

Understanding the effects of comorbidity severity among high-need, high-cost alcohol-related frequent attenders: a cross-sectional study

Mingjun, Ma^{1,*}

¹King's College London, Institute of Psychiatry, Psychology & Neuroscience, the United Kingdom.

Abstract: Objectives: Alcohol dependence (AD) imposes a significant economic burden and frequently co-occurs with other mental disorders. This study aimed to determine the impact of comorbidity severity among high-need, high-cost (HNHC) alcohol-related frequent attendees. (ARFAs). Methods: In a cross-sectional study, 128 participants filled out questionnaires. Assessing patients with the TLFB, APQ, SF-12, and Adult Service Use Schedule. Results: a) Psychiatric comorbidities are common in patients with AD. b) Comorbidity severity significantly predicts alcohol-related problems (APQ), quality of life (QoL), and emergency department (ED) attendance and admission after controlling for the influence of age and gender. c) Daily alcohol intake significantly modifies the relationship between comorbidity severity and emergency department attendance. Conclusions: When treating patients with AD, evaluating and considering the severity of comorbidity is essential.

1. Introduction

Alcohol consumption was the seventh leading cause of mortality and disability worldwide, accounting for 2.2% of female fatalities and 6.8% of male deaths. In 2016, 32.5% of persons worldwide were current drinkers, including 25% of women and 39% of men [1]. Risky drinkers tended to utilize expensive services, such as hospitals and emergency departments (ED), rather than primary health care services, which contributed to the high cost of alcohol [2]. HNHC ARFAs are a subset of all patients with alcohol-related hospitalizations and have a relatively high frequency of alcohol-related hospitalizations or attendances over a limited period [3]. Therefore, it is necessary to comprehend the service users and clinical characteristics of the HNHC ARFAs patient group and investigate the potential mechanisms underlying the service use pattern so that policymakers can reduce the price of alcohol.

Psychiatric disorders are frequently co-occurring with AD; 30% of patients with alcohol use disorders were also diagnosed with one or more psychiatric disorders [4]. According to the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), there is a significant positive correlation between AD and anxiety disorders, personality disorders, and personality disorders [5]. The National Comorbidity Survey [6] and the

Epidemiological Catchment Area Survey [7] yielded comparable results. There are three main explanations for the comorbidity of alcohol dependence and psychiatric disorders: the causal explanation, the common etiological explanation, and the feed-forward vicious cycle model. Psychiatric disorders can promote heavy drinking to reduce psychiatric symptoms [8], on the other hand, alcohol use disorders (AUD) can promote psychiatric disorders due to unsafe consumption [9]. According to the common etiological explanation, psychiatric disorders and AD may be promoted by a common third factor, such as a vital inherited familial component or past trauma [10]. According to the feed-forward vicious cycle paradigm, psychiatric disorders or AD can cause other disorders. The interaction between the two disorders is one of the causes of the persistence of hazardous alcohol use and recidivism among those with comorbidity [11].

A study examining the relationship between comorbidity and QoL revealed that mood or personality disorders were substantially negatively correlated with overall QoL [12]. According to another study, somatic comorbidity negatively predicted the QoL's mental component, whereas psychiatric comorbidity significantly predicted the mental component of the QoL [13]. A South African AD study revealed that the QoL of patients with comorbidities was substantially lower than that of patients without comorbidities and decreased as comorbidities increased [14]. Nonetheless, this study

* Email: mamingjun1120@163.com

suggested that patients with anxiety disorder alone had a lower QoL than those without comorbidity or with two or more comorbidities [14]. Therefore, the impact of various psychiatric disorders on QoL may vary.

The pattern of service use is also popular among researchers. Previous research has shown people with psychiatric disorders comorbid with AUD were more likely to use mental health and drug abuse services [15]. Wu et al. (1999) suggested the amount of AD symptoms can predict the likelihood of service utilization. However, this study showed that people with psychiatric diseases were more likely to use services than patients with AD, and there was no difference in service utilization between people with only psychiatric disorders and those with comorbid disorders. Burns and Teesson (2002) suggested people with psychiatric disorders were 8.4 times more likely to visit a health professional than those with AD. However, people with psychiatric disorders co-occurring with AD were 8.2 times more likely to visit a health professional than people with AD [16]. Therefore, whether people with comorbidities are more likely to utilize services because of psychiatric disorders or a dual diagnosis is worth considering. In addition, alcohol consumption seems to play an important role in this relationship; for example, Burns, Teesson, and O'Neill (2005) suggested there was a significant difference in average drinks per drinking day (DperDD) between patients with comorbidity and without comorbidity, patients with comorbidity drank more heavily than patients without comorbidity [17]. Furthermore, DperDD positively predicted treatment use such as ED, outpatient, alcoholics anonymous, and other related services [18]. However, few previous studies explored the effect of alcohol consumption on the relationship between comorbidity severity and service use. This study explores the impact of alcohol consumption on the relationship between comorbidity severity and service use. Researchers of this study suppose alcohol consumption moderates this relationship; the effect of alcohol consumption on the use of the services would be higher in patients with no and mild comorbidity compared to patients with severe comorbidity.

In summary, this study explored the effect of comorbidity severity on QoL, APQ, and services use and understood how alcohol consumption affects the relationship between comorbidity severity and service use.

2. Methods

Design

This is a cross-sectional analysis of baseline data from a randomized controlled trial.

Recruitment

Participants

All participants were recruited by clinicians based on inclusion and exclusion criteria, and all baseline research assessments were conducted by researchers during an interview.

Assessment

Socio-demographic information: age, gender, ethnicity, relationship status, housing status, education, child.

The severity of comorbidity. The information about comorbidity was collected by retrospective case note review of electronic clinical records by experienced psychiatrists and classified according to ICD-10 [19]. The severity of comorbidity was divided into None, Mild and Severe. The rationale of the classification is based on the definition of severe mental illness by The National Institute for Health and Care Excellence [20] and the discussion in a clinical meeting with clinicians.

Drinking behavior- TLFB 90I. TLFB was developed by Sobell and Sobell (1996), which is a validated and structured assessment method designed to measure alcohol consumption and other related variables.

Alcohol related problems- Alcohol Problems Questionnaire (APQ). APQ includes 46 items in different problems subscales such as affect, and common [21]. Higher scores indicate more problems, and the reliability and validity of the questionnaire are good [22].

Health related quality of life- Short-form-12 (SF-12). SF-12 is a self-completion questionnaire with 12 items in 2 components: physical and psychological, higher score indicates a higher health-related quality of life [23]. The validity and reliability are good in different populations [23, 24].

Resource use – Adult Service Use Schedule (AD-SUS). AD-SUS is a measurement developed for and used to measure the use of resources, including emergency department (ED) attendance, ED admission, inpatient nights and more, for populations with mental health problems (including substances use problems) [25].

3. Statistical analysis

Data analysis was carried out by using SPSS 27.0 version and the alpha level was set at $p < 0.05$.

4. Results

There were 174 participants recruited into the trial and had valid baseline data. When data analysis was conducted, the information and assessment results of participants without comorbidity information were excluded. Therefore, the final number of participants included in this study was 128.

The average age of the sample was 57.94. The majority of the sample was male (57.8%), white (74.2%), single (82.0%), and tenant (84.4%). Most of the participants received GCSE/A education (32.8%) and have a child (60.9%).

The results of the analyses on baseline alcohol, QoL, APQ and service use are shown in Table 1. The mean percent days of abstinent was 27.04, the mean drinks per drinking day were 25.34, the mean common subscale of APQ was 11.46, the mean physical component subscale of QoL was 39.46, the mean ED attendance was 2.26. Most patients with mild comorbidity.

Table 1. Descriptive statistics of variables

Variable	Mean (SD)	n (%)
Percent days of abstinent	27.04 (28.09)	
Drinks per Drinking Day	25.34 (19.59)	
Alcohol-related problems		
Affect	3.16 (1.64)	
Common	11.46 (5.33)	
Quality of Life		
Physical Component	39.46 (8.47)	
Mental Component	35.17 (12.64)	
Services Use		
ED attendance	2.26 (2.24)	
ED admission	1.72 (1.96)	
Comorbidity Severity		
None		39 (30.5%)
Mild		51 (39.8%)
Severe		38 (29.7%)

To explore the prediction effect of comorbidity severity, a multiple linear regression analysis was conducted. Age and gender were included to control the influence of age and gender on the regression relationship. The results showed that compared with severe comorbidity, no comorbidity significantly predicts the affect ($t = -2.537$, $p = 0.012$) and common ($t = -2.127$, $p = 0.035$) of APQ, the mental component ($t = 2.502$, $p = 0.014$) of QoL, ED attendance ($t = -2.187$, $p = 0.031$), and admission ($t = -2.363$, $p = 0.006$). Mild comorbidity significantly predicts ED attendance ($t = -2.535$, $p = 0.013$) and admission ($t = -2.787$, $p = 0.006$). More details are presented in Table 2.

Table 2. The regression relationship between comorbidity severity and other variables

Outcome variable	Predictor	β	t	p-value	95% CI
Percent days of Abstinent	No Comorbidity	-12.274	-1.909	0.059	[-25.004, 0.456]
	Mild Comorbidity	-4.770	-0.794	0.429	[-16.657, 7.117]
Drinks per Drinking Day	No comorbidity	-3.766	-0.834	0.406	[-12.704, 5.171]
	Mild Comorbidity	-1.609	-0.384	0.702	[-9.913, 6.694]
APQ Affect	No Comorbidity	-0.903	-2.537	0.012**	[-1.608, -0.198]
	Mild Comorbidity	-0.403	-1.212	0.228	[-1.061, 0.255]
APQ Common	No Comorbidity	-2.312	-2.127	0.035*	[-4.463, -0.160]
	Mild Comorbidity	-0.242	-0.239	0.812	[-2.252, 1.767]
Quality of life-Physical component	No Comorbidity	1.483	0.743	0.459	[-2.473, 5.438]
	Mild Comorbidity	1.307	0.703	0.483	[-2.376, 4.990]
Quality of life-Mental component	No Comorbidity	6.924	2.502	0.014*	[1.441, 12.407]
	Mild Comorbidity	0.555	0.215	0.830	[-4.550, 5.660]
Service use ED Attendance	No Comorbidity	-1.092	-2.187	0.031*	[-2.080, -0.103]
	Mild Comorbidity	-1.182	-2.535	0.013*	[-2.104, -0.259]
Service use ED Admission	No Comorbidity	-1.031	-2.363	0.020*	[-1.895, -0.167]
	Mild Comorbidity	-1.136	-2.787	0.006**	[-1.943, -0.329]

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To further explore the effect of DperDD on the relationship between comorbidity severity and ED attendance, the modification effect was tested by using a multiple linear regression test. The results of the multiple

linear regression test showed the modification effect of drinks per drinking day on the relationship between comorbidity severity and ED attendance was significant. For more details see Table 3.

Table 3. The modification effect of drinks per drinking day on the relationship between comorbidity severity and ED attendance

Outcome variable	Predictor	β	t	p-value	95% CI
ED attendance	No comorbidity	-2.939	-3.311	0.001**	[-4.697, -1.181]
	Mild comorbidity	-2.377	-3.003	0.003**	[-3.945, -0.810]
	DperDD	-0.044	-2.240	0.027*	[-0.083, -0.005]
	DperDD x no comorbidity	0.064	2.159	0.033*	[0.005, 0.122]
	DperDD x mild comorbidity	0.043	1.783	0.077	[-0.005, 0.090]

5. Discussion

Comorbidities are prevalent among AD patients, and the severity of comorbidities substantially predicted APQ, QoL, and ED attendance and admission. In the relationship between comorbidity severity and ED attendance, the moderate drinking effect of beverages per drinking day was also significant.

Initially, only 30.5% of HNHC ARFAs lacked psychological comorbidities, compared to 69.5% of HNHC ARFAs with psychological comorbidities. The feed-forward vicious cycle model can explain such a high incidence of comorbidities, as both AD and psychological disorders can cause or exacerbate another disease. On the one hand, patients may develop psychological diseases first, which cause or worsen AD; on the other hand, patients may develop AD first, which causes or worsens psychological illnesses, resulting in such a high rate of comorbidity [11].

In addition, when controlling for age and gender, the results of multiple regression revealed that, compared to patients with severe comorbidity, having no comorbidity significantly predicts the affect and common subscales of APQ, the mental component of QoL, ED attendance and admission, and mild comorbidity predicts ED attendance and admission. In particular, patients with no comorbidity had fewer APQ, higher mental QoL, and fewer ED visits and hospitalizations than patients with severe comorbidity. Patients with moderate comorbidity were less likely to visit the ED and be admitted than those with severe comorbidity. These results are consistent with prior research [12, 14-16].

According to the findings of this study, even though patients with severe comorbidities had a relatively high percentage of abstinent days, it was difficult for them to stop drinking once they began, and they would resume excessive drinking behavior. High-intensity drinking refers to consuming an exceptionally large quantity of alcohol in a brief period of time during the drinking day, which can contribute to a variety of alcohol-related problems, including physical problems, sexual problems, inebriated driving, and the use of other substances [26]. The relatively lower quality of life in patients with extensive comorbidity compared to patients without comorbidity may be partially attributable to their drinking habits, and heavy drinking is more likely to result in ED visits. In addition, the previous study demonstrated that psychiatric comorbidity, particularly anxiety, predicted the persistence of alcohol use disorder, which was defined

as no diagnostic remission over time [27]. Understanding the characteristics of excessive drinking, low quality of life, and frequent ED use in this subgroup of patients is facilitated by the extended persistence of alcohol use disorder.

The modification effect of beverages per drinking day on the relationship between comorbidity severity and ED attendance was found to be statistically significant. Specifically, the effect of beverages per drinking day on ED attendance is greater in the absence and presence of moderate comorbidity than in the presence of severe comorbidity.

One of the characteristics of HNHC ARFAs is a relatively higher frequency of ED visits, which results in a financial burden; consequently, it is necessary to undertake early intervention and prevention for patients at risk of frequent ED visits. The implication of this finding is that when a patient had no comorbidity or mild comorbidity, the alcohol consumption per drinking day had a significant effect on ED attendance, whereas this effect was diminished for patients with severe comorbidities. To reduce the utilization of ED services, it is necessary to select individualized treatment plans for patients with varying degrees of comorbidity severity. For patients with no or moderate comorbidities, altering their alcohol consumption patterns may be more effective than treating their comorbidities in reducing the frequency of ED use. In contrast, for patients with severe comorbidity, treating their comorbidity may be more effective than modifying their drinking habits to reduce the frequency of ED use. Indeed, the researcher of this study must acknowledge that the aforementioned strategies are predominately pecuniary in nature. And for the patients with alcohol dependency and comorbid other psychiatric disorders, whether it is more important to treat their addiction problems or treat their comorbidity, or whether the two are equally important, the contribution of this study to this issue is limited.

This study has some contributions, such as supporting the findings of the majority of previous studies and suggesting that it is essential to screen for and treat psychiatric comorbidities when treating patients with alcohol dependence. In addition, the study provided a new classification of the severity of psychiatric comorbidities based on the definition of severe mental illness and whether the patient is actively contacted or referred to mental health services, and affirmed this classification's feasibility.

However, the researcher of this study has to admit that this study has some limitations, for example, as a cross-sectional study, the sample size of this study was

relatively small (n=128). Moreover, both previous studies and this study have confirmed that age and gender have effects on the selected primary variable, our participants were 57.94 (10.32) old and most were male (57.8%), which may have influenced the results of the study. At last, in this study, it was found that many patients with alcohol dependence had both physical and mental comorbidity. However, this study only explored mental comorbidity and did not explore the impact of physical comorbidity on the research results.

6. Conclusions

a) Psychiatric comorbidities are common in patients with AD.

b) Comorbidity severity significantly predicts APQ, QoL, and ED attendance and admission when controlling the influence of age and gender.

c) There is a significant modification effect on drinks per drinking day on the relationship between comorbidity severity and ED attendance.

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