

A Comparison of Treatment Outcomes for Individuals with Substance Use Disorder Alone and Individuals with Probable Dual Diagnosis

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Abstract The co-occurrence of substance use and mental health problems, often referred to as dual diagnosis (DD), is increasingly recognised as commonplace within substance abuse treatment programs. Two-hundred and thirty-four individuals from 9 Australian Salvation Army drug and alcohol rehabilitation programs completed a 3-month post-discharge telephone follow-up. Using a cut-off score from the Psychiatric Subscale of the Addiction Severity Index (5th ed.), 66.7% were classified as likely to have DD and 33.3% as substance use disorder only (SUD). Both groups reported comparable and decreased substance use levels at follow-up, yet DD individuals perceived less improvement in substance use problems. Comparable improvements were reported in the areas of: symptom distress and recovery from symptoms. This was despite greater scope for improvement in individuals with DD. Duration of treatment and access to post treatment services were also assessed. Understanding factors effecting treatment outcomes is imperative for the implementation of effective, evidence based treatment programs.

Keywords Dual Diagnosis · Craving · Treatment duration · Symptom Distress · Post Treatment Services · The Salvation Army

Substance use disorders (SUD) include substance abuse and dependence (Villena and Chelsea 2010). There are a range of treatment strategies for SUD but most have relatively modest success rates (Cacciola et al. 2008). Ongoing research indicates around 75% of individuals in SUD treatment programs require treatment for SUD as well as various co-occurring mental health problems (Cacciola et al. 2008; Drake et al. 2001; Libby et al. 2005; O'Brien et al. 2004; Mental Health Council of Australia [MHCA] 2010; Mortlock et al. 2011; Power and Demartin 2004; Villena and Chelsea 2010; Volkow 2004). Further, individuals reporting mental health problems are more likely to report drinking at high risk

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levels (Australian Bureau of Statistics [ABS] 2006). These issues not only reflect the high levels of co-morbidity apparent in this population but also the need for substance abuse treatment providers to be adequately prepared to treat individuals with co-occurring SUD and mental health problems. This co-occurrence is often referred to as dual diagnosis (DD) (Havassy et al. 2004; Libby et al. 2005). Estimates of DD range from 30% to 90% (Cacciola et al. 2008; Havassy et al. 2004; Libby et al. 2005; Mortlock et al. 2011) and Australian research is minimal. Therefore one of the aims of this study is to estimate the prevalence of DD in Australian drug and alcohol treatment programs.

One of the most widely employed substance abuse treatment models is the 12-Step recovery model. The primary focus of such programs is on substance abuse, which has raised concerns about their appropriateness for the treatment of individuals with DD (Bogenschutz and Atkin 2000; Bogenschutz et al. 2006; Galanter 2007; Robertson 1992; Timko et al. 2010). Reasons include: the complex nature of the programs, strict views regarding the primary problem (Timko et al. 2010), focus on group participation (Timko et al. 2010), perception that abstinence from all substances (including medication for mental health problems) is necessary and also the need to accept a higher power and sponsor (Bogenschutz et al. 2006; Galanter 2007; Timko et al. 2010).

Given the idiosyncratic needs of individuals with DD, specifically tailored treatment programs may prove more effective (Grana et al. 2009; Villena and Chelsea 2010). Integrated treatment programs view both substance abuse and mental health problems as primary diagnoses and treat them concurrently (Grana et al. 2009; Howland et al. 2009; Osilla et al. 2009; Power and Demartin 2004; Villena and Chelsea 2010). Integrated treatment involves not only combining treatment approaches for both disorders but also modifying interventions to the needs of the individuals with DD (Chung et al. 2009; Drake et al. 2001). A comparative study of traditional 12-Step programs versus integrated programs found 65% of individuals with DD reported a negative response to the traditional programs, but 100% reported the integrated programs to be welcoming, helpful and positive (Bogenschutz et al. 2006). Given the breadth of services integrated treatment programs offer, the upfront costs far exceed that of traditional SUD treatment programs (Hayes et al. 2003; RachBeisel et al. 1999). This has hindered the implementation of such programs (Matthews et al. 2010; O'Brien et al. 2004). One of the primary aims of the current study, therefore, is to determine whether comparable outcomes between SUD and DD groups are achieved in the traditional SUD treatment programs that are available.

The Current Study

Individuals with DD typically indicate more negative treatment outcomes compared to individuals with SUD (Kessler 2004). This is particularly apparent in higher relapse rates (Cacciola et al. 2008), poorer psychiatric status (Boden and Moos 2009; Mills et al. 2010), shorter stays in treatment programs (Cacciola et al. 2008) and greater difficulty accessing post treatment services (Cacciola et al. 2008; Havassy et al. 2004). These areas will be examined in the current study to better understand the effects of DD on diverse treatment outcomes.

Substance use rates will be assessed in order to determine if individuals classified as likely to have DD benefit from SUD treatment to the extent of individuals with SUD only. It is hypothesised both groups will have reduced and equivalent substance use rates at follow-up. This is based on research with follow-ups of up to 1 year post treatment that

indicate SUD and DD groups use substances at comparable rates (Boden and Moos 2009; Bogenschutz et al. 2006; Timko et al. 2010).

Various aspects of psychological status will be assessed including; cravings, symptom distress and life engagement. It is hypothesised that the DD group will have poorer psychological status compared to the SUD group at intake to treatment (Boden and Moos 2009; Mills et al. 2010). At follow-up the psychological status of those with DD may depend largely on the extent to which their mental health problems received attention. It is hypothesised that both groups will have an improved psychological status at follow-up, yet those in the DD group have poorer psychological outcomes when compared to individuals with SUD.

Various studies have found longer duration of treatment to be associated with positive treatment outcomes (Krupski et al. 2009; Moos et al. 2000; Reelick and Wierdsma 2006; Walker 2009). However there have been conflicting reports, whereby duration of treatment is unrelated to treatment outcomes (e.g. Bartels and Drake 1996). Given the mixed findings, the relationship between duration of treatment and treatment outcomes (substance use levels and psychological status) will be assessed in the present study. This research is further justified because few studies have examined length of stay in SUD treatment between SUD and DD groups.

In a related concept, continuing treatment beyond SUD rehabilitation, by accessing post treatment services (PTS), is important for positive treatment outcomes (Vogel et al. 1998; Walker 2009). Access to PTS will be examined because it remains unclear whether group differences exist in access rates. In order for a comprehensive understanding of PTS utilisation, services will be separated into substance abuse PTS such as self help groups and substance abuse counselling, and mental health PTS such as mental health counselling. The benefits of substance abuse PTS for individuals with SUD are well established, but are less clear for individuals with DD (Pristach and Smith 1999). Rates of access to mental health PTS between SUD and DD groups will also be examined. It is hypothesised that individuals with DD are more likely to access mental health PTS than individuals with SUD (Cacciola et al. 2001; Hipwell et al. 2000; Kandel et al. 2001).

Method

Participants

Participants were recruited from 8 Salvation Army drug and alcohol rehabilitation centres located along the east coast of Australia. The centres provide up to 10 months of residential drug and alcohol treatment. The program utilises the 12-Step recovery model which is based on the disease model of addiction and aims for abstinence. Participants were eligible for the study if they: a) provided consent b) were enrolled and discharged within the study timeframe; c) completed an intake assessment and d) provided forwarding contact details for follow-up. A total of 627 participants entered treatment over the study period and 317 (51%) met these criteria. The follow-up rate achieved was 74% with 234 of the 317 completing the 3-month follow-up. The final sample for analysis (N=234) comprised 189 males (81%) and 45 females (19%), with the average age being 37.98 ($SD=11.06$ years) and 35.17 ($SD=9.89$ years) years for males and females respectively. The primary substance of use was alcohol for both males (58.1%) and females (54.8%) and the average reported length of problem was 10.27 years ($SD=10.03$ years) and 7.5 years ($SD=10.99$ years) for male and females respectively.

Measures

The Addiction Severity Index 5th edition (ASI) (McLellan et al. 1992) is a multidimensional and semi-structured interview used to determine the severity of an individual's health status in 7 domains: Medical, Employment/Support, Alcohol and Drug Use, Legal, Family/Social Relationships and Psychiatric status. The ASI was administered at both intake and follow-up, however, for the purpose of this study only 2 domains were analysed; Alcohol and Drug Use and Psychiatric status. The follow-up ASI included questions concerning the past 30 days, with 'lifetime' questions omitted for brevity and to avoid repetition. ASI composite scores were calculated for both domains to determine problem status. Composite scores range from 0 to 1, with higher scores indicating greater problem severity. Research indicates that composite scores are the most internally consistent estimate of problem change produced by this assessment (Alterman et al. 2001; Hodgins and el-Guebaly 1992; Rosen et al. 2002; Slaymaker and Owen 2008).

The ASI is a reliable and valid measure for mentally ill substance abusers and the Psychiatric status subscale has been used to identify individuals with probable mental illness (Alterman et al. 2007; Alterman et al. 2001; Cacciola et al. 2008; Calsyn et al. 2004; Currie et al. 2004; Enstrom 2010; Griffin et al. 2009; Reelick and Wierdsma 2006; Zanis et al. 1997). There are 13 items in this scale (e.g., 'Have you had a significant period in which you have experienced depression?' (item P4) and 'How many days of the past 30 have you experienced these psychological/emotional problems?' (item P12).

Given the wide dispersal of treatment services and large number of participants, we did not have the resources to conduct structured clinical diagnostic interviews with participants. Consequently, allocation to groups was based on probabilistic criteria. Participants were classified into SUD and DD categories using a cut-off score of .22 in the intake ASI Psychiatric Composite score. Cacciola et al. (1999) have reported accurate identification of up to 90% of individuals with mental illness and 60% of those without, using this cut off score in a sample of 672 individuals in SUD treatment. Other researchers concur that this cut off score provides acceptable proportions of true negatives and true positives (Calsyn et al. 2004; Reelick and Wierdsma 2006).

Items from the ASI were used to examine access to PTS. Access to substance abuse PTS was derived from item D19a in the follow-up ASI Alcohol and Drug subscale which asks, 'How many times since you left the Salvation Army program have you been treated for Alcohol or Drug abuse?' Access to mental health PTS was derived from item P2 in the follow-up ASI Psychiatric subscale, which asks, 'How many times have you been treated for any psychological or emotional problems since you left the Salvation Army Program in an outpatient/private patient setting?'

The Desires for Alcohol Questionnaire (Love et al. 1998) is a 36 item questionnaire assessing substance craving. A short form of this questionnaire (DAQ-8), with 8 items, has been validated (eg; Mason et al. 2009) and was utilised in this study. Items are based on a 7-point Likert scale of 'Strongly disagree' (1) to 'Strongly agree' (7) with items such as 'I want to drink/use drugs so much I could taste it' (item 1). The Cronbach alpha (Cronbach 1951) for the DAQ-8 was .92 at both intake and follow-up.

The Depression Anxiety Stress Scales (DASS-21) (Lovibond and Lovibond 1995) includes 21 items, comprising three subscales measuring the negative emotional states of depression, anxiety and stress. Participants rate the extent to which they have experienced the emotional states over the past week using a 4-point Likert scale from 'Did not apply to me at all' to 'Applied to me very much, or most of the time'. A total score is produced with higher scores indicating higher levels of symptom distress. The Cronbach alpha (Cronbach

1951) for the subscales ranged from .85 to .91 at intake and .87 to .95 at follow-up and was .95 for the total score at both intake and follow-up.

The Recovery Assessment Scale (RAS-24) (Corrigan et al. 2004) is a 24 item scale (e.g., 'I have goals in life I want to reach' (item 1)) comprising five subscales: Personal Confidence and Hope, Willingness to ask for Help, Goal and Success Orientation, Reliance on Others, and Symptom Coping and No Domination of Symptoms. A 5-point Likert scale ranging from 'Strongly disagree' (1) to 'Strongly agree' (5) is used. A total score is produced with higher scores indicating greater recovery. The Cronbach alpha (Cronbach 1951) for the subscales ranged from .78 to .86 at intake and .64 to .86 follow-up. The Cronbach alpha (Cronbach 1951) for the total score was .92 at intake and .78 at follow-up.

The Life Engagement Test (LET) (Scheier et al. 2006) is a 6 item scale measuring purpose in life and reflects the extent to which an individual is psychologically involved in personally valued life activities (e.g., 'There is not enough purpose in my life' (item 1)). A 5-point Likert scale ranging from 'Strongly disagree' (1) to 'Strongly agree' (5) is used. The Cronbach alpha (Cronbach 1951) for the LET was .65 at intake and .83 at follow-up.

The Before and After Rehabilitation items (BAR) assess perceptions of alcohol and drug use severity and mental health problems, *before* and *after* treatment. The items were developed for this study. The four items are based on a 5-point Likert scale of 'No problem' (0) to 'Very Large Problem' (4). A sample item is, 'To what extent do you feel you had problems with the use of drugs or alcohol prior to entering the program' (item 1). The BAR was included in the follow-up assessment only as an overall indicator of self-perceived change from intake to follow-up. The Cronbach alpha (Cronbach 1951) for the BAR at follow-up was .88.

Procedure

Upon entry to the program, participants completed an intake assessment with a trained assessor. Eligible participants were contacted by telephone 3-month post discharge from the program. Participants received a \$20 gift voucher for completing the follow-up interview. Several methods were used to recruit participants if no contact was made after 4 telephone call attempts such as, contacting nominated family members and mail correspondence. The study received ethical review and approval for the University Human Ethics Committee.

Results

Group Membership

Using the Psychiatric subscale of the ASI, 163 (66.7%) of the total sample were classified as likely to have DD and 71 (33.3%) as SUD only. Individuals classified in the DD group reported prior experience of the following mental health symptomology; serious symptoms of Depression (89%) and Anxiety (92%), hallucinations (34%), serious thoughts of suicide (70%) and previous suicide attempts (50%).

Analysis of Treatment Outcomes

A series of 2×2 repeated-measures Analysis of Variance (ANOVA) were used to compare group differences (SUD and DD) in the treatment outcome measures over time (intake and follow-up). The means and standard deviations are presented in Table 1.

Table 1 Means and standard deviations for treatment outcomes

Measure	Substance Use Disorder				Dual Diagnosis ^a			
	Intake		Follow-up		Intake		Follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ASI Alcohol Composite Score	.44	.70	.15	.26	.78	.71	.23	.31
ASI Drug Composite Score	.08	.10	.04	.09	.13	.11	.03	.23
Desires for Alcohol Questionnaire	17.89	10.35	17.65	11.73	22.30	12.38	20.30	12.92
Depression Anxiety Stress Total	6.58	4.55	4.00	3.54	9.93	4.74	6.74	5.35
Recovery Assessment Scale Total	91.59	12.49	96.26	14.35	84.84	14.59	91.48	15.14
BAR Drug and Alcohol	4.38	1.68	1.91	1.64	4.34	1.80	2.36	1.93
BAR Mental Health	2.91	2.25	1.79	1.80	3.62	2.20	2.54	2.12
Life Engagement Test	18.72	1.90	20.05	3.60	18.99	2.34	19.00	3.01

SUD $n = 71$ and DD $n = 163$

^a Participants were classified as DD according to the probabilistic cut-off score of .22 in the intake ASI Psychiatric Composite score.

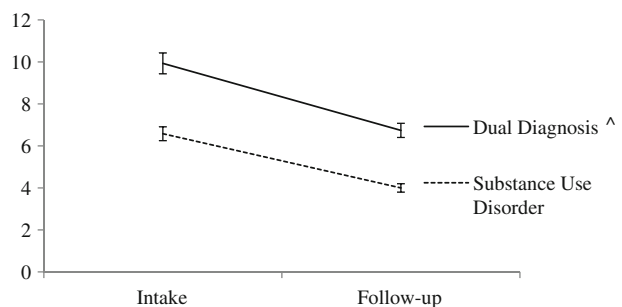
Substance use severity was determined by the ASI Alcohol and Drug Composite scores. Analysis indicated significant decreases in mean scores over time for both the ASI Alcohol Composite score, $F(1,187)=27.29$, $p<.001$ and the ASI Drug Composite score $F(1,179)=18.15$, $p<.001$. No group differences were found in substance use severity.

A significant main effect of group was found for the DAQ-8, with individuals with probable DD reporting higher cravings compared to individuals with SUD, $F(1, 193)=5.44$, $p=.02$.

A significant main effect of time was found for the DASS21 total score, with higher symptom distress reported at intake than follow-up, $F(1, 193)=34.49$, $p<.001$. Significant group differences were also found, with the probable DD group indicating higher symptom distress compared to individuals with SUD, $F(1, 139)=25.52$, $p<.001$. These results are depicted in Figure 1 and reflect the general findings of the other measures.

A significant main effect of time was found for the RAS-24 total score, with lower recovery from symptoms at intake compared to follow-up, $F(1, 139)=17.64$, $p<.001$. Significant main effects of group were also found, with the individuals with probable DD indicating less recovery from symptoms compared to individuals with SUD, $F(1, 139)=10.86$, $p<.001$.

Fig. 1 Results from the DASS total score, over time and according to group. Note: SUD $n = 71$ and DD $n = 163$. ^ Participants were classified as DD according to the probabilistic cut-off score of .22 in the intake ASI Psychiatric Composite score



Analysis of the BAR Drug and Alcohol Problem items indicated a significant interaction between time and group, with greater improvements reported in the SUD group, $F(1, 229)=6.03$, $p=.015$, $\eta^2=.03$. A significant main effect of time was found for the Drug and Alcohol Problem items, with lower drug and alcohol problem ratings at follow-up compared to intake, $F(1, 229)=503.31$, $p<.001$, $\eta^2=.68$. Analysis of the BAR Mental Health Problem items indicated a significant main effect of time, with lower mental health problem ratings at follow-up compared to intake, $F(1, 229)=109.53$, $p<.001$, $\eta^2=.32$. Analysis indicated a significant main effect of group, with individuals with probable DD indicating higher mental health problem ratings compared to individuals with SUD at both intake and follow-up, $F(1, 229)=7.02$, $p=.009$, $\eta^2=.03$.

No other significant results were found, although a main effect for time on LET scores approached significance, $F(1, 179)=3.8$, $p=.053$, $\eta^2=.021$.

Post Hoc repeated measures ANOVA was conducted on the DASS-21 and RAS-24 subscales to compare group differences (SUD and DD) over time (intake and follow-up). Significance was determined using an adjusted Bonferroni alpha of .01. Significant main effects of time were found in all DASS-21 subscales, with higher intake scores compared to their respective follow-up scores: Depression $F(1, 179)=20.98$, $p<.01$, $\eta^2=.11$, Anxiety $F(1, 179)=41.11$, $p<.01$, $\eta^2=.19$ and Stress $F(1, 179)=28.13$, $p<.01$, $\eta^2=.14$. Significant main effects of group membership were also found in all subscales. Those in the probable DD group had higher subscale scores compared to the SUD group for; Depression $F(1, 179)=14.65$, $p<.001$, $\eta^2=.04$, Anxiety $F(1, 179)=21.13$, $p<.001$, $\eta^2=.08$ and Stress $F(1, 179)=21.85$, $p<.001$, $\eta^2=.05$.

Significant main effects of time were found in the RAS-24 subscales of Personal Confidence and Hope, $F(1, 182)=19.40$, $p<.05$, $\eta^2=.10$ and No Domination of Symptoms, $F(1, 182)=38.02$, $p<.01$, $\eta^2=.18$, with lower intake scores compared to their respective follow-up scores. A significant main effect of group was apparent in the subscale of Personal Confidence and Hope, with the probable DD group having significantly lower scores compared to the SUD group, $F(1, 182)=14.74$, $p<.01$, $\eta^2=.08$. No other significant results were found.

Duration of Treatment

Duration of treatment, in days, was calculated as the difference between intake and discharge dates. The mean duration of treatment was 130.18 days ($SD=105.23$ days). T -tests indicated no significant group differences in duration of treatment. Pearson's correlations (r) were used to examine the relationship between duration of treatment and treatment outcome measures. Analysis revealed a significant negative relationship between treatment duration and the DAQ-8 for those in the probable DD group, $r(125)=-.18$, $p=.042$. No other significant correlations were found.

Access to Post Treatment Services

Non-parametric analyses were conducted for the access to PTS variables due to positively skewed data. The means, standard deviations and ranks are reported in Table 2. Mann-Whitney U (U) tests were used to examine rates of access to PTS between the groups (SUD and DD). Analysis indicated a significant difference in access to mental health PTS, with higher access rates for those in the probable DD group, $U=3391.50$, $z=-2.39$, $p=.017$ (2-tailed). No significant differences between groups' rates of access were found for substance abuse PTS ($p=.155$). Spearman's correlations were conducted to examine the

Table 2 Summary information for access to post treatment services

Post Treatment Service	Substance Use Disorder				Dual Diagnosis ^a			
	<i>n</i>	<i>M</i>	<i>SD</i>	Mean Rank	<i>n</i>	<i>M</i>	<i>SD</i>	Mean Rank
Substance Abuse Post Treatment Services	57	10.39	19.50	89.49	131	12.80	21.25	101.26
Mental Health Post Treatment Services	57	1.39	7.05	86.2	131	1.64	4.66	101.41

^a Participants were classified as DD according to the probabilistic cut-off score of .22 in the intake ASI Psychiatric Composite score.

relationship between access to PTS on the treatment outcome measures for each group (see Table 3). For those in the SUD group, greater access to substance abuse PTS was significantly associated with lower alcohol use (ASI Alcohol Composite Score) and lower cravings (DAQ-8). For both groups, greater access to mental health PTS was significantly associated with greater symptom distress (DASS-21).

Discussion

The first aim of this study was to estimate the prevalence of likely DD in the sample. The proportion obtained was that 66.7% of the sample was likely to have a DD and 33.3% likely to have SUD only. This proportion is in line with other research using similar samples and methodology (Mental Health Council of Australia [MHCA] 2010; Havassy et al. 2004; Schulte et al. 2010). Validation of these findings are necessary. The large proportion classified as likely to have DD in this sample reinforces the issue at hand—comorbidity is the rule rather than the exception in this population (Drake et al. 2001; Libby et al. 2005; Power and Demartin 2004). Further, self reported experience of serious mental health symptoms (such as; hallucinations and suicide attempts) were high in the DD group. Following from this, there is a need for SUD treatment providers to be equipped for dealing with serious mental health problems (Havassy et al. 2004).

Table 3 Correlations of outcome measures and access to post treatment services, by group

Measure	Substance Use Disorder			Dual Diagnosis ^a		
	<i>n</i>	SA-PTS	MH-PTS	<i>n</i>	SA-PTS	MH-PTS
ASI Alcohol Composite score	58	-.34**	.06	134	.08	-.12
ASI Drug Composite score	58	-.10	-.19	134	-.06	.06
Desires for Alcohol Questionnaire	58	-.32*	.16	133	-.07	.14
Life Engagement Test	57	.03	.13	131	-.03	-.08
Depression Anxiety Stress Total Score	57	-.21	.30*	134	-.07	.31**
Recovery Assessment Scale	58	.13	-.19	131	.12	-.04

* $p < .05$ ** $p < .001$, all two tailed

^a Participants were classified as DD according to the probabilistic cut-off score of .22 in the intake ASI Psychiatric Composite score

SA-PTS Substance Abuse-Post Treatment Services, MH-PTS Mental Health-Post Treatment Services

The second hypothesis was supported because both SUD and suspected DD groups reported equivalent and decreased rates of substance use at follow-up. Self ratings of drug and alcohol problems, measured by BAR items, also indicated decreased substance use levels at follow-up. It should be noted that the BAR items were constructed for the purposes of this study. Internal consistency was acceptable but further validation is needed. Interestingly, individuals with probable DD perceived less improvement at follow-up in drug and alcohol problems, compared to individuals with SUD only, despite equivalent usage between the groups. Together, these findings indicate the program had a similar, positive effect on substance use *levels* for both groups, but individuals with DD *perceived* less improvement in this area compared to individuals with SUD. Future research should continue to validate these results and investigate whether the findings of decreased substance use are of clinical significance as has been established for individuals undergoing residential treatments for mental illness (e.g., Murugesan et al. 2007).

Various aspects of psychological status were examined in order to assess the hypothesis that individuals classified as DD would have poorer psychological status and both intake and follow-up. Both groups were expected to report psychological improvements over time but the DD group were hypothesized to remain less recovered when compared to the SUD group.

Examination of cravings partially supported the hypotheses. The DAQ-8 (Love et al. 1998) indicated no reductions in cravings from intake to follow-up. Individuals classified as DD reported higher craving levels at both intake and follow-up in comparison to the SUD group. When these findings are considered with the substance use results, it can be suggested that whilst both groups improve in substance use severity after treatment, individuals with probable DD continue to crave substances more than individuals with SUD alone. Higher cravings in the DD group are likely to influence perceptions of substance use problems, which could account for this groups' more negative perceptions of substance use problems (Breiner et al. 1999). Given the overall decreased substance use levels at follow-up, despite equivalent craving levels to those at intake, it is surmised techniques used in the program help individuals manage cravings to some extent. Due to higher reported cravings in individuals with DD, it is possible that techniques used to manage cravings are not as effectively received by this group (Kennedy 1999; 2000).

The DASS-21 (Lovibond and Lovibond 1995) indicated results in line with the hypotheses whereby DD individuals indicated higher symptom distress at intake compared to SUD individuals (Boden and Moos 2009; Mills et al. 2010). Both groups reported decreased symptom distress at follow-up, in all areas of depression, anxiety and stress. This improvement was at an equivalent rate for the groups and resulted in the level of symptom distress in the DD group at follow-up to be comparable to that of the SUD group at *intake*.

Recovery from addiction as measured by the RAS-24 (Corrigan et al. 2004), indicated improvements in psychological symptoms of addiction at follow-up for both groups. Rates of improvement were equivalent, resulting in individuals with probable DD achieving symptom recovery to the level reported at intake for individuals with SUD only. More specifically, recovery in the subscales of, Personal Confidence and Hope and No Domination of Symptoms correlated highly with overall improvements in recovery from symptoms. Additionally, when examining group differences, the area of Personal Confidence and Hope proved to be the main subscale associated with recovery from symptoms. Disparity in recovery between the groups was greatest in this domain, with individuals with DD recovering less. These results indicate that self-efficacy plays a role in positive treatment outcomes and that conversely, lack of self-efficacy is associated with less recovery from symptoms (Brown et al. 1995; Magura et al. 2007). Treatment outcomes for

individuals with probable DD may be enhanced with the integration of self-efficacy modules which are receptive to their specific needs (Brown et al. 1995; Magura et al. 2007; Willard-Long et al. 2006).

Overall, results from the battery of measures indicate that individuals with probable DD report benefits in psychological status at follow-up from SUD treatment. These improvements are at an equivalent rate to individuals with SUD only, despite greater scope for improvement in individuals with DD. It can be suggested that either DD individuals require *more* efforts to improve their psychological status or they are not *responding* to the techniques employed by the program. Treatment responsivity is a critical issue to consider and incorporates several influencing factors such as; motivation to change, matching treatment approach to preferred learning styles and abilities and cognitive abilities (Kennedy 1999; 2000). According to the responsivity principle, these factors can directly impact the effectiveness of a treatment program (Kennedy 1999; 2000). This provides justification for the implementation of integrated programs.

Although purpose in life did not improve significantly from intake to follow-up, this may in part have been due to the relatively short follow-up period of 3 months. It is likely the initial 3 months post discharge from treatment are focused on readjusting to life in the community, maintaining abstinence and re-establishing routines (Carroll 1993). Higher level psychological needs such as purpose in life may require more time to develop (Carroll 1993).

The hypothesis that DD individuals would have a shorter duration of treatment was not confirmed. It can be suggested that group differences may exist but were not apparent in this sample because the average length of treatment (just over 4 months) was substantially less than the recommended duration of 10 months. Analysis indicated individuals classified as DD who had a longer duration of treatment reported a reduction in cravings. Therefore treatment modules which promote retention in treatment and are sensitive to individuals with DD may facilitate positive treatment outcomes. This warrants further investigation.

Access to post treatment services (PTS) were examined to determine if group differences exist in access rates. Comparable access rates to substance abuse PTS were reported between the groups. Individuals with SUD only accessing substance abuse PTS reported decreased cravings and alcohol use levels, whereas no impact on cravings or substance use levels were found in DD individuals. These results and other research suggest that traditional substance abuse PTS do not facilitate substance use recovery for individuals with co-occurring mental health problems to the extent which they benefit individuals with SUD only (Bogenschutz et al. 2006; Galanter 2007; Timko et al. 2010; Vogel et al. 1998). To enhance substance use recovery it is suggested that PTS with an integrated focus, such as Double Trouble in Recovery (Bogenschutz 2005; Vogel et al. 1998), are encouraged for individuals with probable DD at discharge from treatment (Bogenschutz 2005; Grana et al. 2009; Herman et al. 2000; Magura et al. 2007; National Institute on Drug Abuse [NIDA] 2008; Villena and Chelsea 2010). Individuals with DD reported greater access to mental health PTS compared to SUD individuals. This finding highlights the need for individuals with DD to receive treatment for mental health problems. Regardless of group, individuals accessing mental health PTS reported higher symptom distress compared to non-attendees, indicating individual's with higher symptom distress are accessing services.

Limitations and Future Directions

Obtaining a representative sample is particularly difficult in the drug and alcohol field (Oudejans et al. 2009). Sample characteristics often inherent in this population such as

homelessness, unstable living arrangements, lack of contact with family and no telephone contacts can result in low follow-up rates (Oudejans et al. 2009; Mueser et al. 2009). The follow-up rate achieved in this study is comparable to other studies using similar populations and methodology (Gerstein and Johnson 2001; Grella et al. 1999; Oudejans et al. 2009). As with all longitudinal research, findings are based on the contactable individuals within the sample. It is possible that individuals with more positive treatment outcomes participated in follow-up than those who were not able to be contacted or withdrew consent (Oudejans et al. 2009). Therefore the reported positive treatment outcomes could be inflated given that they are based on a limited cohort. The study also relied solely on self report which may lead to some socially desirable responding which went unchecked. There is always scope for future studies to extend procedures utilised in tracking participants for follow-up, obtain a higher follow-up rate and in doing so increase confidence in the representativeness of the sample.

This study classified probably DD according to the Psychiatric Status subscale of the ASD. Whilst this measure is considered adequate as a screening instrument for mental health problems in this population, it has been criticized for not providing enough descriptive detail about specific mental health problems measured (Mortlock et al. 2011). Therefore a limitation of assessing for probable DD with this measure is the limited availability information regarding specific types of co-occurring mental health diagnoses. For this reason we recommend future studies assessing DD supplement the ASI with clinical interviews to determine more specific classifications of mental health problems.

An implication of this study is that the prevalence of DD is the rule rather than the exception in SUD treatment programs (Hall et al. 2009). It is vital that established SUD programs become equipped for dealing with mental health problems in order to provide efficient, evidence-based treatment. Importantly, this study revealed that individuals with DD do benefit from traditional SUD treatment programs. However this study also revealed that there is scope for greater improvement for individuals with DD. By implementing treatment programs that are receptive to the needs of the individuals involved, the foundation for enhancing positive treatment outcomes is established (Kennedy 1999; 2000).

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References

- Alterman, A. I., Bovasso, G. B., Cacciola, J. S., & McDermott, P. A. (2001). A comparison of the predictive validity of four sets of baseline ASI summary indices. *Psychology of Addictive Behaviours*, *15*(2), 159–162.
- Alterman, A. I., Cacciola, J. S., Habing, B., & Lynch, K. G. (2007). Addiction severity index recent and lifetime summary indexes based on nonparametric item response theory methods. *Psychological Assessment*, *19*(1), 119–132.
- Australian Bureau of Statistics [ABS]. (2006). *National Health Survey: Summary of Results, Australia, 2004–05*. Retrieved September 13, 2010 from <http://abs.gov.au/AUSSTATS/abs@.nsf/mf/4832.0.55.001/>
- Bartels, S. J., & Drake, R. E. (1996). A pilot study of residential treatment for dual diagnoses. *The Journal of Nervous and Mental Disease*, *184*(6), 379–381.
- Boden, M. T., & Moos, R. (2009). Dually diagnosed patients' responses to substance use disorder treatment. *Journal of Substance Abuse Treatment*, *37*(4), 335–345.

- Bogenschutz, M. P. (2005). Specialized 12-step programs and 12-step facilitation for the dually diagnosed. *Community Mental Health Journal*, *41*(1), 7–20.
- Bogenschutz, M. P., & Atkin, S. J. (2000). 12 step participation and attitudes toward 12-step meetings in dual diagnosis patients. *Alcoholism Treatment Quarterly*, *18*(4), 31–45.
- Bogenschutz, M. P., Geppert, C. M. A., & George, J. (2006). The role of twelve-step approaches in dual diagnosis treatment and recovery. *The American Journal on Addictions*, *15*(1), 50–60.
- Breiner, M. J., Stritzke, W. G. K., & Lang, A. R. (1999). Approaching avoidance: A step essential to the understanding of craving. *Alcohol Research & Health*, *23*(3), 197–207.
- Brown, S. A., Vik, P. W., Patterson, T. L., Grant, I., & Schuckit, M. A. (1995). Stress, vulnerability and adult alcohol relapse. *Journal of Studies on Alcohol and Drugs*, *56*(5), 538–545.
- Cacciola, J. S., Alterman, A. I., McKay, J. R., & Rutherford, M. J. (2001). Psychiatric comorbidity in patients with substance use disorders: Do not forget axis II disorders. *Psychiatric Annals*, *31*(5), 321–332.
- Cacciola, J. S., Koppenhaver, J. M., McKay, J. R., & Alterman, A. (1999). Test-retest reliability of the lifetime items on the addiction severity index. *Psychological Assessment*, *11*(1), 86–93.
- Cacciola, J. S., Pecoraro, A., & Alterman, A. I. (2008). Development of ASI psychiatric severity cut-off scores to identify co-occurring psychiatric disorders. *International Journal of Mental Health and Addiction*, *6*(1), 77–92.
- Calsyn, D. A., Saxon, A. J., Bush, K. R., Howell, D. N., Baer, J. S., Sloan, K. L., & Kivlahan, D. R. (2004). The addiction severity index medical and psychiatric composite scores measure similar domains as the SF-36 in substance-dependent veterans: Concurrent and discriminant validity. *Drug and Alcohol Dependence*, *76*(2), 165–171.
- Carroll, S. (1993). Spirituality and purpose in life in alcoholism recovery. *Journal of Studies on Alcohol*, *54*(3), 297–301.
- Chung, S., Domino, M. E., & Morrissey, J. P. (2009). Changes in treatment content of services during trauma-informed integrated services for women with co-occurring disorders. *Community Mental Health Journal*, *45*(5), 375–384.
- Corrigan, P. W., Salzer, M., Ralph, R. O., Sangster, Y., & Keck, L. (2004). Examining the factor structure of the recovery assessment scale. *Schizophrenia Bulletin*, *30*(4), 1035–1042.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334.
- Currie, S. R., el-Guebaly, N., Coulson, R., Hodgins, D., & Mansley, C. (2004). Factor validation of the addiction severity index scale structure in persons with concurrent disorders. *Psychological Assessment*, *16*(3), 326–329.
- Drake, R. E., Essock, S. M., Shaner, A., Carey, K. B., Minkoff, K., Kola, L., & Rickards, L. (2001). Implementing dual diagnosis services for clients with severe mental illness. *Psychiatric Services*, *52*(4), 469–476.
- Enstrom, C. (2010). Social workers ability to assess how clients experience investigation sessions- with and without the ASI. *Journal of Social Work*, *9*(3), 309–321.
- Galanter, M. (2007). Spirituality and recovery in 12-step programs: An empirical model. *Journal of Substance Abuse Treatment*, *33*(3), 265–272.
- Gerstein, D. R., & Johnson, R. A. (2001). Nonresponse and selection bias in treatment follow-up studies. *Substance Use and Misuse*, *36*(12), 1749–51. 1753–59.
- Grana, J. L., Munoz, J. J., & Navas, E. (2009). Normal and pathological personality characteristics in subtypes of drug addicts undergoing treatment. *Personality and Individual Differences*, *46*(4), 418–423.
- Grella, C. E., Hser, Y. I., Joshi, V., & Anglin, M. D. (1999). Patient histories, retention, and outcome models for younger and older adults in DATOS. *Drug and Alcohol Dependence*, *57*(2), 151–166.
- Griffin, M. L., Kolodziej, M. E., & Weiss, R. D. (2009). Measuring principle substance of abuse in comorbid patients for clinical research. *Addictive Behaviours*, *34*(10), 826–829.
- Hall, W., Degenhardt, L., & Teesson, M. (2009). Understanding comorbidity between substance use, anxiety and affective disorders: Broadening the research base. *Addictive Behaviours*, *34*(10), 795–799.
- Havassy, B. E., Alvidrez, J., & Owen, K. K. (2004). Comparisons of patients with comorbid psychiatric and substance use disorders: Implications for treatment and service delivery. *The American Journal of Psychiatry*, *161*(1), 139–145.
- Hayes, R. A., Andrews, N., Baron-Jeffrey, M., Conley, C., Gridley, K., Norman, R., & Wright, G. (2003). Service enhancement to a dual-diagnosis population: Mental illness/substance abuse (MISA). *Quality Management in Health Care*, *12*(3), 133–150.
- Herman, S. E., Frank, K. A., Mowbray, C. T., Ribisl, K. M., & Davidson, W. S. (2000). Longitudinal effects of integrated treatment on alcohol use for persons with serious mental illness and substance use disorders. *The Journal of Behavioral Health Services and Research*, *27*(3), 286–302.
- Hipwell, A. E., Singh, K., & Clark, A. (2000). Substance misuse among clients with severe and enduring mental illness: Service utilisation and implications for clinical management. *Journal of Mental Health*, *9*(1), 37–50.

- Hodgins, D. C., & el-Guebaly, N. (1992). More data on the addiction severity index: Reliability and validity with the mentally ill substance abuser. *The Journal of Nervous and Mental Disease*, 180(3), 197–201.
- Howland, R. H., Rush, A. J., Wisniewski, S. R., Trivedi, M. H., Warden, D., Fava, M., Davis, L. L., Balasubramani, G. K., McGrath, P. J., & Berman, S. R. (2009). Concurrent anxiety and substance use disorder among outpatients with major depression: Clinical features and effect on treatment outcome. *Drug and Alcohol Dependence*, 99(1), 248–260.
- Kandel, D. B., Huang, F., & Davies, M. (2001). Comorbidity between patterns of substance use dependence and psychiatric syndromes. *Drug and Alcohol Dependence*, 64(2), 233–241.
- Kennedy, S. (1999). Responsibility: The other classification principle. *Corrections Today*, 61(1), 48–74.
- Kennedy, S. (2000). Treatment responsibility: Reducing recidivism by enhancing treatment effectiveness. *Forum of Corrections Research*, 12, 19–23.
- Kessler, R. C. (2004). Impact of substance abuse on the diagnosis, course and treatment of mood disorders: The epidemiology of dual diagnosis. *Biological Psychiatry*, 56, 730–737.
- Krupski, A., Campbell, K., Joesch, J. M., Lucenko, B. A., & Roy-Byrne, P. (2009). Impact of access to recovery services on alcohol/drug treatment outcomes. *Journal of Substance Abuse Treatment*, 37(4), 435–442.
- Libby, A. M., Orton, H. D., Stover, S. K., & Riggs, P. D. (2005). What came first, major depression or substance use disorder? Clinical characteristics and substance use comparing teens in a treatment cohort. *Addictive Behaviours*, 30(9), 1649–1662.
- Love, A., James, D., & Willner, P. (1998). A comparison of two alcohol craving questionnaires. *Addiction*, 93(7), 1091–1102.
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney: Psychology Foundation.
- Magura, S., Cleland, C., Vogel, H. S., Knight, E. L., & Laudet, A. B. (2007). Effects of ‘dual diagnosis’ mutual aid on self-efficacy for recovery and quality of life. *Administration and Policy in Mental Health Services Research*, 34(1), 1–12.
- Mason, S. J., Deane, F. P., Kelly, P. J., & Crowe, T. P. (2009). Do spiritually and religiosity help in the management of cravings in substance abuse treatment? *Substance Use & Misuse*, 44(13), 1926–1940.
- Matthews, H., Kelly, P.J., & Deane, F. (2010). The dual diagnosis capability of residential addiction treatment centres: Priorities and confidence to improve capability following a review process. *Drug and Alcohol Review*. Retrieved from <http://onlineibrary.wiley.com/doi/10.1111/j.1465-3362.2010.00215.x/>
- McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, R., Grissom, G., & Argeriou, M. (1992). The fifth edition of the addiction severity index. *Journal of Substance Abuse Treatment*, 9(3), 199–213.
- Mental Health Council of Australia [MHCA]. (2010). *Mental Health Fact Sheet: Statistics on Mental Health in Australia*. Retrieved from <http://www.mhca.org.au/documents/AboutMentalHealth/FactsonMental-Health.pdf>
- Mills KL, Deady M, Proudfoot H, Sannibale C, Teesson M, Mattick R, Burns L (2010). *Guidelines on the Management of Co-Occurring Alcohol and Other Drug and Mental Health Conditions in Alcohol and Other Drug Treatment Settings*. University of New South Wales: National Drug and Alcohol Research Centre. Retrieved from <http://ndarc.med.unsw.edu.au/NDARCWeb.nsf/page/Comorbidity+Guidelines>
- Moos, R. F., Finney, J. W., Federman, E. B., & Suchinsky, R. (2000). Speciality mental health care improves patients’ outcomes: Findings from a nationwide program to monitor the quality of care for patients with substance use disorders. *Journal of Alcohol and Drug Treatment*, 61(5), 704–717.
- Mortlock, K. S., Deane, F. P., & Crowe, T. P. (2011). Screening for mental disorder comorbidity in Australian alcohol and other drug residential treatment settings. *Journal of Substance Abuse Treatment*, 40, 397–404.
- Mueser, K. T., Glynn, S. M., Cather, C., Zarate, R., Fox, L., Feldman, J., & Clark, R. E. (2009). Family intervention for co-occurring substance use and severe psychiatric disorders: Participant characteristics and correlates of initial engagement and more extended exposure in a randomized control trial. *Addictive Behaviours*, 34(10), 867–877.
- Murugesan, G., Amey, C. G., Deane, F. P., Jeffrey, R., Kelly, B., & Stain, H. (2007). Inpatient psychosocial rehabilitation in rural NSW: Assessment of clinically significant change for people with severe mental illness. *The Australian and New Zealand Journal of Psychiatry*, 41(4), 343–350.
- National Institute on Drug Abuse [NIDA]. (2008). *Research Report Series: Comorbidity- Addiction and Other Mental Illnesses*. Retrieved from http://www.drugabuse.gov/PDF/RR_Comorbidity.pdf
- O’Brien, C., Charney, D., Lewis, L., Cornish, J., Post, R., Woody, G., & Weisner, C. (2004). Priority actions to improve the care of persons with co-occurring substance abuse and other mental disorders: A call to action. *Biological Psychiatry*, 56(10), 703–713.
- Osilla, K. C., Hepner, K. A., Murioz, R. F., Woo, S., & Watkins, K. (2009). Developing an integrated treatment for substance use and depression using cognitive-behavioural therapy. *Journal of Substance Abuse Treatment*, 37(4), 412–420.

- Oudejans, S. C. C., Schippers, G. M., Merckx, M. J. M., Schramade, M. H., Koeter, M. W. J., & van de Brink, W. (2009). Feasibility and validity of low-budget telephonic follow-up interviews in routine outcome monitoring of substance abuse treatment. *Addiction Methods and Techniques*, 104(7), 1138–1146.
- Power, K., & Demartin, R. (2004). Co-occurring disorders and achieving recovery: The substance abuse and mental health services administration perspective. *Biological Psychiatry*, 56(10), 721–722.
- Pristach, C. A., & Smith, C. M. (1999). Attitudes towards alcoholics anonymous by dually diagnosed psychiatric inpatients. *Journal of Addictive Disease*, 18(3), 69–76.
- RachBeisel, J., Scott, J., & Dixon, L. (1999). Co-occurring severe mental illness and substance use disorders: A review of recent research. *Psychiatric Services*, 50, 1427–1434.
- Reelick, N. F., & Wierdsma, A. I. (2006). The addiction severity index as a predictor of the use of mental health care. *Psychology of Addictive Behaviours*, 20(2), 214–218.
- Robertson, E. C. (1992). The challenge of dual diagnosis- Project muse, today's research tomorrow's inspiration. *Journal of Health Care for the Poor and Underserved*, 3(1), 198–207.
- Rosen, C. S., Henson, B. R., Finney, J. W., & Moos, R. H. (2002). Consistency of self-administered and interview-based addiction severity index composite scores. *Addiction*, 95(3), 419–425.
- Scheier, M. F., Wrosch, C., Baum, A., Cohen, S., Martire, L. M., Matthews, K. A., & Zdzienicka, B. (2006). The life engagement test: Assessing purpose in life. *Journal of Behavioural Medicine*, 29(3), 291–298.
- Schulte, S. J., Meier, P. S., Stirling, J., & Berry, M. (2010). Unrecognised dual diagnosis-A risk factor for dropout of addiction treatment. *Mental Health and Substance Use: Dual Diagnosis*, 3(2), 94–109.
- Slymaker, V. J., & Owen, P. (2008). Alcohol and other drug dependence severity among older adults in treatment: Measuring characteristics and outcomes. *Alcoholism Treatment Quarterly*, 26(3), 259–272.
- Timko, C., Sutkow, A., & Moos, R. (2010). Patients with dual diagnosis or substance use disorders only: 12-Step group participation and 1-year outcomes. *Substance Use & Misuse*, 45(4), 613–627.
- Villena, A. L. D., & Chelsea, C. A. (2010). Challenges and struggles: Lived experiences of individuals with co-occurring disorders. *Archives of Psychiatric Nursing*, 24(2), 76–88.
- Vogel, H. S., Knight, E., Laudet, A. B., & Magura, S. (1998). Double trouble in recovery: Self help for people with dual diagnosis. *Psychiatric Rehabilitation Journal*, 21(4), 356–364.
- Volkow, N. D. (2004). The reality of comorbidity: Depression and drug abuse. *Biological Psychiatry*, 56(10), 714–717.
- Walker, M. A. (2009). Program characteristics and the length of time clients are in substance abuse treatment. *The Journal of Behavioural Health Services and Research*, 36(6), 330–343.
- Willard-Long, M., Cassidy, B. A., Sucher, M., & Stoehr, J. D. (2006). Prevention of relapse in the recovery of Arizona health care providers. *Journal of Addictive Diseases*, 25(1), 65–73.
- Zanis, D. A., McLellan, A. T., & Corse, S. (1997). Is the Addiction Severity Index a reliable and valid assessment instrument among clients with severe and persistent mental illness and substance abuse disorders? *Community Mental Health Journal*, 33(3), 213–227.