Alcohol use disorders comorbid with anxiety, depression and drug use disorders
Findings from the Australian National Survey of Mental Health and Well Being

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Abstract

The aim of this paper is to report the prevalence of 12-month comorbidity between DSM-IV alcohol use disorders (abuse or dependence) and anxiety, affective and drug use disorders in the adult Australian general population and to examine the disability and health service utilisation associated with this comorbidity. The study uses data from the National Survey of Mental Health and Well Being (NSMH&WB). The NSMH&WB is a cross-sectional survey of 10,641 Australian adults conducted in 1997 that measured the prevalence of DSM-IV mental disorders in the previous 12 months and associated disability and health service utilisation. Results show approximately one-third of respondents with an alcohol use disorder (abuse or dependence) met criteria for at least one comorbid mental disorder in the previous 12 months. They were 10 times more likely to have a drug use disorder, four times more likely to have an affective disorder and three times more likely to have an anxiety disorder. Respondents with an alcohol use disorder and a comorbid mental disorder were significantly more disabled and higher users of health services than respondents with an alcohol disorder and no comorbid mental disorders. These results reinforce the need for both mental health and drug and alcohol professionals to be provided with education to assist with appropriate identification, management and referral of clients presenting with this complex range of disorders. © 2002 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Comorbidity; Alcohol use disorders; Affective disorders; Anxiety disorders; Drug use disorders; Disability; Service utilisation

1. Introduction

Comorbidity in mental health refers to the co-occurrence between mental disorders in a specified time frame. There have now been a number of studies that have shown comorbidity between alcohol use disorders (dependence and abuse) and other mental disorders to be widespread (see Ross, 1995; Kessler et al., 1996; Hall et al., 1999). In particular, studies conducted with individuals in treatment have shown strong relationships between alcohol use disorders, anxiety, depression and other drug use disorders (Penick et al., 1988; Raimo and Schuckit, 1998; Hesselbrock, 1991; Brown et al., 1995).

Prevalence estimates of comorbidity taken from treatment samples are, however, biased. This is because the frequency with which two diseases co-exist in treatment samples will be higher than the rate of their true occurrence in the general population (Berkson, 1946). For this reason estimates of comorbidity should be taken from population surveys.

The Epidemiological Catchment Area Survey (ECA) was the first large-scale epidemiological study to collect information on the prevalence of specific disorders in the U.S. population (Robins and Regier, 1991). Approximately, 20,000 respondents aged 18 years and older were surveyed. Among respondents with a lifetime diagnosis of an alcohol use disorder (alcohol abuse or dependence) 37% had at least one other mental disorder and 22% had another drug use disorder (Regier et al., 2002).
The more recent National Comorbidity Study (NCS) examined the extent of comorbidity between substance use and non-substance use disorders in the U.S. population (Kessler et al., 1994, 1997). The NCS was conducted on approximately 8000 respondents aged between 15 and 54 years. With respect to 12-month comorbidity among respondents with a diagnosis of alcohol dependence, 29% of respondents had at least one affective disorder and the most common was major depression (28%). More than one-third of respondents (37%) had at least one anxiety disorder and the most common of these was social phobia (18%).

While attention has been focussed on estimating the prevalence of alcohol-related comorbidity, fewer studies have measured the disability associated with these multiple disorders. Available information comes mainly from clinical studies comparing alcohol treatment outcomes for people with and without comorbid mental disorders. Results show that comorbid mental disorders have a generally negative impact on treatment outcomes, although this may not be the case for all mental disorders or all subgroups of clients (Lynskey, 1998; Kranzler et al., 1996; Kushner et al., 2000).

Population surveys provide stronger evidence about the association between alcohol-related comorbidity and treatment seeking. In the ECA, respondents with an alcohol use disorder in specialist treatment services were nearly four times as likely to have a comorbid mental disorder compared to respondents not in treatment (Regier et al., 1990). Kessler et al. (1996) examined service utilisation patterns from the NCS. They also found comorbidity between mental disorders substantially increased the likelihood of treatment seeking. Wu et al. (1999) further analysed the NCS data to determine the specific impact of comorbidity between alcohol use disorders and other mental disorders on health service utilisation (Wu et al., 1999). This analysis involved the construction of five groups of respondents from the NCS data; respondents with alcohol dependence or abuse and no other mental disorder in the previous year, those with alcohol abuse or dependence and at least one other comorbid mental disorder in the previous year, those with a mental disorder other than an alcohol use disorder in the previous year, those with a mental disorder in their lifetime but not in the previous year, and those with no mental disorder in their lifetime.

Respondents in the comorbid alcohol use disorder group were higher users of services than those with a single disorder. More specifically, help seeking was associated with being in the 36 and 44 years age group; being separated, widowed or divorced; having had recent legal problems; having a parent with a history of psychopathology; having a household income of $35,000–$69,999 or $20,000–$34,999 and having at least three symptoms of alcohol dependence.

In sum, previous research has shown that comorbid mental disorders are common in individuals with alcohol use disorders, and the impact of these added disorders on treatment outcomes for alcohol problems is generally negative, although this may not be the case for all mental disorders or all subgroups of clients. Previous research has also shown that comorbidity leads to increased use of treatment services.

While U.S. population studies provide important information a number of questions still remain. Firstly, how common is alcohol-related comorbidity outside the U.S.? Secondly, what is the population level disability associated with this comorbidity? Thirdly, does the influence of comorbidity on service use remain outside the U.S.? This current analysis provides the first examination of these issues in a nationally representative sample of the Australian adult population.

Specifically, this study has two main aims:

1) To report the prevalence of 12-month DSM-IV comorbidity between alcohol use disorders and other mental disorders (anxiety, affective and drug use disorders) in the Australian general population.
2) To examine the disability and health service utilisation associated with this comorbidity.

2. Methods

2.1. National Survey of Mental Health and Well Being (NSMH&WB)

The NSMH&WB was undertaken in 1997 (Australian Bureau of Statistics, 1999; Hall et al., 1999; Teesson et al., 2000; Andrews et al., 1999). The objectives of the survey were to provide information on the prevalence of the most common mental disorders, the level of disability associated with these disorders, and the health services used and help needed as a consequence of mental problems for Australians aged 18 years and over. The interview was restricted to symptoms in the last 12 months to minimise the uncertainty of recall of symptoms over longer time periods.

The diagnostic component of the interview was administered through a modified version of the Composite International Diagnostic Interview (CIDI). The CIDI is a comprehensive interview for adults that can be used to assess current and lifetime prevalence of mental disorders through the measurement of symptoms and their impact on day-to-day activities. The CIDI enables the diagnoses of mental disorders based on either the International Classification of Diseases—10th revision
(ICD-10) or the Diagnostic and Statistical Manual of Mental Disorders—4th revision (DSM-IV). Present data analysis has been undertaken using DSM-IV categories for diagnosis.

The CIDI assessments have been shown to have excellent inter-rater reliability in international field trials (Cottler et al., 1991; Wittchen et al., 1991) and the test-retest reliability has been shown to be good (Andrews and Peters, 1998; Cottler et al., 1991; Wittchen et al., 1991). As with all measures, assessing the validity is more difficult. There are few studies of the validity of the CIDI assessments for substance use disorders. Janca et al. (1992) compared CIDI diagnoses to diagnosis completed by clinicians using a checklist after observing the administration of the CIDI. The overall agreement between the CIDI and the clinical diagnosis was good (k = 0.77).

In the present study disability was measured by two variables, the number of days out of role taken in the previous 4 weeks and score on the SF-12. The SF-12 is a standard international instrument that provides a general measure of health status (Ware et al., 1996). It may also be considered a measure of disability because it addresses physical and mental limitations. The SF-12 mental health summary score is scored as a continuous variable but cut-offs have been established to determine degree of disability associated with mental limitations. A score of less than 30 is rated as severely disabled, 30–49 as moderately disabled, 40–49 as mildly disabled and 50 and over as not disabled (Sanderson and Andrews, 2002).

Two dichotomous variables were created to measure use of health services; use of generalist health professionals and use of services for mental problems. Use of generalist services was measured as the number of visits made to any health professional in the past 12 months for respondents own health. Use of services for mental problems was measured as the number of these visits that were made for mental problems such as stress, anxiety, depression, or dependence on drugs or alcohol. Dichotomous variables were scored as no visits or one or more visits.

2.2. Sampling

The NSMH&WB was conducted throughout Australia by the Australian Bureau of Statistics using stratified multistage area sampling of private dwellings. The area-based selection ensured that all sections of the population living in private dwellings within the geographical scope of the survey were represented in the sample. One respondent per household aged 18 years or over usually resident at the dwelling was interviewed. Ten thousand six hundred and forty-one responding interviews were achieved representing a response rate of 78%.

2.3. Weights

The survey estimates conform to independent estimation of the Australian population for the third quarter of 1997. A post-stratification method was used to weight the data according to state by part of state by sex by age group levels, with each unit assigned an initial weight equal to the inverse of the probability of selection of the unit. These initial weights were then adjusted to sum to known population benchmarks to give final weights (Australian Bureau of Statistics, 1999).

Due to the complex sample design and weighting of the NSMH&WB, special analysis procedures were used in this analysis to adjust standard errors for the purposes of testing the statistical significance of measures of association. Adjustment involved the use of Jackknife methods of replication in 30 design based balanced sub-samples. Replication methods involved repeatedly selecting sub-samples from the whole sample. For each sub-sample the statistic of interest was calculated. The variance of the full sample statistic was then estimated using the variability among the replicate statistics calculated from the sub-samples.

2.4. Statistical analysis

To account for the complex survey design, statistics presented in this report have been calculated using SUDAAN 7.5 (Software for the Statistical Analysis of Correlated Data) with adjustment using Jackknife method of replication (Shah et al., 1997).

To examine the prevalence of alcohol-related comorbidity information is presented about the number and type of comorbid mental disorders experienced by respondents with DSM-IV alcohol use disorders (abuse or dependence). Co-occurrence between disorders are measured by odds-ratios and 95% confidence intervals. Associated prevalence estimates (conditional prevalences) are presented with standard errors.

To examine the correlates of comorbidity four groups of respondents were constructed from the data:

The 'pure alcohol use disorder' group—respondents with either DSM-IV alcohol abuse or dependence and no comorbid anxiety, affective or drug use disorders) in the previous 12 months.

The 'comorbid alcohol use disorder' group—respondents with either DSM-IV alcohol abuse or dependence and at least one comorbid anxiety, affective or drug use disorder in the previous 12 months.

The 'other disorder' group—respondents with at least one anxiety affective or drug use disorder but
without DSM-IV alcohol abuse or dependence in the previous 12 months.

The 'no disorder' group—respondents who had no anxiety, affective, drug or alcohol use disorder measured by the survey in the previous 12 months.

Initially, univariate results are reported between the groups with respect to each of the demographic correlates. Multivariate logistic regression is then used to assess the association between disability, use of health services and group after controlling for known correlates of alcohol disorders; age, gender, schooling, marital status, and employment (Degenhardt et al., 2000). In this analysis the no disorder group is used as the referent group category. The test for each effect is based on the change in the value of $-2 \log$-likelihood if the effect is removed from the final model.

3. Results

3.1. Number of comorbid disorders in individuals with alcohol use disorders

Prior analysis of the survey has shown that 7% of respondents had an affective disorder, 6% had an anxiety disorder, 2% had alcohol abuse and 4% had alcohol dependence in the previous 12 months (Andrews et al., 2001). More than one-third (37%) of those respondents with an alcohol use disorder (abuse or dependence) also had at least one comorbid anxiety, affective or drug use disorder. The range of disorders was between one and six, with over half the respondents with a comorbid disorder having just one comorbid disorder (58%). Approximately, one-quarter of respondents had two comorbid disorders (23%), and the remainder (19%) had three or more.

3.2. Extent of the relationship between alcohol use disorder, anxiety, affective and drug use disorders

Table 1 presents the conditional prevalences between alcohol use disorders and anxiety, affective and drug use disorders. Drug use disorders refer to a combination of abuse and dependence. Entries in the column labelled M are the percentage of respondents with a 12-month alcohol use disorder (indicated by the column heading) who also had a particular 12-month mental disorder. For example, the entry in the upper left corner of the table shows that 0.6% of respondents with an alcohol use disorder also had a bipolar disorder. Entries in the column labelled A are the percentage of respondents with a 12-month alcohol use disorder (indicated by the column heading) who also had an alcohol use disorder (indicated by the column heading). For example, 32% of respondents with a bipolar disorder also met criteria for an alcohol use disorder.

Overall, 37% of respondents with an alcohol use disorder had at least one other mental disorder and 19% of respondents with a mental disorder had an alcohol use disorder. Of those individuals with an alcohol use disorder, 18% had an affective disorder, 15% had an anxiety disorder and 17% had another drug use disorder. The most prevalent affective disorder was depression (17%), the most prevalent anxiety disorder generalised anxiety disorder (7%) and the most prevalent drug use disorder cannabis (14%).

Of those respondents with a 12-month mental disorder, 17% of those with an affective disorder, 16% of those with an anxiety disorder and 36% of those with a drug use disorder also had an alcohol use disorder. The most prevalent affective disorder was bipolar disorder (32% had an alcohol use disorder), the most prevalent anxiety disorder post-traumatic stress disorder (24% had an alcohol use disorder) and the most prevalent drug use disorder was for stimulants (62% had an alcohol use disorder).

3.3. Strength of the association between alcohol use disorder, alcohol dependence and other mental disorders

There was a significant association between the presence of at least one comorbid anxiety, affective or drug use disorder and having an alcohol use disorder (Wald $F=46.70; \text{df}=1; P<0.001$). After controlling for gender, age, marital status, schooling and employment in a logistic regression, the odds of having a mental disorder were four times higher in respondents with an alcohol use disorder (OR = 4.1, 95% CI: 2.7, 6.3).

Table 2 presents odds ratios and 95% confidence limits for the relationships between alcohol use disorders and specific anxiety, affective and drug use disorders. All the odds ratios are significant. Respondents with an alcohol use disorder were more likely to have each of the mental disorders specified, relative to respondents without an alcohol use disorder. The odds were strongest for the relationship between alcohol use disorders and other drug use disorders (OR = 10.1, 95% CI: 6.5, 15.6). The strongest specific drug associations were with cannabis (OR = 10.5, 95% CI: 6.8, 16.2) and stimulant disorders (OR = 26.1, 95% CI: 11.1, 61.1). The odds were similar for the affective (OR = 3.6, 95% CI: 2.5, 5.0) and anxiety disorders (OR = 3.3, 95% CI: 2.3, 4.8).

3.4. Correlates: alcohol use disorders and mental disorders

The majority of respondents did not meet criteria for a mental disorder in the last 12 months (84%), 10% met criteria for a mental disorder other than an alcohol use disorder, 4% met criteria for an alcohol use disorder.
Table 1
Prevalence and standard errors of DSM-IV mental disorders

<table>
<thead>
<tr>
<th>DSM-IV diagnosis</th>
<th>A-percentage of respondents with 12-month alcohol use disorder who also have a mental disorder</th>
<th>M-percentage of respondents with 12-month mental disorder who also have an alcohol use disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipolar</td>
<td>0.6 (0.5)</td>
<td>31.7 (18.4)</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>2.8 (0.7)</td>
<td>16.2 (4.0)</td>
</tr>
<tr>
<td>Depression</td>
<td>16.8 (2.9)</td>
<td>16.1 (1.7)</td>
</tr>
<tr>
<td>Any affective</td>
<td>18.4 (2.7)</td>
<td>16.6 (1.5)</td>
</tr>
<tr>
<td>Panic</td>
<td>3.5 (0.8)</td>
<td>19.7 (3.9)</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>1.0 (0.4)</td>
<td>12.6 (5.0)</td>
</tr>
<tr>
<td>Social phobia</td>
<td>3.7 (0.9)</td>
<td>16.7 (3.7)</td>
</tr>
<tr>
<td>Obsessive compulsive</td>
<td>1.6 (0.3)</td>
<td>14.8 (4.7)</td>
</tr>
<tr>
<td>Post-traumatic stress</td>
<td>5.4 (1.0)</td>
<td>24.1 (4.2)</td>
</tr>
<tr>
<td>Generalised anxiety</td>
<td>7.1 (1.4)</td>
<td>16.7 (3.3)</td>
</tr>
<tr>
<td>Any anxiety</td>
<td>14.9 (1.7)</td>
<td>16.0 (2.0)</td>
</tr>
<tr>
<td>Sedative</td>
<td>2.9 (0.7)</td>
<td>36.5 (7.7)</td>
</tr>
<tr>
<td>Stimulant</td>
<td>3.6 (1.1)</td>
<td>61.8 (9.4)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>13.8 (2.5)</td>
<td>37.1 (3.8)</td>
</tr>
<tr>
<td>Opioids</td>
<td>1.5 (0.6)</td>
<td>31.2 (10.0)</td>
</tr>
<tr>
<td>Any drug</td>
<td>16.8 (2.5)</td>
<td>35.5 (3.6)</td>
</tr>
<tr>
<td>Any disorder</td>
<td>36.5 (4.1)</td>
<td>18.9 (1.3)</td>
</tr>
</tbody>
</table>

Table 2
Odds ratios and 95% confidence limits for the association between alcohol use disorders (DSM-IV alcohol abuse or alcohol dependence) and mental disorders

<table>
<thead>
<tr>
<th>DSM-IV disorder</th>
<th>Alcohol use disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipolar</td>
<td>7.3* (1.2, 43.4)</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>3.1 (1.6, 5.7)</td>
</tr>
<tr>
<td>Depression</td>
<td>3.4 (2.3, 5.0)</td>
</tr>
<tr>
<td>Any affective</td>
<td>3.6 (2.5, 5.0)</td>
</tr>
<tr>
<td>Panic</td>
<td>3.9 (2.3, 6.7)</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>2.3* (0.9, 5.8)</td>
</tr>
<tr>
<td>Social phobia</td>
<td>3.2 (1.8, 5.8)</td>
</tr>
<tr>
<td>Obsessive compulsive</td>
<td>2.7 (1.2, 6.2)</td>
</tr>
<tr>
<td>Post-traumatic stress</td>
<td>5.2 (3.3, 8.1)</td>
</tr>
<tr>
<td>Generalised anxiety</td>
<td>3.3 (1.9, 5.6)</td>
</tr>
<tr>
<td>Any anxiety</td>
<td>3.3 (2.3, 4.8)</td>
</tr>
<tr>
<td>Sedative</td>
<td>9.2 (4.4, 19.0)</td>
</tr>
<tr>
<td>Stimulant</td>
<td>26.1 (11.1, 61.1)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>10.5 (6.8, 16.2)</td>
</tr>
<tr>
<td>Opioids</td>
<td>7.2 (2.6, 19.5)</td>
</tr>
<tr>
<td>Any drug</td>
<td>10.1 (6.5, 15.6)</td>
</tr>
</tbody>
</table>

* Cell size less than five.

only and 2% for an alcohol use disorder and at least one other anxiety, affective or drug use disorder.

Table 3 presents prevalence estimates for demographic correlates in each of the four groups (pure alcohol, comorbid alcohol, other disorder and no disorder). Alcohol use disorders (both in the pure and comorbid alcohol groups) were primarily disorders of men (76% male in the pure alcohol group and 69% in the comorbid alcohol group). By contrast, the other disorder group was primarily female (61%) whilst the no disorder group was more evenly split (51% female). Both the alcohol groups were younger than the other two groups (46% of the pure group and 52% of the comorbid alcohol group were aged between 18 and 29 years old in comparison to 31% of the other and 22% of the no disorder groups). The comorbid alcohol group were the most likely of all the four groups to have never been married (49%) and were nearly twice as likely as the pure alcohol group to have been separated or divorced (14 versus 8%).

With respect to education and employment, individuals in the other disorder group were the least likely (40%) to have completed secondary school. Respondents in the comorbid alcohol group was most likely of the four groups to be unemployed (17%). The comorbid alcohol group were more than twice as likely to be unemployed than the pure alcohol group (17 versus 7%).

3.5. Disability

Respondents were asked about the number of days when they were totally unable to work or carry out normal activities and the number of days when they had to cut down on what they did, or did not get as much done as usual in the previous 4 weeks. These two scores were summed to give a variable measuring the number of partial or full days taken out of role in the previous 4 weeks.
Table 3
Prevalences of demographic correlates by group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pure alcohol disorder N = 410</th>
<th>Comorbid alcohol disorder N = 235</th>
<th>Other psychiatric disorder N = 1013</th>
<th>No psychiatric disorder N = 8983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>75.7</td>
<td>69.2</td>
<td>39.1</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>24.3</td>
<td>30.8</td>
<td>60.9</td>
<td>51.4</td>
</tr>
<tr>
<td>Age</td>
<td>18-29</td>
<td>46.3</td>
<td>51.8</td>
<td>31.3</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>30-49</td>
<td>42.0</td>
<td>40.5</td>
<td>45.6</td>
<td>40.2</td>
</tr>
<tr>
<td></td>
<td>50+</td>
<td>11.8</td>
<td>7.7</td>
<td>23.2</td>
<td>38.1</td>
</tr>
<tr>
<td>Marital status</td>
<td>Never married</td>
<td>46.8</td>
<td>49.3</td>
<td>28.4</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>Married/defacto/widowed</td>
<td>44.8</td>
<td>37.2</td>
<td>57.3</td>
<td>74.3</td>
</tr>
<tr>
<td></td>
<td>Separated/divorced</td>
<td>8.4</td>
<td>13.6</td>
<td>14.3</td>
<td>7.2</td>
</tr>
<tr>
<td>Education</td>
<td>Completed secondary</td>
<td>47.1</td>
<td>44.9</td>
<td>39.6</td>
<td>45.9</td>
</tr>
<tr>
<td></td>
<td>Not completed secondary</td>
<td>52.9</td>
<td>55.1</td>
<td>60.4</td>
<td>54.1</td>
</tr>
<tr>
<td>Employment</td>
<td>Unemployed</td>
<td>6.5</td>
<td>16.8</td>
<td>8.5</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>Employed/not in labour-force</td>
<td>93.5</td>
<td>83.2</td>
<td>91.5</td>
<td>96.8</td>
</tr>
</tbody>
</table>

Adjusted odds ratios between days out of role and group were calculated using logistic regression. Respondents with no disorder were used as the referent category. Table 4 shows that after adjusting for gender, age, schooling, marital status, and employment the pure alcohol group were 1.4 (95% CI: 1.1, 1.7) times more likely, the comorbid alcohol group 3.1 (95% CI: 2.3, 4.2) times more likely and the other disorder group 3.0 (95% CI: 2.6, 3.5) times more likely than the no disorder group to have taken one full or partial day out of role in the previous 4 weeks.

With respect to SF-12 mental summary scores, after adjusting for gender, age, schooling, marital status, and employment status respondents in the pure alcohol group were 1.7 (95% CI: 1.3, 2.2) more likely, those in the comorbid alcohol group 6.5 times (95% CI: 4.5, 9.4) more likely and those in the other group 7.3 times (95% CI: 6.2, 8.7) more likely to have a SF-12 score of less than 50 (i.e. be disabled) than those in the no disorder group. As with days out of role, the comorbid alcohol group was found to be more similar to the other disorder group than those in the pure alcohol group with respect to SF-12 mental summary scores.

3.6. Use of health services

There was a significant association between consultation with a generalist health professional and group. Table 5 shows that individuals in the pure alcohol group were slightly less likely than those in the comorbid alcohol group to have seen any health professional in the previous 12 months (83 versus 88%). Individuals with a mental disorder, other than an alcohol use disorder, were the most likely to have seen a generalist health professional (92%).

There was also a significant relationship between the use of specialist services and group. As would be expected, the group with no mental disorders consulted these professionals least (6%). Those with a pure alcohol use disorder were the next least likely of the groups to have seen a specialist health professional (11%). This is considerably less than the other two disorder groups, where approximately half the respondents in each group had seen a professional for their mental problems (46% of those with a comorbid alcohol use disorder and 52% of those in the other disorder group).

Odds ratios were used to assess the strength of the relationship between group membership and use of mental health services. The no disorder group was used as the base category. As it is particularly useful
Comorbid disorders were more likely to be female, younger and unemployed. This replicates previous research. Younger, living in a metropolitan area, to have comorbid alcohol group were approximately four times more likely to use specialist mental health services than those with an alcohol disorder, that is the main contributor to this disability.

In the Australian adult population alcohol-related comorbidity was found to be widespread. More than one-third (37%) of respondents with an alcohol use disorder had at least one comorbid anxiety, affective or drug use disorder in the previous 12 months. As with findings from the U.S., the odds are highest for other drug use disorders (Regier et al., 1990). Although, the association was strongest for the drug use disorders, depression was the most prevalent of the specific mental disorders. This replicates previous U.S. research (Kessler et al., 1996).

Kessler et al. (1994) found that respondents with comorbid disorders were more likely to be female, younger, living in a metropolitan area, to have completed less years of secondary schooling and more likely to be in a lower income bracket (Kessler et al., 1994). Our research had similar findings. In comparison to the pure alcohol group the comorbid alcohol group were more likely to be female, younger and unemployed. Conversely, respondents with a pure alcohol disorder were primarily male and less likely to be unemployed than those without these added disorders. For this subgroup of respondents, therefore, the workplace may provide an opportunity for the prevention and management of alcohol problems through effective, appropriately targeted preventive campaigns and employee assistance programs (Trice and Sonnenstuhl, 1990; Blum et al., 1993; Gill, 1994).

The comorbid alcohol group were more likely to have taken days out of role and to be more severely disabled with respect to their mental health than those without a comorbid mental disorder. This concurs with previous clinical research that has shown comorbidity leads to an increase in general disability, a more severe illness course and poorer treatment outcomes (Lehman et al., 1993; Drake et al., 1996; Hesselbrock, 1991). The current data is, however, unique in that it indicates that it is the comorbid mental disorder, rather than the alcohol disorder, that is the main contributor to this disability.

Research from the NCS and the ECA has shown that comorbidity increases treatment seeking and that respondents with comorbid mental disorders were more likely to use specialist treatment services (Kessler, 1995). In the ECA data, respondents with an alcohol use disorder in specialist treatment services were nearly four times as likely to have a comorbid mental disorder compared to respondents not in treatment (Regier et al., 1990). Our findings were similar. Respondents in the comorbid alcohol group were approximately four times as likely to use specialist mental health services than respondents with an alcohol use disorder but no comorbid mental disorders.

The NSMH&WB does not, however, tell us the specific nature of the disorder for which help was sought. The finding that respondents in the pure alcohol group were less likely to seek this sort of help indicates that it is the disability associated with the comorbid mental disorder that leads to treatment seeking. This concurs with data from the NCS that shows that the addition of a substance use disorder to a mental disorder

### Table 5
Percentage and odds ratios for consulting a health professional at least once in the past 12 months by group

<table>
<thead>
<tr>
<th>Group</th>
<th>Generalist services&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Subjects using specialist services&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Odds of using specialist services for respondents with SF-12 score B 50&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure alcohol use disorder</td>
<td>82.9</td>
<td>11.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Comorbid alcohol and mental disorders</td>
<td>87.8</td>
<td>46.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Other psychiatric disorders only</td>
<td>91.9</td>
<td>51.9</td>
<td>8.4</td>
</tr>
<tr>
<td>No disorder</td>
<td>85.5</td>
<td>5.5</td>
<td>--</td>
</tr>
</tbody>
</table>

<sup>a</sup> Generalist services refer to having seen a health professional for a mental health problem in the previous 12 months.

<sup>b</sup> Specialist services refer to having seen a health professional for a mental health problem in the previous 12 months.

<sup>c</sup> No disorder group is referent category.

to look at use of services by those who could be classified as 'in need of services' this analysis was undertaken on the sub population of respondents who had an SF-12 score of less than 50, that is, were classified as disabled. After adjusting for gender, age, schooling, marital status, and employment the pure alcohol group were 2.2 (95% CI: 1.3, 3.7) times more likely, the comorbid alcohol group 8.2 (95% CI: 4.9, 13.8) times more likely and the other disorder group 8.4 (95% CI: 6.5, 10.8) times more likely to have visited a health professional for a mental health problem in the previous 12 months.

4. Discussion

Two main questions were addressed in this study. Firstly, what is the prevalence of 12-month comorbidity between alcohol use disorders and other mental disorders (anxiety, affective and drug use disorders) in the Australian general population. Secondly, what is the disability and health service utilisation associated with this comorbidity.

In the Australian adult population alcohol-related comorbidity was found to be widespread. More than one-third (37%) of respondents with an alcohol use disorder had at least one comorbid anxiety, affective or drug use disorder in the previous 12 months. As with findings from the U.S., the odds are highest for other drug use disorders (Regier et al., 1990). Although, the association was strongest for the drug use disorders, depression was the most prevalent of the specific mental disorders. This replicates previous U.S. research (Kessler et al., 1996).

Kessler et al. (1994) found that respondents with comorbid disorders were more likely to be female, younger, living in a metropolitan area, to have completed less years of secondary schooling and more likely to be in a lower income bracket (Kessler et al., 1994). Our research had similar findings. In comparison to the pure alcohol group the comorbid alcohol group were more likely to be female, younger and unemployed.
raised the proportion of the sample treated only minimally whilst the addition of a mental disorder to a substance use disorder raised it substantially (Kessler et al., 1993). It seems more likely, therefore, that clients will initially present for their mental health disorders in the mental health rather than drug and alcohol sector. This finding reinforces the need for screening for alcohol problems in clients seen for other mental health disorders. Further implied is the need for professional education to ensure appropriate use and interpretation of screening instruments.

It is likely that the NSMH&WB will have underestimated the prevalence of respondents with alcohol-related comorbidity. This is because sampling was based on households and excluded the homeless and those living in institutions who have higher rates of mental disorders than the general community. However, previous studies have shown that the inclusion of these groups adds only a small fraction of 1% to the estimated percentage of the population who had a substance use or other mental disorder (Robins and Regier, 1991; Meltzer et al., 1995). Of more concern is the 21% of the sample who did not respond. Extensive efforts were made in the NCS to re-contact and interview individuals who initially declined to be interviewed. A brief interview was conducted with these respondents and it was found that the rate of mental disorders in this group was higher than in people who initially agreed to be interviewed.

Lastly, the cross-sectional nature of the NSMH&WB means that the direction of the relationship between the variables discussed (alcohol disorders, other mental disorders, disability and service utilisation) cannot be inferred. Interpretation and explanation of these relationships would be best guided by further longitudinal studies commencing at childhood.

In sum, all mental disorders were more common in respondents with alcohol use disorders. Respondents in the comorbid alcohol group were more disabled and more likely to seek specialist treatment that those without these added disorders. Future research should seek to examine, in more detail, the nature of alcohol dependence in this sub-group of individuals in an attempt to determine whether it is the comorbid mental disorder or the severity of the alcohol use disorder that leads to treatment seeking. This will, in turn, help identify more appropriate and effective initiatives in both prevention and treatment.

As suggested by Wu et al. (1999) alcohol dependence in the presence of a comorbid disorder may be more severe (Wu et al., 1999). Alternatively, it may be that the nature of alcohol dependence differs qualitatively in some subgroups of the population (Muthe et al., 1993; Caetano et al., 1999). Previous research has suggested cultural and gender differences. This analysis suggests comorbidity may also be a defining factor. Finally, both mental health and drug and alcohol professionals should be provided with education to assist with appropriate identification, management and referral of clients presenting with this complex range of disorders.

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