were taken into account (Gamble et al., 2010). This suggests that effective treatment of depression helps outcome.

High baseline AUDIT scores did appear to be predictive of relapse at 3 and 6 months, suggesting that it is a useful measure. Other markers of severity of alcohol dependence did not influence treatment response, and there were no differences between the abstainers and relapsers at 3 months or the abstainers and relapsers at 6 months in their other baseline alcohol drinking characteristics. There was evidence for higher depression, craving and drinking scores at 3 months in the early rehospitalized group, reflecting their relapse to alcohol and a probable deterioration in mood. Similarly, there was an increase in the depression, anxiety, craving and drinking scores by 6 months in those rehospitalized in the 3–6-month period. Treatment intervention in the

form of rehospitalization by 3 months was a significant protective factor and led to a diminution in drinking in early relapsers, whereas non-hospitalization of early relapsers meant they were more likely to continue their drinking. These data overall suggest that rehospitalization be considered for relapse to alcohol. The rehospitalization generally involved a short stay of detoxification and brief psychotherapeutic intervention, and this appears to have been helpful for a significant number of patients who might have done badly otherwise. As rehospitalization was not a central part of the programme, and was dependent upon patient commitment to follow up and to agreement to rehospitalization, it is possible that this subpopulation were self-selective, and had a better prognosis than other non-rehospitalized relapsers. Nevertheless, it demonstrates that rehospitalization was not an inappropriate strategy in this population.

The importance of attendance at an aftercare programme is suggested in this study. Those who organized aftercare before discharge from the hospital appeared to have less relapse to alcohol and 3 and 6 months. This finding emphasizes the central importance of follow-up to any dual diagnosis programme, and this was incorporated into the original principles of the programme (Farren and McElroy, 2008). This supports the research by De Marce et al. (2008) who found that individuals with a dual diagnosis who received contracting, prompting and reinforcing of continuing care showed an increased duration of treatment and improved abstinence rates compared with those who received standard care. There are few randomized control trials to determine whether 12-step programmes are effective. However, Project MATCH Research Group (1998) showed a positive effect from encouraging attendance at 12-step meetings. It may be the case that the effectiveness of aftercare in increasing abstinence rates depends on the form of aftercare. It is also possible that there is an element of self-selection going on, where those with the best prognosis choose to attend aftercare.

A notable factor in this study is the similarity in treatment outcomes for the depressed and the bipolar alcoholics at both 3 and 6 months post discharge. It suggests that these groups may be effectively treated in the same programme, as at the St Patricks programme, and that it is not necessary to devise separate treatment programmes for dually diagnosed depressed and bipolar patients. While there were some significant treatment differences between the bipolar and depressed groups, there were fewer differences that might have been expected for nosologically distinct entities.

This cohort study has some limitations, including that the sample was drawn from an inpatient population that by implication was motivated to engage in treatment. As the study is based upon a specific treatment protocol, it is uncertain how generalizable the findings are to other settings. Also, St Patrick's is a private hospital where patients tend to be people with health insurance. Measurement of pharmacotherapy adherence was not built into the study. Study strengths include the large study numbers, the structured interview-based diagnosis and the very high follow-up rates and the use of detailed manual-based treatment interventions.

The study overall suggests that there are a number of baseline factors that can be associated with treatment outcome in this population, and also that early-specific treatment interventions can significantly improve upon subsequent outcome. The study suggests that further research into specific areas including the level of anxiety in this population may prove fruitful. Furthermore, as dually diagnosed individuals have complex presentations, it is possible that multiple risk factors interact in a non-linear manner to increase vulnerability to relapse and research in this area may enhance understanding of relapse.

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