



# Prevalence and Predictors of Symptoms of Depression Among Individuals Seeking Treatment from Australian Drug and Alcohol Outpatient Clinics

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## Abstract

This study examined the prevalence of and sociodemographic characteristics associated with elevated symptoms of depression among clients seeking alcohol or other drug (AOD) treatment. Consenting clients attending two AOD outpatient clinics answered demographics, treatment questions and the Patient Health Questionnaire to assess depressive symptoms. Counts and percentages were calculated to determine the prevalence of elevated depressive symptoms. Logistic regression was used to model the odds of having elevated depressive symptoms for client demographics. Of the 203 clients who completed the survey (87% consent rate), 55% (n = 111) demonstrated elevated depressive symptoms. Females were twice as likely to experience elevated symptoms of depression compared to males (OR 2.07; 95% CI 1.05, 4.08; P = 0.037). The high rates of elevated depressive symptoms among individuals seeking AOD treatment highlight the importance of ongoing research to provide effective treatments for this comorbidity. Routine screening and clear treatment pathways may assist with providing high quality care.

**Keywords** Mental health · Substance-related disorders · Mood disorders · Population characteristics

## Introduction

### Co-occurring Depression and Substance Misuse are Associated with Greater Morbidity

Depression and alcohol or other drug (AOD) misuse co-occur at a high rate in the general population, with recent meta-analytic data indicating individuals with AOD abuse or dependence to be 2–3 times more likely to experience depression compared with those without an AOD disorder (Lai et al. 2015). Comorbidity between depression and AOD misuse has also been associated with greater service use compared to those with AOD misuse alone (Burgess et al. 2009). This is likely due to a greater intensity of depressive and AOD related symptoms experienced by these individuals. For instance, a study examining over twenty-five hundred patients seeking treatment for major depression in the United States found that those with comorbid AOD misuse had more intense depressive symptoms, greater functional impairment and more suicide attempts than those with major depression alone (Davis et al. 2006). Similarly, Australian data suggests greater impairment and suicidality among individuals with comorbid depression and AOD

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misuse compared to those with AOD misuse alone (Johnston et al. 2009; Teesson et al. 2009). Despite higher rates of service use, outcomes for those with comorbid depression and AOD misuse remain suboptimal (Lejoyeux and Lehert 2011; Nunes and Levin 2004). More information is required about depression in AOD treatment settings to inform and improve treatment pathways for clients.

### Estimates of the Prevalence of Depression in Individuals Seeking AOD Treatment Varies Widely

A recent systematic review examined the prevalence of mental health comorbidity among Australian residents seeking treatment for AOD misuse. This review indicated that prevalence of current depression among this group ranged from 27 to 85% (Kingston et al. 2016). This large range was attributed to a number of potential factors including: type of AOD misuse; type of treatment setting; variation of diagnostic instruments; and differences in sample size and representativeness. For instance, studies examining depression among various AOD disorders have been primarily conducted within inpatient settings (Cole and Sacks 2008; Deane et al. 2013; Dingle and King 2009; Dore et al. 2012; Johns et al. 2009; Lubman et al. 2007; Mortlock et al. 2011). Furthermore, most studies examining depression among outpatient settings have focussed on a specific substance, including amphetamine (Baker et al. 2004); alcohol (Burns et al. 2005); benzodiazepines (Hood and O'Neil 2009); and methamphetamines (McKetin et al. 2011). One study examined depression among 95 general AOD outpatient treatment seekers and reported a prevalence of 76% (Staiger et al. 2011). This finding, however, is unlikely to be representative of depression prevalence within outpatient AOD settings as the recruitment method relied upon self-referral through response to advertising, or case manager referral of clients with a comorbid mental health and AOD disorder. This recruitment strategy may have resulted in a higher prevalence of comorbidity. To the authors' knowledge, no other studies have examined the prevalence of depression among a general sample of Australian AOD outpatients.

### Studies have Examined Only a Narrow Range of Sociodemographic Correlates of Depression Among Individuals Seeking AOD Treatment

A number of studies have investigated the impact of gender on comorbidity within AOD treatment settings and found females at greater risk for depression (Cole and Sacks 2008; Darke et al. 1992, 1994; McKetin et al. 2011; Ross et al. 2005). Two studies have examined the impact of age on depression in those seeking AOD treatment and found no association (Darke et al. 1992; Dore et al. 2012). Despite factors such as ethnicity, employment and education being

associated with depression in general (Freeman et al. 2016; Hoebel et al. 2017; Riolo et al. 2005); to date only two studies have explored the relationship between these broader sociodemographic characteristics and depression among people seeking treatment for heroin (Cole and Sacks 2008; Darke et al. 1994), while no studies have explored among a general sample of AOD treatment seekers. It is therefore important to determine the demographic characteristics associated with depression among AOD treatment seekers to understand who is at greatest risk of this comorbidity.

### Aims

To determine among a sample of clients seeking treatment for AOD misuse from Australian outpatient clinics, the:

1. Prevalence of elevated symptoms of depression, determined using a standardised instrument; and
2. Sociodemographic characteristics associated with elevated symptoms of depression.

### Method

#### Design

The current study reports on data collected from a larger cross-sectional study. Only data related to depression are reported here.

#### Setting

A convenience sample of two Australian outpatient AOD treatment centres were invited to participate in the study. One centre was located in a public hospital in New South Wales and provides over 7000 outpatient consultations each year. The other was located in a community centre in Queensland and treats approximately 1200 outpatients each year. The outpatient services provided at both locations included a range of treatment options, including counselling, withdrawal management, medication, group educational programs and referral to external group recovery services.

#### Participants

Eligible clients were: (i) aged 18 years or older; (ii) attending a participating outpatient clinic; and (iii) judged by clinic staff to be proficient enough in English to complete the survey. Ineligible clients were those deemed by clinic staff to be: (i) too ill; (ii) visibly distressed (e.g., angry or upset); (iii) under the influence of drugs or alcohol; or (iv) otherwise unable to provide informed consent (e.g., cognitive

impairment). Clients who had previously participated in the research were also ineligible.

## Procedure

Data was collected between September 2015 and August 2016. Upon presentation to the clinic, clients were approached by clinic staff and verbally invited to take part in the study. Clinic staff recorded the age and gender of those who chose not to initiate the survey. Clients who agreed to participate were provided with a computer tablet (iPad) and were asked to provide their age and gender. They then read an overview of the study on the computer tablet before being asked for consent to continue. For those who consented, the survey questions followed. If participants were called into their appointment before completing the survey, they were able to complete the survey at the end of their appointment. No compensation was offered to participants for participation.

## Measures

### Participant Demographics

Participants self-reported their: age, gender, ethnicity, education, employment status, marital status, living arrangements and whether they were in possession of a concession card or private health insurance. A concession card is issued by the Australian government and provides access to cheaper health services and medication for those receiving government assistance or meeting income requirements.

### Treatment Variables

Participants also provided treatment information. This included the main substance for which they were seeking treatment, responses included: *Alcohol, Amphetamines, Benzodiazepines, Cannabis, Heroin, Methamphetamines or Other*. They were also asked whether they were attending for a new episode of treatment and, if not, how far into treatment they currently were. A new episode of treatment was defined as the following: “This is the first time you have ever attended treatment at a drug and alcohol clinic; OR This is the first time you have attended treatment at this clinic; OR More than 3 months has passed since you last attended drug and alcohol treatment”.

### Depression

The Patient Health Questionnaire (9 items; PHQ-9) (Kroenke et al. 2001) was used to assess depression. Participants were asked whether, in the past 2 weeks, they have: felt little interest or pleasure; felt down, depressed or hopeless;

had trouble falling asleep or sleeping too much; felt tired or had little energy; irregular appetite; felt bad about themselves; had trouble concentrating; been moving/speaking slowly or being very fidgety or restless; or had suicide ideation. Responses were provided using a 4-point likert scale, which included: not at all; several days; more than half the days; nearly every day. This measure has been found to have sound reliability and validity when assessed in both outpatient (Dum et al. 2008) and residential (Hepner et al. 2009) substance abusers.

## Data Analysis

Differences between consenters and non-consenters were determined using a *t* test for comparing age between the two groups and a Chi square test for comparing gender. Each question for the PHQ-9 was scored from 0 to 3, with a total possible score of 27. A cut point of  $\geq 12$  was used to categorise participants as having elevated symptoms of depression, as this cut point has demonstrated a sensitivity of 81% and specificity of 75% among a sample of outpatient substance abusers (Delgado et al. 2011). The prevalence of those with elevated symptoms of depression is presented as the number of patients with a PHQ-9 score  $\geq 12$  divided by the total number of participants (expressed as a percentage). Logistic regression was used to model the odds of being in the elevated depression group versus not for client demographics. Hospital site was included as a design variable in the regression analysis. Client characteristic subgroups were collapsed where necessary to account for the relatively small sample size. Of note, treatment length was collapsed into three groups: new episode, 2 weeks or less and 3 weeks or more. This variable was grouped as such to differentiate between those who were not yet undergoing treatment, those who were in the early stages of treatment and potentially experiencing withdrawal and those who were further along in treatment. Additionally, a number of clients reported treatment seeking for prescribed medication in the ‘Other’ category of main treatment seeking substance. Therefore, another variable was created to account for this group and was included in the regression. Regression analysis was restricted to those with complete data (under the missing completely at random assumption). Results are presented as odds ratios (ORs) and 95% Wald based confidence intervals and P-values. A likelihood ratio test P-value assessing the reduction in fit comparing the full model to the model without the variable is also included. Model calibration was assessed by the Hosmer–Lemeshaw test, and discrimination assessed with the c-statistic. McFadden’s pseudo R-square values are also presented. A P-value threshold of 5% was used to declare statistical significance. All statistical analyses were programmed using Stata V14 (Statacorp, College Station, TX).

## Results

### Consent Rate and Characteristics of Patients

Of the 253 clients approached to participate, 248 (98%) were eligible and 215 (87%) consented to participate. No difference was found for age of consenters compared to non-consenters [ $t(225) = -1.17, P = 0.243$ ]. There was a significant difference for gender between the two groups [ $\chi^2(1) = 4.79, P = 0.029$ ], with females more likely to consent to participation. Significantly different rates of elevated symptoms of depression were found between sites [39% vs. 70%,  $\chi^2(1) = 19.5534, P < 0.001$ ]. Characteristics of the participating clients are provided in Table 1. Participating clients had a mean age of 39.27 (SD = 11.52), were majority males (58%), had a high school education (37%) and were unemployed (31%).

### Prevalence and Predictors of Depression

Of the 203 participants who completed the PHQ-9, 55% ( $n = 111$ ) had elevated symptoms of depression. The prevalence of elevated symptoms of depression by main treatment seeking substance is provided in Table 2. Results of the logistic regression model are provided in Table 3 ( $n = 193$ ). The model accounted for approximately 13% of the variance in the data (Pseudo  $R^2 = 0.1273$ ), and appeared to be calibrated (Hosmer–Lemeshow test  $P = 0.4477$ ). Adjusted odds ratios showed females were more than twice as likely to have elevated symptoms of depression compared to males (OR 2.07; 95% CI 1.05, 4.08;  $P = 0.037$ ). While not statistically significant, the estimated OR and confidence intervals for the education and treatment length variables showed evidence of large effects. Those with a high school education and those with a university education were 2.01 (95% CI 0.99, 4.06) and 1.89 (95% CI 0.72, 4.97) times more likely to than those with a trade or vocation to experience depressive symptoms, respectively. Additionally, those who were less than 2 weeks into treatment were twice as likely as those presenting to a new appointment to demonstrate elevated symptoms of depression (OR 1.99; 95% CI 0.75, 5.30).

## Discussion

To the authors' knowledge, this study is the first to examine the prevalence of elevated symptoms of depression and associated sociodemographic characteristics amongst a group of outpatients seeking treatment for AOD misuse in Australia. The findings indicate that 55% of the study population were experiencing elevated symptoms of depression. This aligns

with previous literature indicating depression prevalence to be high among individuals with AOD disorders (Kingston et al. 2016). Estimates of depression identified in the current study demonstrate a median point between previous estimates of current depression, which ranged from 27 to 85% (Kingston et al. 2016). Significant differences were found in rates of depression between the two participating sites. However no previous multi-site studies have reported differences in depression prevalence by site or location (Burns et al. 2005; Lubman et al. 2007; McKetin et al. 2011; Mortlock et al. 2011), making it difficult to draw further conclusions regarding the possible reason for this variation. While analysis was performed in an attempt to explore reasons for this variation (data not shown), it could not be attributed to any other variance detected, including the variance in gender as described below.

Gender was the only characteristic significantly associated with elevated symptoms of depression, with females more than twice as likely to experience symptoms of depression compared to males. This finding aligns with previous research demonstrating that gender is associated with depression among different AOD disorder types and within inpatient settings (Cole and Sacks 2008; Darke et al. 1992, 1994; McKetin et al. 2011; Ross et al. 2005). While women demonstrated greater risk for depressive symptoms in the current study, it is important to acknowledge emerging evidence indicating that depressive symptoms can appear differently in males (Martin et al. 2013) which may have contributed to current and previous gender findings. Depression in males is less likely to be exhibited through sadness, hopelessness and low mood, and more so through somatic symptoms, aggression or reckless behaviour (Martin et al. 2013). As the PHQ-9 does not include questions regarding aggressive or reckless behaviours, these male specific depressive symptoms may have gone undetected within our study. Additionally men are less likely to report depression but have higher rates of suicide (Bilsker and White 2011), and this has shown a relationship with AOD misuse (Jenkins 2007). Therefore, despite the current findings, there is still a need for clinicians to be vigilant for depressive symptoms in male clients. The lack of association between age and depression comorbidity aligns with previous research among inpatients (Dore et al. 2012) and those abusing opioids (Darke et al. 1992). While there have been some associations between age and depression prevalence in the general population (Ferrari et al. 2013), our finding in conjunction with previous research indicate this is unlikely to be the case among AOD populations.

Mixed findings have been found for depression prevalence among main substance of concern (Dore et al. 2012; Staiger et al. 2011). Our study found no difference of depression prevalence for main substance. This finding aligns with previous research by Dore et al. (2012),

**Table 1** Client characteristics (n = 203)

Variable	Subgroup	N (%)
Age	M = 39 (SD = 11.26)	–
Gender	Male	116 (57)
	Female	87 (43)
Aboriginal or Torres Strait Islander origin	No	195 (96)
	Yes	5 (2.5)
	Missing	3 (1.5)
Education level	Primary school	9 (4)
	High school	79 (39)
	Trade or vocational training	72 (35)
	University degree	40 (20)
	Missing	3 (1.5)
Current employment	Full-time work	51 (25)
	Part-time or casual work	28 (14)
	Home duties	17 (8)
	Unemployed	66 (33)
	Retired	6 (3)
	Disability pension	15 (7)
	Student	11 (5)
	Other	6 (3)
	Missing	3 (1)
	Insurance coverage	Yes
No		144 (71)
Missing		4 (2)
Possession of a concession card	Yes	114 (56)
	No	85 (42)
	Missing	4 (2)
Marital status	Married or living with partner	51 (25)
	Divorced or separated	50 (25)
	Widowed	2 (1)
	Never married	96 (47)
	Missing	4 (2)
Lives with <sup>a</sup>	Spouse or partner	64 (32)
	Child(ren)	47 (23)
	Parents	27 (13)
	Other family members	14 (7)
	Friends	10 (5)
	On my own	50 (25)
	Unrelated flatmate or co-tenant	16 (8)
	No stable arrangement	7 (3)
	Missing	4 (2)
	Main treatment seeking substance	Alcohol
Amphetamines		2 (1)
Benzodiazepines		8 (4)
Cannabis		20 (10)
Heroin		11 (5)
Methamphetamines		27 (13)
Prescribed medication		29 (14)
Other		4 (2)
Missing		3 (1)

**Table 1** (continued)

Variable	Subgroup	N (%)
Current treatment length	New episode of treatment	125 (62)
	2 weeks or less	34 (17)
	3 weeks	1 (0.49)
	1 month	8 (4)
	2 months	8 (4)
	3 months	2 (1)
	4 months	1 (0.49)
	5 months	2 (1)
	6 or more months	22 (11)

<sup>a</sup>Participants were able to select more than one response for this question, therefore the proportions presented are > 100%

**Table 2** Prevalence of elevated symptoms of depression (i.e., PHQ-9 score  $\geq 12$ ) by substance of misuse (n = 200)

	PHQ-9 < 12, n (%)	PHQ-9 $\geq 12$ , n (%)
Alcohol	48 (48)	51 (52)
Amphetamines	2 (100)	0 (0)
Benzodiazepines	1 (13)	7 (88)
Cannabis	7 (35)	13 (65)
Heroin	4 (36)	7 (64)
Methamphetamines	12 (44)	15 (56)
Prescribed medication	16 (55)	13 (45)
Other	1 (25)	3 (75)

which also found no difference for depression symptoms across principal drug of concern. However, Staiger et al. (2011) found depression prevalence to be higher among those using illicit substances compared to those misusing alcohol in AOD outpatients. The recruitment strategies used by Staiger et al. (2011), i.e., recruitment via referral, differed from the consecutive recruitment of all treatment seekers in the current study, which may have contributed to this finding. Nevertheless, there may be differences in the prevalence of elevated depressive symptoms among specific substances. When examining this in the current study, the prevalence of elevated depressive symptoms was lowest among those seeking treatment for amphetamines (0%) and prescribed medication (45%). Among people seeking treatment for all other types of drugs, the prevalence of depression was above 50%, ranging from 52 to 88%, indicating large variation. However, the sample sizes were small among different AOD types so this finding should be interpreted with caution.

## Limitations

The findings of this study should be considered in light of several limitations. Firstly, as a modest number of participants were recruited from only two sites, and these two sites reported significantly different prevalence rates of elevated symptoms of depression, this reduces the generalisability of study findings. While differences in prevalence of depression between sites was controlled for in our analysis, we also attempted to determine possible differences between sites to attribute this variance to, but none were identified. It is possible that this variation in elevated depressive symptoms is due to a natural variation in prevalence; however, this cannot be confirmed until larger studies with a greater number of centres are performed to improve generalisability. Secondly, there was a significant difference between consenters and non-consenters, which further restricts generalisability. Finally, we did not assess depression using a clinical diagnosis, but rather a brief screening tool. While this is a potential limitation, the PHQ-9 was chosen as it is a psychometrically robust tool with high sensitivity and specificity compared to diagnostic interview for this population. Further, it has been recommended that within AOD treatments settings, acknowledging elevated symptoms of depression is important for case management, even when an individual does not meet the criteria for a diagnosis of depression (Marel et al. 2016). Therefore, understanding the prevalence of elevated depressive symptoms has significant implications for practice.

## Implications

Guidelines for treating mental health comorbidity within AOD settings indicate that screening for possible comorbid mental health conditions is a critical aspect of case management and should be ongoing throughout all stages

**Table 3** Demographics associated with elevated depression symptoms (i.e., PHQ-9 score  $\geq 12$ ) (n = 193)

Variable	Sub group	Odds of elevated depression symptoms			
		Crude OR (95% CI)	Adjusted OR (95% CI)	Wald P-value	LR P-value
Age	18–34	Ref	Ref	Ref	–
	35–64	0.94 (0.50, 1.75)	1.00 (0.43, 2.33)	0.998	–
	65+	0.36 (0.04, 3.48)	0.42 (0.03, 5.05)	0.494	0.7415
Gender	Male	Ref	Ref	Ref	–
	Female	2.11 (1.15, 3.86)	2.07 (1.05, 4.08)	0.037	0.0345
Aboriginal or Torres Strait Islander origin	No	Ref	Ref	Ref	–
	Yes	0.85 (0.13, 5.60)	0.56 (0.07, 4.30)	0.576	0.5811
Education	Trade or vocation	Ref	Ref	Ref	–
	High school and below	1.77 (0.91, 3.43)	2.01 (0.99, 4.06)	0.053	–
	University	1.63 (0.71, 3.77)	1.89 (0.72, 4.97)	0.199	0.1302
Current employment	Paid employment	Ref	Ref	Ref	–
	Not in workforce	1.34 (0.74, 2.44)	1.12 (0.57, 2.21)	0.742	0.7423
Marital status	Married or living with partner	Ref	Ref	Ref	–
	Divorced/separated or widowed	1.91 (0.84, 4.35)	1.88 (0.75, 4.71)	0.18	–
	Never married	1.67 (0.81, 3.45)	1.89 (0.77, 4.64)	0.163	0.2902
Main substance	Alcohol	Ref	Ref	Ref	–
	Illicit drug	1.03 (0.52, 2.04)	0.99 (0.44, 2.24)	0.984	–
	Prescribed drug	1.41 (0.64, 3.09)	1.49 (0.63, 3.51)	0.361	0.6111
Treatment length	New	Ref	Ref	Ref	–
	2 weeks or less	2.08 (0.87, 4.98)	1.99 (0.75, 5.30)	0.168	–
	3 weeks or more	1.34 (0.63, 2.85)	1.04 (0.45, 2.42)	0.925	0.3639

of treatment (Marel et al. 2016). Furthermore, identifying mental health conditions early in the treatment process has been associated with better prognosis, treatment that is more comprehensive, and reductions in disease progression (Berk et al. 2010; Chan et al. 2008; Stafford et al. 2013). The results of this study highlight the high rate of co-occurring depression among individuals seeking AOD treatment. It is therefore important for clinicians to screen for elevated symptoms of depression as part of routine care, particularly for females who are more likely to experience depressive symptoms than males. As women only represent one third of treatment seekers within substance abuse settings but are twice as likely to experience depressive symptoms compared to males, this demographic could be easily identified and proactive steps taken to assess depression. However, identification of depression alone is not enough to improve outcomes for AOD clients. The current comorbidity guidelines in Australia (Marel et al. 2016) provide a summary of evidence and recommendations for several psychological, pharmacological, and alternative approaches to treatment of depression among AOD clients. While these approaches appear promising, well-controlled methodological research is lacking in determining the optimal care for patients. Assessing the effectiveness of different models of identifying and treating depression

within outpatient AOD clinics should be the next step for developing clear pathways for treatment.

## Conclusion

The majority of outpatients within the AOD setting experience elevated symptoms of depression. Females are twice as likely to report elevated depression symptoms within this setting. While the findings from the current study may assist in identifying those at greater risk, given the high rate of symptoms among this group it is important that all clients are screened for depression. This finding supports current guidelines which encourage clinicians to screen all clients for depression throughout the treatment process.

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## Compliance with Ethical Standards

**Conflicts of interest** The authors have no conflicts of interest to declare.

**Ethical Approval** The Hunter New England Human Research Ethics Committee (15/06/17/4.02) and the University of Newcastle (H-2015-0414) granted full ethical approval for this research. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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