

Lifetime Affective and Alcohol Use Disorder: Impact of Comorbidity on Current Functioning and Service Use in a Rural Population

Frances J Kay Lambkin^{1,2}, Kerry J Inder^{1,2*}, Tonelle E Handley^{2,3}, Yun Ming Yong⁴, Terry J Lewin¹ and Brian J Kelly¹

¹Centre for Translational Neuroscience and Mental Health, Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia

²National Health and Medical Research Council Centre for Research Excellence in Mental Health and Substance Use, National Drug and Alcohol Research Centre, University of New South Wales, Sydney, Australia

³Centre for Rural and Remote Mental Health, University of Newcastle, Orange, Australia

⁴School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia

Abstract

Background: Depression and alcohol use problems frequently co-occur and significant barriers to service use for co-morbid mental health problems exist.

Purpose of the study: This study examines relationships between current functioning and lifetime treatment among people with an affective disorder (AD) and/or an alcohol use disorder (AUD) in a rural sample.

Methodology: A sub-sample of participants in the Australian Rural Mental Health Study with lifetime AD and/or AUD were assessed for current functioning using measures of psychological distress, alcohol use, and physical and psychological impairment, using multivariate logistic regression. Help seeking and perceived treatment effectiveness were examined across disorders.

Major findings: 234 participants (55% female) met criteria for a lifetime AD and/or AUD. A lifetime history of both disorders (24%) was associated with higher levels of current psychological distress, psychological and physical impairment than a lifetime history of AUD alone, and higher levels of risky current alcohol use than AD alone. Substantial delays in treatment seeking were detected (from 9-14 years). Those with AUD alone reported unacceptably low rates of treatment seeking (11%) compared with the other groups (76-78%). Those with comorbid AD+AUD reported the lowest endorsement of past perceived "effective treatment" for either condition. Effective treatment for depression was less likely to be reported by those with both AD and AUD.

Conclusion: Lifetime comorbid AD+AUD has a specific impact on current psychological and physical functioning that is not accounted for by age, gender, recent life events or chronic illness, highlighting the pressing need for better and more effective ways to offer assessment and treatment for these conditions. Rural participants more frequently accessed treatment for AD than AUD, representing an important opportunity to intervene early to better manage or prevent AUD and their associated burden. Technological solutions offer promise in this context as a way to address this need.

Keywords: Affective disorder; Alcohol use disorder; Comorbidity; Health service use; Rural mental health; AUDIT; WMH-CIDI

Introduction

After cancer (19%) and cardiovascular disease (18%), mental disorders, including addiction, are the third leading factor contributing to the burden of disease and injury in Australia [1]. Mental disorders account for 13% of the total health burden [1], a contribution mirrored internationally [2]. Alcohol dependence is the second highest independent contributor to the burden borne out by mental disorders [1]. In addition, epidemiological research reports mental health and alcohol use disorders frequently co-occur; among Australians with a 12-month substance use disorder 21% also met criteria for a 12-month affective disorder and 34% met criteria for an anxiety disorder [3]. In comparison, in North America, the National Comorbidity Study found that men and women had a lifetime prevalence of 24% and 48% respectively for being diagnosed with co-occurring alcohol dependence if they have had a previous diagnosis of depression [4]. This co-occurrence (hereafter referred to as comorbidity) typically multiplies the burden experienced by people reporting these conditions in isolation [3].

The main goals in current mental health policy centre on the delivery of effective preventive care and early intervention, through overcoming the low rates of health service utilisation for mental disorders [5,6]. At present, mental health services in Australia encompass those provided by general practitioners, psychiatrists and psychologists, local community and residential mental health

services, and hospital care including emergency department services and inpatient care [5]. Many health services in Australia are subsidised by the universal health care scheme, Medicare, and the majority of psychotropic treatments for mental illness management are subsidised by the Australian Government through the Pharmaceutical Benefits Scheme [6]. Australian Government initiatives like the Access to Allied Psychological Services and the Better Outcomes in Mental Health Care Program, which aims to support an effective working relationship between general practitioners and psychologists in delivering optimal care, have been shown to increase primary mental health care use by people with mental health problems [7,8].

Despite this, significant barriers to service use for mental health

***Corresponding author:** Dr. Kerry Inder, Hunter Institute of Mental Health, PO Box 833, Newcastle, NSW 2300 Australia, Tel: +61 2 4924 6959; Fax: +61 2 4924 6901; E-mail: Kerry.Inder@newcastle.edu.au

Received January 27, 2014; Accepted May 20, 2014; Published May 31, 2014

Citation: Kay Lambkin FJ, Inder KJ, Handley TE, Yong YM, Lewin TJ, et al. (2014) Lifetime Affective and Alcohol Use Disorder: Impact of Comorbidity on Current Functioning and Service Use in a Rural Population. J Addict Res Ther S10:009. doi: 10.4172/2155-6105.S10-009

Copyright: © 2014 Kay Lambkin FJ, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

problems exist, especially for people experiencing co-occurring conditions. Individuals with comorbidity typically experience a greater need for care reflected by higher service use, yet the complexity of their diagnosis often leads to poorer treatment outcomes [9]. Concurrently these individuals experience the same range of barriers reported by those with single diagnoses including low perceived need for treatment, shortfalls in mental health education (e.g. poor understanding of mental disorders and the stigma surrounding these conditions), and societal values [10]. Socio-demographic characteristics are frequently correlated with service utilisation, such that females, older persons, those previously married, those less educated, and those with a primary and co-occurring mental health disorder are more likely to utilise services [11-17].

Geographic disparities influence mental health service access and utilisation and have been of particular interest in the Australian context, given the dispersed population base across regional, rural and remote locations. The Australian Rural Mental Health Study found that 47% of rural and remote residents with estimated high service needs had not utilised any form of professional services [18]. Internationally, Hauenstein et al. identified that residents of rural areas receive 47% less mental health treatment than metropolitan residents [19].

Considering that mental health problems occur at a similar rate across geographical areas [20], and that higher rates of alcohol misuse are often observed in non-metropolitan areas [21], the challenges related to adequate service provision for comorbidity may be especially pertinent for rural residents. As disproportionate levels of disability have been noted for individuals with comorbidity [22], and in light of the lower service availability in rural areas, exploring functioning and wellbeing among rural residents with comorbidity may lead to important implications for future resource allocation.

In summary, studies indicate high lifetime prevalence of co-existing mental health and substance use disorders, and the significant barriers to treatment for both sets of conditions. The disparities in health service availability and utilisation between rural and urban areas are well documented, alongside the known lifetime prevalence of such conditions, with both sets of evidence suggesting the importance of examining the patterns of service use for co-morbid conditions among rural residents, and the impact on functioning among this population. This study aimed to examine current functioning and mental health service utilisation in a sub-sample of community dwelling rural and remote Australians and reporting a lifetime affective disorder (AD), lifetime alcohol use disorder (AUD), or lifetime comorbidity between these conditions (AD+AD). We hypothesised that current functioning would be poorer in individuals reporting lifetime AD+AUD, and that individuals reporting this comorbidity would be less likely to have received professional mental health services for their comorbidity compared to individuals with AD or AUD alone.

Methods

Participants

Data were obtained from a sub-sample of the baseline phase of the Australian Rural Mental Health Study (ARMHS), a longitudinal population study of the determinants of mental health in rural and remote communities [23]. The ARMHS sample comprised randomly selected adults from the Australian Electoral Roll residing in one of 60 local government areas of non-metropolitan New South Wales (NSW), accounting for 70% of the state. Approximately one third of the Australia population reside in non-metropolitan areas and in NSW of those residing outside metropolitan areas 44% live in coastal areas and

56% live inland. More older people reside in inland areas than in coastal areas and metropolitan areas and overall non-metropolitan residents have lower socioeconomic status [24].

Eligible participants aged 65 years or over were screened using the modified Telephone Interview for Cognitive Status [25] and those with a total score <17 indicating significant cognitive impairment were excluded. Non-English speaking members of a household, those with significant hearing impairment that impeded consent and/or interview, and those with no identifiable telephone contact number (after directory and electronic database search) were also excluded. Ethical approval for ARMHS was provided by the Human Research Ethics Committees of the participating institutions.

Baseline postal surveys were completed by 2,639 men and women (response rate 27%) of whom a selected subsample of 867 were invited to participate in a World Mental Health Composite International Diagnostic Interview version 3 (WMH-CIDI-3.0) by telephone. Participants were selected for interview based on their level of psychological distress using Kessler 10 scores [26] in order to obtain a reasonable representation in each category of psychological distress. Interviews were offered to 100% of those with a high-range score (25+), 75% of those with a moderate-range score (16-24), and one-sixth of those scoring in the low range (10-15). A total of 636 (73%) participants completed a WMH-CIDI-3.0. Participants included in the current analysis were limited to those who met criteria for any lifetime AD or any lifetime AUD.

Measures

Demographic characteristics

Age (categorised as 18-44, 45-64, 65 years and older) and gender were assessed by single-item self-report questions.

Lifetime affective and alcohol use disorders

The WMH-CIDI-3.0 is a standardised diagnostic interview used to assess psychiatric diagnoses defined by the Diagnostic and Statistical Manual (DSM-IV) [27] and International Classification of Diseases (ICD-10) criteria [28]. The WMH-CIDI-3.0 has excellent inter-rater reliability, good validity and test-retest reliability, and is an acceptable method to determine lifetime psychiatric diagnoses [29]. The WMH-CIDI-3.0 was used to assess a lifetime diagnosis of any AD (including dysthymia, minor depression and unipolar and bipolar major depression), and any AUD, including alcohol abuse or dependence. For this analysis participants were categorised into three groups: lifetime AD only, lifetime AUD only, or having experienced both disorders during their lifetime (AD+AUD). Participants may or may not have current symptoms of the disorder.

Current functioning

a) Current psychological distress was assessed using the Kessler-10 (K10) psychological distress scale [26], a 10-item measure of symptoms of distress during the previous four weeks, where scores ranged from 10 to 50 with higher scores indicating higher distress. High psychological distress was defined as a K10 score of >24.

b) Current alcohol use was measured using the Alcohol Use Disorder Identification Test (AUDIT), a 10 item measure of harmful or hazardous alcohol use [30], modified to examine recent consumption during the previous six months, with a maximum total score of 40. Higher scores represent higher alcohol use and/or related harmful behaviours. Participants with an AUDIT score of >7 were defined as having risky alcohol use.

c) Physical and psychological impairment were measured using the Assessment of Quality of Life - 6D scale (AQoL-6D) [31]. The AQoL-6D is a 20-item self-report instrument designed to provide a sensitive multidimensional evaluation of health related quality of life across six domains: independent living; relationships, mental health, coping, pain and senses [31]. The physical and psychological components of quality of life were identified as two higher order factors of the AQoL-6D using community samples and considered to have satisfactory construct, concurrent and convergent validity [32]. Higher scores indicate greater impairment, where significant impairment is indicated by scores greater than 1 standard deviation (SD) above the relevant population mean [32]. For the present purposes, physical impairment was defined as a mean score > 2.18 (normative mean (SD) 1.73 (0.45)) and psychological impairment as a mean score > 2.48 (normative mean (SD) 1.98 (0.50)) [32].

Moderating factors

Recent adverse life events: Recent adverse life events were assessed using a 12-item measure of events or threatening experiences in the past 12 months, including major illness or injury, death of a spouse, relative or friend, marital difficulties, becoming unemployed or major financial difficulties [33]. The number of events reported were categorised as 0–2 or 3 or more.

Chronic illness: Lifetime self-reported diagnoses of chronic illness were measured using the question ‘Has a doctor EVER told you that you have...’ heart attack or angina, other heart disease, stroke, cancer, or diabetes. Participants were categorised as having at least one chronic illness or not having a chronic illness.

Health service use

Help-seeking: As part of the WMH-CIDI-3.0 participants who met criteria for lifetime AD or lifetime AUD were asked if they ever talked to a medical practitioner or other professional about their problems (yes/no). Other professionals were defined as psychologists, counsellors, spiritual advisors, herbalists, acupuncturists and other healing professions.

Perceived treatment effectiveness: Participants who stated they had ever spoken with a medical practitioner or other health professional about their mental disorder were asked if they had ever received treatment that they perceived to be helpful or effective.

Delay in treatment: It was estimated by subtracting their age the first time they had an episode (e.g. for AD “age first time you had an episode of sadness / discouragement of lack of interest” and AUD “age first time you had any problems related to alcohol use”) from the age when they first reported getting treatment; reported in years.

Statistical Analysis

Analyses were conducted using Statistical Packages for Social Sciences (SPSSv.22; IBM Corporation, Armonk NY, USA). For the primary analysis, multivariate logistic regression analyses were undertaken to assess the relationship between the presence of disorder (lifetime AD only / lifetime AUD only / lifetime AD+AUD) and four current functioning outcomes: high psychological distress (K-10), high AUDIT scores, physical impairment and psychological impairment (AQOL-6D). All regression analyses were adjusted for age, gender, recent adverse life events and chronic illness and the log likelihood test of model fit is reported for each outcome. Results are reported as Adjusted Odds Ratios (AORs) with 95% confidence intervals (CIs). Statistical significance was set at $p < 0.05$.

The secondary analysis assessed the proportions of people with AD, AUD and AD+AUD reporting professional health service use and perceived effectiveness of treatment, and examined delays in seeking treatment (means and standard deviations (SD)).

Results

Of the 636 ARMHS participants who completed the WMH-CIDI-3.0, 234 met criteria for any lifetime AD or any lifetime AUD: 94 with AD only (40%), 91 with AUD only (39%) and were included in this sub-analysis. Forty-nine participants (21%) met criteria for both disorders (AD+AUD). The mean age (SD) of the sample was 51.6 (13.0) years and 45% were male. Table 1 summarises the socio-demographic characteristics of the sample. Within the group of participants diagnosed with AD, 25.8% of females and 50.0% of males were diagnosed with comorbid lifetime AUD. For those with lifetime AUD, 30.9% of males and 40.7% of females also met criteria for lifetime AD. People with AD+AUD were significantly younger at their age of onset for AUD (23.92 ± 8.25 vs. 20.68 ± 6.54 , $F(1,135)=5.44$, $p=.021$) and AD (24.04 ± 12.64 vs. 19.31 ± 10.65 , $F(1,110) = 3.95$, $p=.049$) compared to those with AUD or AD alone (Table 1).

Current Functioning

Psychological distress

Within this stratified sample 16.3% reported low psychological distress, 46.4% moderate distress and 37.5% high distress. As shown in Table 2, participants reporting lifetime AD+AUD were significantly more likely to experience high psychological distress currently compared with participants reporting AUD only ($p < 0.001$), but the same was not true for AD. Older participants had reduced odds of reporting high psychological distress; this was statistically significant for those aged 45–64 years. The experience of three or more recent life events in the 12 months prior to assessment was associated with

	AUD only n (%)	AD only n (%)	AUD + AD n (%)	Total sample n (%)
Age				
Under 45	27 (29.7)	21 (22.3)	17 (34.7)	65 (27.8)
45-64	46 (50.5)	61 (64.9)	26 (53.1)	133 (56.8)
65+	18 (19.8)	12 (12.8)	6 (12.2)	36 (15.4)
Gender				
Male	56 (61.5)	25 (26.6)	25 (51.0)	106 (45.3)
Female	35 (38.5)	69 (73.4)	24 (49.0)	128 (54.7)
Marital status				
Currently/previously married	81 (90.0)	82 (89.1)	41 (83.7)	204 (88.3)
Never married	9 (10.0)	10 (10.9)	8 (16.3)	27 (11.7)
Education				
Didn't complete high school	26 (28.6)	28 (29.8)	12 (24.5)	66 (28.2)
Completed high school	65 (71.4)	66 (70.2)	37 (75.5)	168 (71.8)
Location				
Inner regional	30 (33.0)	44 (46.8)	21 (42.9)	95 (40.6)
Outer regional	34 (37.4)	33 (35.1)	22 (44.9)	89 (38.0)
Remote/very remote	27 (29.7)	17 (18.1)	6 (12.2)	50 (21.4)
K10 category				
Low (>16)	25 (27.5)	10 (10.8)	3 (6.1)	38 (16.3)
Moderate (16-24)	48 (52.7)	41 (44.1)	19 (38.8)	108 (46.4)
High (25+)	18 (19.8)	42 (45.2)	27 (55.1)	87 (37.3)

Table 1: Sociodemographic characteristics of the Australian Rural Mental Health Study (ARMHS) sub-sample with lifetime affective disorder (AD) and/or an alcohol use disorder (AUD); n=234.

significantly greater psychological distress. Gender and chronic illness were not associated with high levels of current psychological distress in this sample (Table 2).

Alcohol use

Reporting a lifetime AD was associated with significantly lower odds of reporting current risky alcohol consumption ($p < 0.01$) compared to those reporting comorbidity (AD+AUD). Reporting an AUD only was associated with increased odds of current risky alcohol use; however

this did not reach statistical significance. Age, gender, recent life events and chronic illness were not associated with reporting risky alcohol use in this sample (Table 2).

Physical impairment

Reporting an AUD only was associated with significantly lower odds of reporting physical impairment compared with those reporting both disorders ($p < 0.05$), (Table 3). The odds of reporting a physical impairment was similar for those reporting an AD or reporting both

	n	Current psychological distress* (K10 >24)		Current risky alcohol use§ (AUDIT >7)	
		%	AOR (95%CI)	%	AOR (95%CI)
Lifetime diagnoses					
AD + AUD	49	55.1	1.00	32.5	1.00
AUD only	91	19.8	0.20 (0.09-0.46)***	39.7	1.40 (0.61-3.25)
AD only	94	45.2	1.03 (0.47-2.25)	9.0	0.25 (0.09-0.73)**
Age					
18-44	65	47.7	1.00	32.7	1.00
45-64	133	31.8	0.41 (0.20-0.84)*	23.9	0.63 (0.27-1.43)
65+	36	38.9	0.81 (0.29-2.26)	23.5	0.39 (0.12-1.28)
Gender					
Male	106	36.8	1.00	35.9	1.00
Female	128	37.8	0.54 (0.27-1.06)	17.3	0.52 (0.25-1.11)
Recent life events					
0-2	131	24.4	1.00	25.2	1.00
3+	99	54.5	3.75 (2.02-7.00)***	26.9	1.07 (0.52-2.19)
Any chronic illness					
No	122	37.7	1.00	24.5	1.00
Yes	112	36.9	1.06 (0.55-2.03)	27.7	1.22 (0.57-2.61)

* $p < .05$, ** $p < .01$, *** $p < .001$. * -2LL = 254.58, $\chi^2(7) = 49.48$, $p < .001$. § -2LL = 193.68, $\chi^2(7) = 27.14$, $p < .001$. AOR: Adjusted Odds Ratios; CI: Confidence Interval; AUDIT: Alcohol Use Disorder Identification Test; K10: Kessler 10; AD: Affective disorder; AUD: Alcohol Use Disorder.

Table 2: Relationship between lifetime diagnoses of affective and alcohol use disorders and current functioning for selected participants in the Australian Rural Mental Health Study (n=234).

	n	Physical impairment ¥ (AQoL-6D)		Psychological impairment € (AQoL-6D)	
		%	AOR (95%CI)	%	AOR (95%CI)
Lifetime diagnoses					
AD+AUD	49	34.2	1.00	52.6	1.00
AUD only	91	15.8	0.27 (0.09-0.77)*	17.1	0.21 (0.08-0.53)***
AD only	94	28.6	1.02 (0.39-2.65)	52.2	1.23 (0.51-3.00)
Age					
18-44	65	18.4	1.00	41.7	1.00
45-64	133	20.6	1.11 (0.42-2.93)	37.3	0.91 (0.40-2.10)
65+	36	45.5	3.86 (1.13-13.17)*	33.3	1.15 (0.36-3.67)
Gender					
Male	106	30.3	1.00	30.3	1.00
Female	128	18.9	0.41 (0.18-0.97)*	44.7	1.07 (0.51-2.24)
Recent life events					
0-2	131	17.9	1.00	23.8	1.00
3+	99	34.2	3.33 (1.48-7.49)**	56.6	4.14 (2.03-8.44)***
Any chronic illness					
No	122	14.9	1.00	37.6	1.00
Yes	112	34.4	2.41 (1.06-5.51)*	37.8	1.08 (0.52-2.27)

$p < .05$, ** $p < .01$, *** $p < .001$. ¥ -2LL = 169.44, $\chi^2(7) = 34.15$, $p < .001$. € -2LL = 196.22, $\chi^2(7) = 43.40$, $p < .001$. AOR: Adjusted Odds Ratios; CI: Confidence Interval; AQoL-6D: Assessment of Quality of Life 6D Impairment; AD: Affective disorder; AUD: Alcohol Use Disorder.

Table 3: Relationship between lifetime diagnoses of affective and alcohol use disorders and current quality of life for selected participants in the Australian Rural Mental Health Study (n=234).

disorders. Older participants ($p < 0.05$), those experiencing three or more recent adverse life events ($p < 0.01$) and those reporting at least one chronic illness ($p < 0.05$) were significantly more likely to experience current physical impairment. Female gender was associated with significantly lower odds of reporting physical impairment ($p < 0.05$).

Psychological impairment

Reporting an AUD only was associated with significantly lower odds of reporting psychological impairment compared with those reporting both disorders ($p < 0.001$), (Table 3). Reporting an AD was associated with increased odds of reporting psychological impairment; however this did not reach statistical significance. Reporting three or more adverse life events in the past 12 months was significantly associated with increased odds of reporting psychological impairment. Age, gender and chronic illness were not associated with reporting psychological impairment in this sample (Table 3).

Health Service Use

Help seeking

Table 4 displays the proportions of those with lifetime disorders who reported ever having talked to a medical practitioner or other professional about their problems. Only small proportions of those with AUD or AD+AUD sought help for their alcohol use while three quarters of those reporting an AD only reported seeking help for their depression. For those reporting both disorders 28.6% sought help for both.

The mean (M) delay to help-seeking for participants reporting any lifetime AD was 9.3 years (SD 11.3, range 0–47 years, $n = 84$). There was no significant difference in time to seeking help for those reporting an AD only ($M = 9.0 \pm 9.5$) compared to those reporting both disorders ($M = 9.5 \pm 12.3$). The mean delay to help-seeking for participants reporting any lifetime AUD was 14.4 years (SD 10.5, range 0–35 years, $n = 22$). There was no significant difference in time to seeking help for those reporting an AUD only ($M = 15.1 \pm 9.2$) compared to those reporting both disorders ($M = 13.5 \pm 11.7$) (Table 4).

Perceived treatment effectiveness

More than three quarters (80.3%) of those with an AD only who sought help, perceived this to be effective (Table 5). For participants with AUD only, half who sought treatment perceived it to be effective.

	No help sought n (%)	Help sought – alcohol n (%)	Help sought – affective disorder n (%)	Help sought – both n (%)
AUD only	81 (89.0%)	10 (11.0%)	-	-
AD only	23 (24.5%)	-	71 (75.5%)	-
AD+AUD	11 (22.4%)	1 (2.0%)	23 (46.9%)	14 (28.6%)

AD: Affective Disorder; AUD: Alcohol Use Disorder.

Table 4: Help-seeking by disorder in selected participants from the Australian Rural Mental Health Study, $n = 234$.

	Effective alcohol treatment	Effective depression treatment
Help-seeking for AUD only ($n = 10$)	5 (50.0%)	-
Help-seeking for AD only ($n = 71$)	-	57 (80.3%)
Help-seeking for AD+AUD ($n = 38$)**	7 (18.4%)	8 (21.1%)

**Note – 3(7.9%) participants in the comorbidity group reported effective treatment for both alcohol use disorder and affective disorder. AD: Affective Disorder; AUD: Alcohol Use Disorder.

Table 5. Help-seekers who received effective treatment.

For people with comorbid AD+AUD, 18.4% reported receiving effective treatment for their alcohol use disorder and 21.1% for their affective disorder. Treatment delay had no significant relationship with perceived treatment effectiveness (Table 5).

Discussion

This study is the first in Australia to report on the specific impact of lifetime comorbid alcohol and affective disorders on current functioning and service utilisation. We found that, after accounting for age, gender, chronic illness and recent life events, comorbid AD+AUD was associated with significantly earlier onset of both alcohol use disorder (AUD) and affective disorder (AD) compared with those reporting AD or AUD alone, and that this earlier onset was of the order of 3-5 years. Lifetime comorbidity conferred a greater risk of current high psychological distress than did a lifetime AUD alone, along with significantly greater likelihood of physical impairment and psychological impairment. This increased risk was independent of that associated with age, gender, chronic illness, and recent (12-month) life events. Lifetime comorbidity was not associated with increased risk of current problematic alcohol use, over and above that associated with a lifetime AUD. Delay to help-seeking was not affected by lifetime comorbidity, relative to that reported by people with AD or AUD alone, although the delay to help-seeking for alcohol use problems was 2 years earlier in people reporting comorbid lifetime AD+AUD. These results are elaborated below.

In the general population, the prevalence of more than one lifetime mental disorder is between 25-50% [3,4]. In our study, of the 234 rural participants who met criteria for either a lifetime AD or AUD, 21% ($n = 49$) reported comorbid lifetime AD+AUD. This is also consistent with international research, indicating a prevalence of around 29% for lifetime comorbid AD+AUD [4,34]. In contrast, however, we found higher proportions of males than females (50% vs. 26%) with lifetime AD who were also diagnosed with lifetime AUD. Previous results from the National Comorbidity Survey [NCS, 4], for example, reported that 24% of males and 48% of females who were diagnosed with lifetime AD also met criteria for comorbid AUD. This finding suggests that depression is more frequently associated with drinking among females in North America (as per the NCS), however in the Australian rural context, the reverse seems to be true.

Delays to treatment seeking were 9 years for AD and 14 years for AUD, suggesting that participants may have been attempting to manage their symptoms and associated problems on their own (or with the support of families) for quite some time from the onset of first symptoms. These delays are similar to that reported in the National Survey of Mental Health and Wellbeing (NSMHWB) in Australia, with median delays in treatment for those who eventually sought treatment for AUD being substantial, and approximately 14 years for people with lifetime alcohol abuse and 23 years for those with lifetime alcohol dependence [35]. In our sample, treatment seeking for AUD was rare, let alone delayed, with only 11% of participants ever seeking treatment despite meeting criteria for lifetime AUD and current risky drinking practices. This is likely to be indicative of the cultural significance of alcohol in Australia, and particularly in rural locations. For example, previous research has documented the integral role alcohol plays in Australian rural culture, in terms of its intrinsic value as a positive social practice, essential for belonging, with active exclusion of non-drinkers [36]. As a result, alcohol-related harm was of little concern to the rural communities studied [36]. The 'cultural capital' of alcohol in rural communities may in part explain the low rates of treatment seeking for AUD in our study or rural participants, despite clearly meeting

criteria for disorder. This may also account for the differences in rates of AUD within AD observed in our male participants relative to those in other countries. Much work remains to address these cultural issues including exploring opportunities to implement alcohol use prevention programs such as the local Newcastle experiment that restricted hotel closing times to reduce assaults [37,38].

In Australia, only 35% of respondents to the NSMHWB with mental disorders reported having consulted a health professional for their disorder in the 12-months prior to survey [17,18,39]. Despite being at a reputed geographical disadvantage in terms of service provision, our rural/remote participants reported higher rates of service utilisation for AD (75%) and comorbid AD+AUD (78%) over their lifetime. Service use in the NSMHWB was driven primarily by people with AD, either alone or in combination with other mental disorders, including AUD [3]. A similar finding was apparent in the current study, with service utilisation being highest among those with AD alone, and next among those with comorbid AD+AUD, with no significant differences between these classes of disorders. In contrast, AUD alone was not associated with significant treatment utilisation. Synthesising this with our results on delays to treatment seeking, whereby people with comorbid AD+AUD sought treatment for their alcohol use problems, on average, two years earlier than their AUD alone counterparts, highlights the importance of affective disorders (and related symptoms) in being a key prompt for treatment seeking, and the need to effectively assess and treat alcohol use disorders in people presenting with affective disorders. This is particularly critical given the recent NESARC cohort study results indicating that mood disorders at baseline predicted increased risk of drug and alcohol abuse at 3-year follow-up [40]. The same was not observed for alcohol use disorders at baseline and future mood disorder.

Comorbidity treatment guidelines [41] together with evidence from the literature [42] consistently recommend that both addiction and psychiatric approaches are essential to effectively treat people experiencing comorbid addictive and psychiatric disorders. Despite this, only one-third of the people with comorbid AD+AUD sought treatment for both of their disorders, and only 8% of these reported that they receive effective and adequate treatment for both disorders. Emerging evidence in Australia [43] and internationally [44] highlight that existing mental health and substance use treatment services do not perceive themselves to be “comorbidity ready” beyond screening for comorbidity in their service users. In lieu of a complete re-organisation of treatment resources, innovative treatment approaches incorporating technology into the assessment and treatment of comorbid AD+AUD are emerging [e.g. 42] as a potential immediate solution to this problem. For example, recent research has indicated the efficacy of a clinician-assisted computerised treatment program for depression and alcohol/other drug use problems, with equivalent benefits reported for both depression and alcohol use as an entirely therapist-delivered treatment [42,44]. The Internet (and related technologies) show promise as a means of closing the gap between evidence and clinical practice in this context [42,45,46].

Strengths and Limitations

The strength of this study lies in the use of a validated standardised diagnostic interview to determine the lifetime presence of disorder (WMH-CIDI-3.0) and to measure current functioning and service use. As in previous work in this area [47] the average age of our sample raises issues relating to potential recall, especially for lifetime alcohol problems, or generational effects, in an era when alcohol misuse was not the subject of public campaigns and treatment seeking was not

addressed to the extent it is today. The ARMHS sample has a higher response rate from females (59.4%) and was under-representative of those aged 18-45 years. Further the cross-sectional nature of this analysis, the low survey response rate, the exclusion criteria related to telephone access and the selection of interview participations based on psychological distress may impact on the generalisability of the findings. There are also limitations in the capacity to investigate the relationship between affective disorder and alcohol use disorder and the type and duration of any treatment received; nevertheless our findings highlight an important relationship that requires further investigation.

Conclusions

We have demonstrated the specific negative contribution that lifetime comorbid affective and alcohol use disorders (AD+AUD) makes to current physical and psychological functioning, compared to alcohol use disorder (AUD) alone in a sample of rural Australians. This is after accounting for the influence of age, gender, chronic illness and recent life events. There is a critical need to adequately assess and treat depressive (and related) symptoms in people with lifetime AUD, with a view to offsetting the burden borne by this lifetime comorbidity. Moreover, people with lifetime comorbidity in our sample were much more likely to seek treatment for their affective disorder (AD), despite also meeting criteria for lifetime AUD. Equally then, assessment and treatment planning for AD needs to encompass assessment and treatment for AUD. This may go some way to encouraging the implementation of evidence and policy guidelines that recommend effective treatment for comorbidity that target both conditions, rather than either the AUD or AD alone; a treatment experience reported by only 8% of our comorbid sample. Importantly, offering assessment and brief intervention for risky alcohol use in people with AD may be key to preventing the development of a subsequent alcohol use disorder, potentially reducing the incidence of lifetime alcohol use disorders. Capitalising on the emerging evidence base for technology-based approaches to assessment and treatment of comorbidity in this context is an important potential tool in these efforts.

Acknowledgements

The Australian Rural Mental Health Study was funded by the National Health and Medical Research Council (Project Grants #401241 and #632061) and was supported by a Research Capacity Building Grant from the Australian Rural Health Research Collaboration. The authors wish to acknowledge the other investigators on this study: Prof David Perkins, A/Prof Lyn Fragar, Prof Jeffrey Fuller, A/Prof Helen Stain, Prof Prasuna Reddy, Prof Vaughan Carr, Prof David Lyle and Prof John Beard and Project Coordinator, Dr Clare Coleman. We also wish to acknowledge the support of Directors of Mental Health Services during the course of the study: Dr Russell Roberts, Richard Buss, Judy Kennedy, Dinesh Arya, Martin Cohen, the research site coordinators in each site: Jan Sidford, John Ogle (Broken Hill), Trim Munro, Amy Strachan (Moree), Louise Holdsworth, Kath O'Driscoll (Lismore), Cheryl Bennett, Jannelle Bowler (Orange), along with Fleur Hourihan, Dr Gina Sartore, DenikaNovello. We specifically acknowledge and thank the team of CIDI interviewers. Dr Tonelle Handley's post-doctoral research fellowship is funded by Australian Rotary Health, with thanks.

References

1. Begg S, Vos T, Barker B, Stevenson C, Stanley L, et al. (2007) The burden of disease and injury in Australia 2003. Canberra: Australian Institute of Health and Welfare; 337p. Report No: PHE82.
2. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, et al. (2013) Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet* 382: 1575-1586.
3. Teesson M, Slade T, Mills K (2009) Comorbidity in Australia: findings of the 2007 National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry* 43: 606-614.
4. Kessler RC, Crum RM, Warner LA, Nelson CB, Schulenberg J, et al. (1997) Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Arch Gen Psychiatry* 54: 313-321.

5. Australian Institute of Health and Welfare (2013) Mental health services – in brief 2013. Canberra: Australian Institute of Health and Welfare; Report No: HSE141, p45.
6. Australian Institute of Health and Welfare (2013) Mental health-related prescriptions. Canberra: Australian Institute of Health and Welfare; 10p.
7. Hickie I, Groom G (2002) Primary care-led mental health service reform: an outline of the Better Outcomes in Mental Health Care initiative. *Australas Psychiatry* 10: 376–382.
8. Kohn F, Morley B, Pirkis J, Shandley K, Naccarella L, et al. (2005) Evaluating the Access to Allied Psychological Services component of the Better Outcomes in Mental Health Care Program sixth interim evaluation report. Melbourne: The University of Melbourne Program Evaluation Unit; 35p.
9. Brown SA, Inaba RK, Gillin JC, Schuckit MA, Stewart MA, et al. (1995) Alcoholism and affective disorder: clinical course of depressive symptoms. *Am J Psychiatry* 152: 45-52.
10. Andrews G, Issakidis C, Carter G (2001) Shortfall in mental health service utilisation. *Br J Psychiatry* 179: 417-425.
11. Prins M, Meadows G, Bobevski I, Graham A, Verhaak P, et al. (2011) Perceived need for mental health care and barriers to care in the Netherlands and Australia. *Soc Psychiatry Psychiatr Epidemiol* 46: 1033-1044.
12. Sareen J, Jagdeo A, Cox BJ, Clara I, ten Have M, et al. (2007) Perceived barriers to mental health service utilization in the United States, Ontario, and the Netherlands. *Psychiatr Serv* 58: 357-364.
13. Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, et al. (2005) Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 62: 629-640.
14. Demyttenaere K, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, et al. (2004) Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 291: 2581-2590.
15. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, et al. (2004) Use of mental health services in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand* 109: 47-54.
16. Andrews G, Henderson S, Hall W (2001) Prevalence, comorbidity, disability and service utilisation: overview of the Australian National Mental Health Survey. *Br J Psychiatry* 178: 145-153.
17. Burgess PM, Pirkis JE, Slade TN, Johnston AK, Meadows GN, et al. (2009) Service use for mental health problems: findings from the 2007 National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry* 43: 615-623.
18. Perkins D, Fuller J, Kelly BJ, Lewin TJ, Fitzgerald M, et al. (2013) Factors associated with reported service use for mental health problems by residents of rural and remote communities: cross-sectional findings from a baseline survey. *BMC Health Serv Res* 18: 157-170.
19. Hauenstein EJ, Petterson S, Rovnyak V, Merwin E, Heise B, et al. (2007) Rurality and mental health treatment. *Adm Policy Ment Health* 34: 255-267.
20. Peen J, Schoevers RA, Beekman AT, Dekker J (2010) The current status of urban-rural differences in psychiatric disorders. *Acta Psychiatr Scand* 121: 84-93.
21. Inder KJ, Handley TE, Fitzgerald M, Lewin TJ, Coleman C, et al. (2012) Individual and district-level predictors of alcohol use: cross sectional findings from a rural mental health survey in Australia. *BMC Public Health* 12: 586.
22. Whiteford H, Groves A (2009) Policy implications of the 2007 Australian National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry* 43: 644-651.
23. Kelly BJ, Stain HJ, Coleman C, Perkins D, Fragar L, et al. (2010) Mental health and well-being within rural communities: the Australian rural mental health study. *Aust J Rural Health* 18: 16-24.
24. Australian Institute of Health and Welfare (2007) Rural, regional and remote health: a study on mortality (2nd edn). Rural health series no. 8. Cat. no. PHE 95. Canberra: AIHW.
25. de Jager CA, Budge MM, Clarke R (2003) Utility of TICS-M for the assessment of cognitive function in older adults. *Int J Geriatr Psychiatry* 18: 318-324.
26. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, et al. (2002) Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine* 32: 959-976.
27. American Psychiatric Association. Diagnostic and statistical manual of mental disorders.
28. World Health Organization, International Classification of Diseases version 10.
29. Andrews G, Peters L (1998) The psychometric properties of the Composite International Diagnostic Interview. *Soc Psychiatry Psychiatr Epidemiol* 33: 80-88.
30. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M (1993) Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption—II. *Addiction* 88: 791-804.
31. Richardson JR, Peacock SJ, Hawthorne G, Iezzi A, Elsworth G, et al. (2012) Construction of the descriptive system for the Assessment of Quality of Life AqoL-6D utility instrument. *Health Qual Life Outcomes* 10: 38.
32. Allen J, Inder KJ, Lewin TJ, Attia JR, Kelly BJ (2013) Construct validity of the Assessment of Quality of Life - 6D (AqoL-6D) in community samples. *Health Qual Life Outcomes* 11: 61.
33. Brugha TS, Cragg D (1990) The List of Threatening Experiences: the reliability and validity of a brief life events questionnaire. *Acta Psychiatr Scand* 82: 77-81.
34. Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, et al. (1990) Comorbidity of mental disorders with alcohol and other drug abuse. Results from the Epidemiologic Catchment Area (ECA) study. *JAMA* 264: 2511-2518.
35. Chapman C, Slade T, Hunt C, Teesson M (2013) Delay to seek treatment for alcohol use disorders in Australia. *Alcoholism: Clinical and Experimental Research* 37: 134A.
36. Allan J, Clifford A, Ball P, Alston M, Meister P (2012) 'You're less complete if you haven't got a can in your hand': alcohol consumption and related harmful effects in rural Australia: the role and influence of cultural capital. *Alcohol* 47: 624-629.
37. Kypri K, Jones C, McElduff P, Barker D (2011) Effects of restricting pub closing times on night-time assaults in an Australian city. *Addiction* 106: 303-310.
38. Kypri K, McElduff P, Miller P (2014) Restrictions in pub closing times and lockouts in Newcastle, Australia five years on. *Drug Alcohol Rev* 33: 323-326.
39. Henderson S, Andrews G, Hall W (2000) Australia's mental health: an overview of the general population survey. *Aust N Z J Psychiatry* 34: 197-205.
40. Grant BF, Goldstein RB, Chou SP, Huang B, Stinson FS, et al. (2009) Sociodemographic and psychopathologic predictors of first incidence of DSM-IV substance use, mood and anxiety disorders: results from Wave 2 National Epidemiological Survey on Alcohol and Related Conditions. *Mol Psychiatry* 14: 1051-1066.
41. Mills K, Deady M, Proudfoot H, Sannibale C, Teesson M, Mattick R, et al. (2012) Guidelines on the management of co-occurring alcohol and other drug and mental health conditions in alcohol and other drug treatment settings.
42. Kay-Lambkin FJ, Baker AL, Lewin TJ, Carr VJ (2009) Computer-based psychological treatment for comorbid depression and problematic alcohol and/or cannabis use: a randomized controlled trial of clinical efficacy. *Addiction* 104: 378-388.
43. Matthews H, Kelly PJ, Deane FP (2011) The dual diagnosis capability of residential addiction treatment centres: priorities and confidence to improve capability following a review process. *Drug Alcohol Rev* 30: 195-199.
44. Sacks S, Chaple M, Sirikantraporn J, Sacks JY, Knickman J, et al. (2013) Improving the capability to provide integrated mental health and substance abuse services in a state system of outpatient care. *J Subst Abuse Treat* 44: 488-493.
45. Kay-Lambkin FJ, Baker A, Kelly B, Lewin T (2011) Clinician-assisted computerised versus therapist-delivered treatment for depressive and addictive disorders: a randomised controlled trial. *Med J Aust* 195: S44-S50.
46. Handley TE, Kay-Lambkin FJ, Inder KJ, Attia JR, Lewin TJ, et al. (2014) Feasibility of internet-delivered mental health treatments for rural populations. *Soc Psychiatry Psychiatr Epidemiol* 49: 275-282.
47. Inder KJ, Handley TE, Fitzgerald M, Lewin TJ, Coleman C, et al. (2012) Individual and district-level predictors of alcohol use: cross sectional findings from a rural mental health survey in Australia. *BMC Public Health* 12: 586.

This article was originally published in a special issue, **Addictions with Co-occurring Problems** handled by Editor(s) Dr. Marie-Josée Fleury and Dr. Serge Brochu; Montreal Addiction Rehabilitation Centre - University Institute, Canada