

# Anxiety, psychosis and substance use: prevalence, correlates and recognition in an outpatient mental health setting

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## Abstract

**Objective:** The current study examined anxiety in people with substance use disorder (SUD) and a psychotic disorder. It is hypothesised that: anxiety disorders (AD) would be highly prevalent (greater than 20%) in people identified as having SUD and psychotic disorders; those with comorbid AD would fare worse than those without, on measures of quality of life, severity of substance dependence, locus of control, suicidality and psychotic symptoms; and, the presence of such anxiety disorder symptomatology would be under-detected by their mental health case managers. **Method:** Outpatients with co-occurring substance use disorder and psychosis were interviewed to collect data about their diagnosis, depressive and psychotic symptoms, severity of dependence on substances, quality of life and locus of control. Participants' case managers made blind ratings of the presence and severity of participants' anxiety. **Results:** Fifty eight percent of participants had at least one anxiety disorder. Of these, 56% – 70% had case managers who had identified them as having an anxiety problem. The occurrence of anxiety disorder was associated with more external locus of control, greater intensity of suicidal thinking, worse psychotic symptoms, lower quality of life and greater severity of dependence on substances. **Conclusion:** This research suggests anxiety in people with substance use disorder and psychosis is highly prevalent, is associated with poorer outcomes, and is under detected by case managers. Further examination of this issue may lead to important advances in the treatment and prognosis of people with substance use disorder and psychosis.

**Keywords:** Anxiety disorders; Substance-related disorders; Psychotic disorders; Comorbidity; Diagnosis; Prevalence.

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## Introduction

The "dual diagnosis" of psychosis and substance use disorders (SUD) has recently attracted significant clinical and research attention.<sup>1,2</sup> Such dual diagnosis is common, with lifetime rates of substance abuse in those with psychotic disorders varying according to setting, ascertainment and also definition of substance use, but a review of the international literature concluded an overall rate for any substance abuse disorder to

be of the order of 40-60%.<sup>1</sup> Individuals with schizophrenia and SUD fare worse than their counterparts without SUD in a number of domains including: physical health; self-harm; suicide; engagement, retention and adherence in psychiatric treatment; and psychiatric treatment outcomes.<sup>3</sup> Fortunately a number of treatment programs to address dual diagnosis have been developed.<sup>4-6</sup> What is often missed, though, is that people with such dual diagnosis are also at risk of other comorbidities, and these might also impact on both longitudinal outcome and treatment response.<sup>7</sup> Anxiety disorders (AD) are particularly important in this regard, as they are elevated in both those with schizophrenia and those with SUD, and add further complexity to the clinical picture.

It is well established that in both community and treated samples, AD and SUD commonly co-occur<sup>8-11</sup>; thus, people with

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an AD are more likely to have a substance use disorder and vice versa. Similarly, there is an elevated rate of AD in people with schizophrenia.<sup>12-16</sup>

With respect to particular AD, rates of panic disorder in schizophrenia are of the order of 5% to 35%.<sup>14-19</sup> Obsessive-compulsive disorder (OCD) also commonly co-occurs with schizophrenia. Studies have found 29% of an inpatient sample<sup>17</sup> and 37.5% of an outpatient sample<sup>14</sup> to have OCD in addition to schizophrenia. The picture is similar for social phobia, with rates of 16.1% in inpatient<sup>17</sup> and 37.5% in outpatient samples<sup>14</sup> of people with schizophrenia. Other AD also seem to also co-occur with schizophrenia, but less consistently.<sup>14,17</sup> Huppert and Smith<sup>14</sup> found people with schizophrenia and an AD often have more than one AD diagnosis. In their outpatient sample of people with schizophrenia 28% had at least one AD, 28% had two AD, and 6.2% had three or four AD.

Thus it is clear that AD co-occur with SUD and with schizophrenia. This might lead one to predict that AD is even more highly prevalent in dual diagnosis populations, i.e. those people with both schizophrenia and SUD. Hitherto, however, few studies have examined correlates between psychotic disorder, anxiety disorders and substance use disorders. In clinical samples, people with schizophrenia and anxiety symptoms<sup>18</sup> or social phobia<sup>20</sup> are more likely to have a SUD compared to their non-anxious peers. However, other studies have produced contradictory results. For instance, Labbate et al.<sup>21</sup> found, in a sample of people with schizophrenia or schizoaffective disorder, that a lifetime history of SUD was not associated with current or past panic attacks or panic disorder. Similarly, another study of outpatients with schizophrenia or schizoaffective disorder compared matched samples of those with and without SUD. Whilst those with SUD more often had a history of trauma, they did not have statistically significant higher rates of PTSD symptoms. Furthermore, there was no difference between those with and without SUD on a measure of trait and state anxiety.<sup>22</sup> Given that each of these studies have examined different AD it is difficult to synthesise their results.

Goodwin and colleagues<sup>9</sup> sampled 184 consecutive inpatients with schizophrenia, 31.5% of whom had an AD and 35.3% a history of SUD. After examining the association between discrete AD and SUD they found panic attacks to be significantly associated with increased likelihood of having a history of SUD. There was no association between a history of SUD and other AD (OCD, specific phobia, social phobia, agoraphobia). A limitation of that study is the exclusion of people with current substance abuse; one would expect this to reduce any observed relationship between specific AD and SUD.

It is also clear that AD comorbidity is often missed in clinical practice. Shear et al.<sup>23</sup> found that only 24% of patients who had a primary AD identified on the SCID had an AD diagnosis noted in their outpatient clinic medical record. Similarly, in an outpatient sample of people with schizophrenia only 10% who were found to have an AD on the Anxiety Disorders Interview Schedule also had this disorder recorded in their medical record.<sup>14</sup> And in a separate sample of inpatients with schizophrenia, schizoaffective disorder or bipolar disorder, only 5% of those identified as having an AD on the SCID were noted in their medical record as receiving treatment for an AD.<sup>24</sup> AD are more likely to remain undetected in usual clinical practice than psychotic disorders, SUD<sup>25</sup> and personality disorders.<sup>26</sup>

The implications of AD comorbidity in schizophrenia are

substantial. For example in people with schizophrenia, those with panic disorder have higher rates of other mental illnesses, more psychotic symptoms and more suicidality.<sup>3</sup> Panic disorder in this population may also lead to poor treatment outcomes and excessive service utilisation.<sup>13</sup> Similarly, anxiety may negatively impact the course and outcome of schizophrenia and impair quality of life.<sup>14</sup> Anxiety, rather than schizophrenia, might be the source of disability<sup>27</sup> or may contribute to and maintain the psychotic symptoms.<sup>15</sup> Thus, the recognition of anxiety in people with schizophrenia is important. More accurate diagnosis may mean that treatment outcome can be better predicted, comorbidities are more likely to be treated, and patients may be more satisfied.<sup>28</sup> This in turn may result in an improved working alliance and greater treatment adherence.<sup>28</sup>

This brief review highlights: (1) anxiety is present in both SUD populations and psychotic populations; (2) a limited amount of research suggest a co-occurrence of SUD, AD and psychotic disorders, (3) AD tend to be poorly detected in clinical practice, and (4) AD are associated with poorer outcomes for people with schizophrenia.

This study explored the prevalence, and clinical correlates of anxiety disorders in a sample of people identified as having a dual diagnosis of psychosis and a SUD. We also examined the rate of detection of these comorbidities by the patients' case managers. Our specific hypotheses were: that:

- (1) Anxiety disorders would be highly prevalent (greater than 20%) in people identified as having SUD and psychotic disorders.
- (2) Those with comorbid AD would fair worse than those without, on measures of quality of life, severity of substance dependence, locus of control, suicidality and psychotic symptoms.
- (3) The presence of such anxiety disorder symptomatology would be under-detected by their mental health case managers.

## Method

### Sample and recruitment

The sample was recruited as part of a randomised controlled trial (RCT) of an integrated group based intervention for substance use and psychosis. Participants were from four public area mental health services in metropolitan and rural Victoria, Australia. All participants were outpatients and referred to the study by their case manager. Inclusion and exclusion criteria were a current DSM-IV diagnosis of schizophrenia or an affective psychosis and problematic substance use or dependence; age 16 or above; able to converse in English; and, absence of developmental disability or amnesic syndrome or other cognitive impairment that would impair ability to learn from the intervention. To minimise selection biases and maximise referrals, case managers were asked to keep a low threshold for referral to the study. Education about the study was provided to all case managers and psychiatrists within each service; extra work demands for case managers as a consequence of referral was kept to a minimum; and researchers met with individual case managers and attended clinical reviews in order to identify potential participants and streamline referral to the study. The study was approved by the Human Subjects Review Committees of the participating health services and participants give informed, voluntary and written consent.

Participants were interviewed prior to randomisation by research clinicians, completing the following measures:

*Mini International Neuropsychiatric Interview (MINI) Version 5<sup>29</sup>*: a structured diagnostic interview assessing the presence or absence of 17 Diagnostic and Statistical Manual IV (DSM-IV)<sup>30</sup>, Axis I disorders; it has established validity and reliability.<sup>31,32</sup>

*Montgomery and Asberg Depression Rating Scale (MADRS)*<sup>33</sup>: a 10-item observer-rated scale. Each item relates to observed or reported depressive symptoms and is rated on a 7-point likert scale. Higher scores indicate more severe depressive symptomatology.

*Brief Psychiatric Rating Scale (BPRS) – 16 item version*<sup>34</sup>: an observer rated scale that assesses positive symptoms of psychosis as well as general affective and anxiety symptoms. Higher scores indicate more severe psychopathology. This scale is widely used and has adequate psychometric properties.<sup>35</sup> In addition to the total score, a number of subscales can be derived from the BPRS. For the purposes of this study we examined total score and three subscale scores: thinking; anxiety / depression; hostility / suspicion.

*The Severity of Dependence Scale (SDS)*<sup>36</sup>: The SDS measures the degree of dependence on illicit drugs. It consists of 5 items rating the psychological aspects of dependence on 4-point likert scales.<sup>35</sup> Higher scores indicate greater dependence. It has good psychometric properties.<sup>35</sup>

*Australian World Health Organisation Quality of Life Scale – Brief (WHOQOL-BREF)*<sup>37</sup>: This 26-item self-report scale measures four domains of quality of life, viz.: physical, psychological, social relationships and environmental. Further single items assess overall quality of life and general health.

*Locus of Control of Behaviour Scale*<sup>38</sup>: measures perception of personal responsibility for certain behaviours. Higher scores indicate external locus of control whereas lower scores indicate internal locus of control.

*Opiate Treatment Index (OTI) drug use section*<sup>39</sup>: a structured interview which obtains information about the amount of alcohol and tobacco, and type and amount of illicit drugs used over three most recent occasions of use for each substance.

Qualified research interviewers, all experienced mental health professionals, conducted interviews according to a research interviewing protocol and procedure manual.

Participants' case managers independently completed Health of the Nation Outcome Scale (HoNOS) Short form.<sup>40</sup> They were blinded to the current research hypothesis. The HoNOS is a 12-item, observer rated scale routinely used in Victorian Mental Health Services. All case managers are trained in the use of the HoNOS. For the purpose of this analysis we focused on question 8, which asks case managers to indicate whether the client has any "other mental and behavioural problems" (phobias; anxiety and panic; obsessional and compulsive problems; reactions to severely stressful events and traumas; dissociative problems; somatisation; problems with appetite; sleep problems; sexual problems; problems not specified elsewhere). If such a problem

is present its severity is rated on a 5-point likert scale. Higher scores indicate greater severity. If more than one problem is present, the most important one is recorded.

### Statistical analyses

The hypothesis that the prevalence of one or more anxiety disorders would be greater than 20% was tested using a single sample binomial test. Confidence intervals for the prevalence estimates for the anxiety disorders were calculated using exact binomial confidence intervals with a confidence level of 95%. Associations between psychometric data, demographics and AD were investigated using ordinal logistic regression. The number of AD (0, 1, 2, or >2) for each participant (based on the MINI) was used as the response variable. In the absence of specific information on the severity of each AD identified by the MINI for each participant, this choice of response variable makes better use of the available information than a simple binary variable indicating whether an AD is present, while avoiding assuming that the number of AD is on an interval scale. Missing items in the psychometric scales and age were imputed using multiple imputation.<sup>41</sup> We used the `ice` Stata command<sup>42</sup> to generate imputations and estimates were combined using the `mim` Stata prefix command.<sup>43</sup>

The candidate explanatory variables for a multiple regression were screened with univariate ordinal logistic regression.<sup>44</sup> Those with a p-value less than 0.2 and not measuring anxiety were evaluated further using correlation analysis (Pearson and Spearman) followed by a multiple ordinal logistic regression with explanatory variables chosen on clinical and statistical grounds.

Recognition of anxiety by case managers was analysed using the kappa statistic<sup>45</sup> to determine the agreement between the MINI diagnosis and case manager report on the HoNOS. In this study, each participant's AD profile was rated once by a clinician using the MINI and once by their case manager using the HoNOS item 8. Consequently, it was not possible to separate the variance due to the measurement method (MINI or HoNOS) and the variance due to the rater performing the particular measurement. It is only possible to calculate a measure of the overall agreement between the two measurement processes: MINI diagnosis by a clinician versus HoNOS diagnosis by a case manager.

When a non-anxiety problem was specified as the main problem in item 8 of the HoNOS there was ambiguity as to whether the case manager recognised an anxiety problem or not. This issue was dealt with by considering three separate cases in our analysis (see Results).

Based on a one-tailed single sample binomial test with prevalence of AD of 20% as the null hypothesis and a prevalence of 50% as the prevalence that it is important to be able to detect, the sample size required for greater than 99% power with a significance level of 0.05 is 42 participants.<sup>46</sup> With a sample of 87 available from the RCT, this study is well powered to examine prevalence of AD. Stata 9.2 under Windows XP was used for the analysis.

## Results

### Sample characteristics

The total number of participants randomised in the RCT was 102. Of these, 87 participants had sufficient baseline data to analyse. The sample selection procedure was determined by what data was available, so that if there was any bias it would be

most likely due to participants selectively not responding rather than research clinicians choosing the sample. The age range of the 87 participants was 19 to 50 years and 22% were female. Primary diagnoses on referral were: schizophrenia (any type) 56% (49/87); schizoaffective disorder 23% (20/87); bipolar (and not schizoaffective) 2% (2/87) and other psychotic disorders including schizophreniform psychosis 18% (16/87). The total numbers for the MINI and OTI differ as some baseline assessments contained missing data. Sixty percent (50/84) had current alcohol abuse or dependence according to the MINI, and 75% (63/84) had current substance abuse or dependence. Based on the OTI, the prevalence of drugs used in the previous 28 days was: alcohol 80% (66/82), cannabis 57% (47/83), amphetamines 12% (10/83), cocaine 0% (0/82), hallucinogens 5% (4/81), inhalants 0% (0/82), heroin 5% (4/83), tobacco 96% (78/81). The length of time within mental health services ranged from 1 to 32 years (mean 9.2 years; standard deviation (SD) 8.1 years). Employment status was reported for 73 participants. Of these, 78% (57/73) were unemployed, 19% (14/73) had casual or part-time employment and 3% (2/73) were employed full-time. Prescribed psychotropic medications were recorded for 79 participants. Ninety-four percent (74/79) were prescribed anti-psychotics, 24% (19/79) mood stabilisers, 20% (16/79) anti-depressants, 8% (6/79) anxiolytics, and 4% (3/79) hypnotics. Forty-two percent (33/79) of participants were prescribed more than one class of psychotropic medication.

#### Prevalence of AD

Data from the MINI showed that the prevalence of at least one AD was significantly greater than 20% ( $p < 0.001$ ). The prevalence estimate was 58.6% with 95% confidence interval 47.6% to 69.1%. In our sample, 35.6% of the participants met criteria for one AD, 12.6% had two AD, and 10.4% had three or more AD. The prevalence of different types of AD were: generalised anxiety disorder 25.3% (CI 16.6% to 35.7%), agoraphobia 21.8% (CI 13.7% to 32.0%), social phobia 19.5% (CI 11.8% to 29.4%), panic disorder 14.9% (CI 8.2% to 24.2%), post traumatic stress disorder 10.3% (CI 4.8% to 18.7%) and obsessive compulsive disorder 4.6% (CI 1.2% to 11.4%).

#### Association between observed AD and demographic and psychometric data

The results for the univariate screening of 13 explanatory variables are shown in Table I. Gender, age and WHO-QOL BREF satisfaction with health did not reach statistical significance ( $p > 0.2$ ) in their association with the observed AD and were dropped from further analysis. The significant results for MADRS total score, BPRS total score and BPRS anxiety / depression were not surprising because these scales contain items measuring anxiety directly and we expected them to be associated with the diagnosis of an AD. Consequently, these three variables were also dropped from further analysis, leaving seven potential explanatory variables: SDS, LCB, BPRS thinking, BPRS hostility /suspicion, WHOQOL-BREF quality of life, WHOQOL-BREF psychological health and MADRS suicide item.

The correlation analysis of these remaining variables is shown in Fig 1. We used this correlation analysis to choose three explanatory variables to include in the final multiple ordinal logistic regression; SDS total; combined BPRS thinking and hostility/suspicion sub-scales (herein referred to as BPRS thinking/hostility/suspicion); and WHOQOL-BREF quality of life. These variables were chosen as representative variables because, among the correlates, they were the most conceptually distinct from each other and were not strongly correlated (Figure 1). The response variable for the regression was the number of AD.

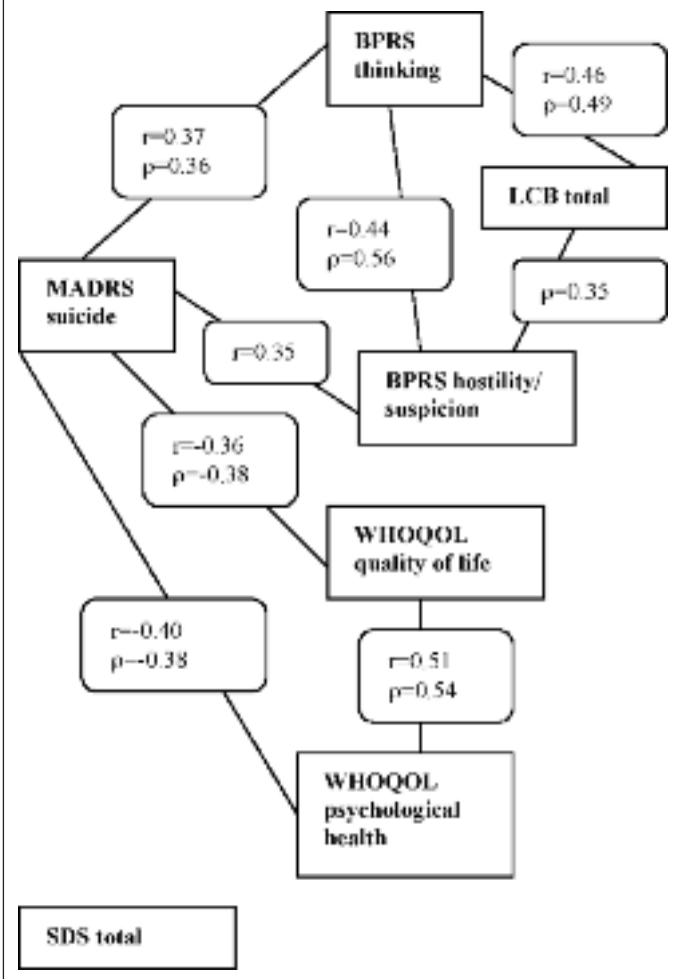
The results of the multiple ordinal logistic regression are shown in Table II. For a given combination of explanatory variables, the model predicts probabilities of the number of AD, as illustrated in Fig. 2. The confidence regions (not shown in Figure 2 for clarity) were wide: for example, with explanatory variables at their means, the probability of one or more AD had a 95% CI with width 0.3. Consequently, the model predictions are not precise but they do indicate a pattern of association between increasing numbers of AD and worse ratings on the SDS, WHOQOL-BREF quality of life item and BPRS thinking/hostility/suspicion.

In the case of SDS, as the total score increases, the probability of being free of any AD decreases, and the probability of having 1 or more, 2 or more and 3 or more AD

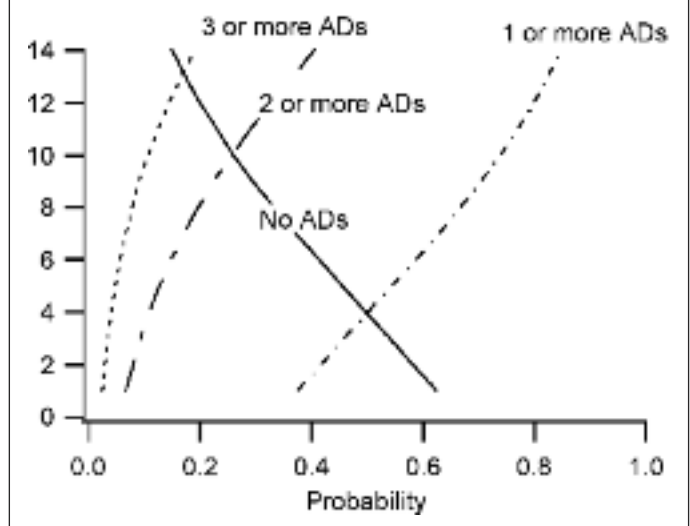
**Table I: Summary statistics and screening using ordinal logistic regression with the number of AD as the response variable, combined estimates from 10 imputations. All scales are negatively scored except WHO-QOL scales which are positively scored. A positive t value indicates higher scores on the scale are associated with higher numbers of AD. N= 87 for all scales except BPRS where N=84 due to difficulties with ensuring the multiple imputation procedure for missing data converged. Odds ratios (OR) are given for a one point increase in the relevant variable. \* $p < 0.2$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ , \*\*\*\* $p < 0.001$**

Variable	Mean	SD	t	OR	95%CI	p
Gender	1.22 (M=1,F=2)	0.42	-0.34	0.84	0.29 to 2.38	0.7
Age (yrs)	31.58	8.63	0.13	1.00	0.96 to 1.05	0.9
SDS total	7.83	3.88	1.83	1.15*	0.99 to 1.35	0.07
LCB total	35.19	10.91	2.42	1.05**	1.01 to 1.10	0.02
BPRS total	1.68	0.53	4.45	6.67****	2.89 to 15.38	<0.001
BPRS thinking	1.58	0.84	2.93	1.70***	1.19 to 2.43	0.003
BPRS anxiety/depression	2.11	0.81	3.96	3.47****	1.87 to 6.44	<0.001
BPRS hostility/suspicion	1.46	0.62	2.49	2.52**	1.21 to 5.23	0.01
WHOQOL-BREF quality of life	3.15	1.08	-3.21	0.52***	0.35 to 0.78	0.001
WHOQOL-BREF satisfaction with health	2.93	1.06	-0.79	0.83	0.53 to 1.31	0.4
WHOQOL-BREF psychological health	51.70	17.00	-2.67	0.96***	0.93 to 0.99	0.008
MADRS total	10.86	9.58	3.47	1.11***	1.05 to 1.18	0.001
MADRS suicide item	0.72	1.21	2.25	1.66**	1.07 to 2.60	0.03

**Figure 1: Significant correlations between candidate explanatory variables, after screening to remove weak ( $p \geq 0.2$ ) predictors of AD and those measuring anxiety directly,  $r$  = Pearson product moment correlation,  $\rho$  = Spearman rank correlation. The Sidak adjustment for multiple tests was used with significance level 0.05**



**Figure 2: Predicted probabilities of having a particular number of AD as a function of SDS total. Based on the ordinal logistic regression model with the WHOQOL-BREF quality of life item constrained to be 3 and combined BPRS thinking/hostility/suspicion constrained to be 1.52. The response variable for the regression was the number of AD**



**Table II: Multiple ordinal logistic regression using multiple imputation for missing data (10 imputed datasets with N=84). The response variable is the number of AD (0, 1, 2, or >2). Odds ratio (OR) is for a one point increase in the explanatory variable. Cut points are used to link the latent variable to the observed categories**

Explanatory variables:	OR	t	95% CI	p-value
SDS total	1.19	2.27	1.02 to 1.38	0.03
BPRS thinking/hostility/suspicion	2.49	2.76	1.30 to 4.78	0.006
WHOQOL-BREF quality of life item	0.55	-2.68	0.35 to 0.85	0.008
Cut points:				
Cut 1	1.28		0.12 to 14.02	
Cut 2	10.51		0.81 to 136.00	
Cut 3	30.36		2.25 to 409.59	
Wald $\chi^2(3) = 25.55$ , Prob > $\chi^2 < 0.0001$ , Pseudo $R^2 = 0.12$				

**Table III: Association between MINI anxiety and HoNOS anxiety**

HoNOS	MINI No Anxiety	Anxiety	Total
No problem	10	10	20
Anxiety problem	8	18	26
Non - anxiety problem	9	6	15
Invalid/missing	2	6	8
Total	29	40	69

increases. For example an SDS score of 14 indicates a probability of approximately 20% for having 3 or more AD. Similar patterns were seen with the WHOQOL-BREF quality of life item (although this scale is positively scored) and combined BPRS thinking/hostility/suspicion.

Thus, the profile of someone at most risk of having an AD is an individual who scores high on the SDS and BPRS thinking/hostility/suspicion scores and has a low WHOQOL-BREF quality of life item score. For example scores of 12 on SDS, 2 on WHOQOL and 2.5 BPRS thinking/hostility/suspicion give a 43% probability of having more than 2 anxiety disorders. In contrast, the profile of someone at least risk of AD is low SDS and BPRS thinking/hostility/suspicion scores and high WHOQOL-BREF quality of life item score. For example, scores of 4 on SDS, 4 on WHOQOL-BREF quality of life and 1 on BPRS thinking/hostility/suspicion give a 74% probability of no AD.

**Recognition**

Rates of recognition of AD by their case managers are shown in Table III, where the MINI diagnosis is tabulated against item 8 of the HoNOS. Item 8 of the HoNOS was rated as (a) no problem (b) an anxiety problem (i.e. phobias; anxiety and panic; obsessional

and compulsive problems) or (c) non-anxiety problems (i.e. reactions to severely stressful events and traumas; dissociative problems; somatisation; problems with appetite; sleep problems; sexual problems; problems not specified elsewhere). There was ambiguity when a case manager specified a non-anxiety problem: the case manager could have recognised an anxiety problem but specified a non-anxiety problem which they thought was more severe than the anxiety problem, or they could have not recognised an anxiety problem, or no anxiety problem was present. This ambiguity was dealt with by considering the following three cases in the analysis when a non-anxiety problem was specified at item 8: (i) case managers recognised the client as having an anxiety problem (ii) case managers did not recognise an anxiety problem and (iii) case managers recognised the anxiety problem in agreement with the MINI.

For case (i) the expected agreement assuming random rating was 52% and the observed agreement was 56% with  $\kappa = 0.08$  (slight agreement, standard error = 0.12,  $z = 0.63$ ,  $p = 0.26$ ); for case (ii), the expected agreement was 49% and the observed agreement was 61% with  $\kappa = 0.23$  (fair agreement, standard error = 0.12,  $z = 1.83$ ,  $p = 0.03$ ); and for case (iii), expected agreement was 50% and the observed agreement was 70% with  $\kappa = 0.41$  (moderate agreement, standard error = 0.13,  $z = 3.18$ ,  $p < 0.001$ ). This last analysis is the most generous to the case managers' HoNOS ratings in terms of assuming their accuracy.

## Discussion

The study reported here explored the prevalence and associations between AD, substance use and psychotic symptoms in a group of patients with a comorbid psychotic illness and SUD. The results demonstrate that 58% of a sample of people with substance use and psychosis met criteria for at least one anxiety disorder. The presence and number of AD was associated with more externally (rather than internally) located locus of control, greater intensity of suicidal thinking, worse psychotic symptoms, lower of quality of life and greater severity of dependence on substances. These three latter domains, analysed together, were all strongly associated with the number of AD.

Analysis of case manager's recognition of anxiety problems in this sample suggests the presence or absence of anxiety problems was correctly recognised in clients between 56% and 70% of the time. It needs to be emphasised that case managers were only asked whether they observed anxiety problems, not anxiety disorders. Thus the criteria for case manager recognition of anxiety was low, should this criteria have been higher (i.e. anxiety disorder) one can assume that the case managers may have recognised fewer AD. One explanation for case managers not recognising anxiety problems is the tendency to think of psychiatric illnesses as on a hierarchy, with AD being lower down that hierarchy than psychotic illnesses. Bermanzohn<sup>27</sup> suggests that hierarchical systems of diagnosis have played a role in the lack of attention given to comorbid diagnoses in schizophrenia as it lead to diagnostic reductionism; "the tendency to reduce all of the symptoms and signs shown by a person with schizophrenia to the schizophrenia alone." (p3).<sup>27</sup> It should also be pointed out that anxiety-like symptoms can also be consequent upon, or misinterpreted as, substance withdrawal, akathisia, or as part of the manifestation of psychotic symptoms per se.

This study has a number of strengths, including the fact that all subjects met criteria for both a psychotic illness and a SUD. There were few exclusion criteria and the inclusion of people with

current substance use is an improvement from previous research.<sup>8,21</sup> Also, all were assessed using standardised measures with raters 'blind' to the hypotheses of the study. The number of subjects, whilst modest, was sufficient to power the analyses performed. However, the numbers were not sufficient for more complex analyses using other variables, for example service utilisation data. Nor did we include data on treatment response, which is a gap because understanding the implications of comorbidity on treatment response could enhance our management of these patients.

Several limitations of this study are important to note. The variance for the two measurement processes could not be separated out into components due to the measurement method (MINI or HoNOS) and a component for the rater (clinician or case manager). An inter rater reliability study with more than one rating per participant/ method combination (outside the scope of this article) would be required to investigate this. Furthermore, the sample was selected on the basis of referral to a RCT for psychosocial treatment for psychosis and SUD. Although efforts were made to obtain the broadest possible sample, it remains the case those individuals who were not considered by case managers as appropriate for the specified treatment would be selected out, limiting the generalisability of results.

## Conclusion

Our findings do reinforce the high rates of anxiety disorder comorbidity in those with a psychotic illness and substance abuse, and show that anxiety problems are missed in routine clinical practice even by case managers who 'know' their patients well. The results also suggest that, compared to their non-AD peer those individuals with SUD, psychosis and AD fair worse on a number of domains. This line of research may be advanced through conceptualising anxiety on a continuum rather than discrete disorders; investigating the impact of anxiety on treatment outcomes for those with dual diagnosis; and examining the relationship between anxiety, specific SUD and psychosis in larger, epidemiological studies.

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