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Correlates of alcohol use among anxious and depressed primary care patients

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Abstract

Objective: The purpose of this study is to determine the patterns of alcohol use for primary care patients with anxiety disorders and/or major depression in three urban university-affiliated outpatient clinics.

Method: A waiting room sample of adults was screened for anxiety disorders and major depression. Six hundred fourteen screened patients were assessed using the Composite International Diagnostic Interview [World Health Organization. Composite International Diagnostic Interview (CIDI) 2.1. Geneva: World Health Organization, 1997] and frequency–quantity alcohol use questions. Adjusted for age and gender, logistic regression analyses were used to determine associations between panic disorder, social phobia, PTSD, major depression and typical heavy (three drinks/two or more times a week) and frequent (four or more times a week) alcohol use.

Results: Of the patients, 6.19% (38/614) reported typical heavy drinking and 8.31% (51/614) reported frequent drinking in the preceding 3 months. PTSD was associated with heavy drinking (adjusted OR=3.1; 95% CI, 1.3–7.3). Panic disorder was associated with frequent alcohol use (adjusted OR=2.2; 95% CI, 1.2–4.2) but reduced heavy drinking (adjusted OR=0.4; 95% CI, 0.2–0.9). There was no significant relationship between alcohol use and the co-occurrence of two or more anxiety and/or mood disorders.

Conclusion: In an examination of primary care patients diagnosed, the majority of whom were with at least one anxiety disorder and/or major depression; current heavy and frequent alcohol use was associated with specific individual anxiety disorders and/or major depression.

Keywords: Primary care; Alcohol; Anxiety; Depression

1. Introduction

Anxiety and mood disorders are highly common among patients in primary care settings [1,2]. Identifying the alcohol use patterns in the subgroup of primary care patients diagnosed with anxiety and/or mood disorders may be particularly important. Large epidemiological studies of the co-occurrence of alcohol abuse and the dependence with anxiety and mood disorders indicate a strong positive relationship between the two groups of disorders [3–6]. For example, the recent National Epidemiologic Survey (NES) [5] found that a diagnosis of any *DSM-IV* independent anxiety disorder or major depression in the past year was associated with a 13.02% and 16.40% prevalence of AUDs, respectively. These figures were significantly higher than 8.46%, the 12-month prevalence rate of AUDs in the overall NES sample, indicating a strong association between independent mood and anxiety disorders and AUDs.

Rates and patterns of alcohol use also have been shown to differ across the different anxiety and mood disorders. In the NES [5], the 12-month prevalence of *DSM-IV* AUDs among respondents with a 12-month independent mood or anxiety disorder diagnosis was highest for panic disorder

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with agoraphobia (18.81%), followed by major depression (16.40%), panic disorder without agoraphobia (15.29%) and social phobia (13.05%). PTSD was not assessed in the NES, but other studies [7,8] indicate a significant positive association between PTSD and AUDs. In addition, the National Comorbidity Study (NCS) [3], the NCS replication study [4] and the WHO Collaborative Study [1] found that the risk for AUDs was greater for individuals with two co-occurring mood and anxiety disorders, internalizing disorders or psychiatric conditions, respectively, than for individuals with one condition.

Given their high rate of co-occurrence, several studies have examined the prevalence and co-occurrence of AUDs and mood and/or anxiety disorders in primary care samples. An investigation by Olfson et al. [2] in an urban primary care sample found that of the 7.9% of patients diagnosed with a substance use disorder, most frequently AUDs, 36% met the criteria for co-occurring major depressive disorder (MDD), panic disorder or generalized anxiety disorder (GAD). Similarly, the WHO Collaborative Study [1] found that 43% of individuals with alcohol dependence met the criteria for at least one other psychiatric disorder.

In none of these primary care studies, however, was the strength of association between AUDs and specific anxiety and/or mood disorders calculated. In addition, these studies examined the association among primary care patients between AUDs and anxiety and mood disorders, rather than potentially risky, lower-grade alcohol use patterns and anxiety and mood disorders. Finally, few previous studies examined alcohol use in an anxiety- and depression-enriched primary care sample, as the proportion of primary care patients meeting diagnostic criteria for a current anxiety disorder(s) or major depression was commonly less than one fifth (e.g., Ref. [2]).

The current study examined the alcohol use patterns in a primary care sample in which the majority of patients were diagnosed with one or more anxiety disorder and/or major depression. As part of the Collaborative Care for Anxiety in Primary Care Study [9], outpatients screened for anxiety and/or major depression symptoms via a five-question screener [10] at an index visit to their primary care provider were diagnostically assessed for *DSM-IV* anxiety disorders and major depression using the Composite International Diagnostic Interview (CIDI) [11]. The current report focuses on diagnoses of panic disorder, social phobia, posttraumatic stress disorder and major depression. On the basis of the strong association between AUDs and anxiety and mood disorders found in both general and primary care populations, we hypothesized that the presence of anxiety and mood disorders would be associated with typical heavy alcohol consumption. We also surmised that patterns of alcohol use would differ by specific anxiety or mood disorder diagnosis, and that multiple co-occurring anxiety and/or mood disorders would be associated with higher alcohol use.

2. Methods

2.1. Participants and procedure

Data are from the Collaborative Care for Anxiety in Primary Care Study [9], a randomized, controlled trial of pharmacotherapy and cognitive behavioral therapy for patients with panic disorder in primary care. Data analyzed herein are from the baseline CIDI telephone interviews [11] with potentially eligible participants. Patients from waiting rooms in university-affiliated outpatient clinics in one of three universities (University of Washington, University of California Los Angeles or University of California San Diego) were deemed eligible for the CIDI interview if they met the following criteria: (1) were between 18 and 70 years old, (2) were English speaking, (3) had access to a telephone, (4) agreed to fill out a brief screen questionnaire, (5) were "willing to accept" medication and/or psychological treatment if appropriate, (6) were not currently pregnant and (7) were not currently being treated by a psychiatrist. The Seattle and Los Angeles clinics were internal medicine clinics, whereas the San Diego clinic also included family medicine clinics. Insurance was a combination of private (50–80%) and public. In addition to recruitment from waiting rooms, referrals from clinic physicians were actively solicited.

Recruitment took place from March 2000 through March 2002. Of the 1586 individuals who responded positively to at least one anxiety and/or mood disorder symptom item on the screener questionnaire [10], 913 were eligible and agreed to be interviewed and 569 completed the CIDI telephone interview [11]. Of the 1109 individuals responding negatively to these screening questionnaire items, 406 were eligible and agreed to be interviewed and 232 completed the CIDI telephone interview. Thus, overall participation rate in the CIDI was 60.7% (801/1319 eligible). For purposes of the current analysis, 187 individuals were further excluded because they were eliminated from the study before responding to the alcohol questions due to positive responses to further screens for psychosis, unstable bipolar illness or terminal illness. Eligibility criteria "5" above was used for the 416 participants who were recruited for the original panic treatment study [9], and for the remaining participants which included patients from a substudy and negatively screened patients this criteria was not used. Interviews were conducted over the telephone by trained interviewers with bachelor's degrees in psychology, and participants were paid $20 for participation in the interview. The institutional review board at each site reviewed and approved the research protocol, and all patients completing the CIDI provided informed, written consent.

2.2. Measures

In the Collaborate Care study [9], the computerized version of the 12-month CIDI-Auto, version 2.1 [11], modified to enhance distinguishing between panic disorder and social phobia [12], was used for diagnosing anxiety and

mood disorders. All scoring was automated and included *DSM-IV*-based diagnostic modules for panic disorder, social phobia, PTSD and MDD.

Alcohol use was measured with a 2-item quantity/frequency instrument based on the first two questions of the 10-item Alcohol Use Disorders Instrument Test [13]. The first question was, "Thinking about the past 3 months, how often do you have a drink containing alcohol?" The second question was, "How many drinks containing alcohol do you have on a typical day when you are drinking?" The individual questions in this measure have been shown by Soderstrom et al. [14] in mostly male patients from an urban trauma setting to yield a sensitivity of 0.80 and specificity of 0.82 when used at a low threshold screening level (drinks two or more times/week, three or more drinks per drinking day) to detect AUDs, whereas the combined questions display slightly lower sensitivity but slightly higher (0.86) specificity. A further study by Buchsbaum et al. [15] in an urban ambulatory clinic population indicated that drinking six or more drinks a week, while appearing "safe," may indicate the presence of an AUD and should be further assessed. The cutoff for typical heavy drinking used in the current analysis parallels the low threshold screening level used by Soderstrom et al. [14] and Buchsbaum et al. [15], with heavy drinking defined as drinking two or more times per week and three or more drinks per drinking day, and frequent drinking defined more conservatively as drinking four or more times per week.

2.3. Data analysis

The data were analyzed according to a two-step strategy. The first step involved fitting two sets of logistic regression equations in SPSS Version 11.5 to investigate the relationship of any mood or anxiety disorder diagnosis, and of multiple co-occurring mood and/or anxiety disorders and alcohol use. Age and gender were included as predictors due to their theoretical relevance.

In the second analysis step, a logistic equation model was built to determine which individual mood and anxiety disorder diagnoses were particularly associated with heavy or frequent drinking. Age and gender were also included.

Logistic regression equations were constructed such that theoretically relevant predictors were kept in the model regardless of their statistical significance. This provided a more scientifically sound basis for testing hypotheses predicted by past research. The significance of interaction terms was tested by examining the significance of the interaction coefficient and with a likelihood ratio test comparison of the model with and without the given interaction term. Interactions between age and gender, and each individual diagnosis and age and gender, were tested on the basis of research indicating gender and age differences in alcohol use and varying rates of AUDs by individual mood and anxiety disorder diagnoses [3–5]. We therefore hypothesized that given the known effects of age, gender and specific diagnostic status on alcohol use, these variables may interact with one another in ways that affect alcohol use, a possibility for which some data exist, particularly for depression [16].

Power was calculated for each major predictor in the models. With a 2.0 odds ratio chosen as the level of meaningful difference, the power was 55% to 65% depending on the specific predictor. Given that the ideal level of power is in the 80%+ range, null results in the current analyses should be interpreted with caution (particularly for interaction terms), whereas significant results likely reflect relatively large effect sizes.

Within the equations, the portion of the sample not diagnosed with any mood or anxiety disorder was represented by the constant of the logistic equation models, which represents the odds ratio when all of the predictors are equal to 0. Thus, the value of the intercept (when all predictors equal 0) statistically accounted for the healthy controls included in the sample. Age was mean centered and females were the reference group.

3. Results

3.1. Sociodemographic characteristics

The majority of the sample (61.7%) was female. The mean age was 41.3 (12.7) years and 23.0% of the sample had 12 years of education or less (high school equivalent or less). Of the sample, 64.5% was Caucasian, 13.4% Hispanic, 13.8% African American and 8.3% of other ethnic or racial origin.

Table 1
Logistic regression predicting heavy and frequent drinking ($n=614$ total)

	Heavy drinking ($n=38$), adjusted OR (95% CI)	Coefficient P values ($df=1$)	Frequent drinking ($n=51$), adjusted OR (95% CI)	Coefficient P values ($df=1$)
Age[a]	0.95 (0.92–0.98)	.00[b]	1.01 (0.98–1.03)	.66
Gender[c]	3.26 (1.60–6.63)	.00[b]	1.51 (0.84–2.70)	.17
Panic disorder	0.40 (0.18–0.90)	.03[b]	2.21 (1.17–4.15)	.01[b]
Major depression	1.80 (0.79–4.10)	.16	0.83 (0.42–1.63)	.58
PTSD	3.09 (1.32–7.25)	.01[b]	1.06 (0.48–2.35)	.89
Social phobia	0.28 (0.10–0.75)	.01[b]	0.59 (0.28–1.27)	.18

[a] Mean centered.
[b] Statistically significant at .05 level or below.
[c] Females as reference group.

Of the 614 patients for whom both diagnostic interview and alcohol use data were available, 65.0% (399/614) were diagnosed with at least one anxiety or mood disorder (of MDD, social phobia, PTSD and panic disorder), including 67.8% (257/379) of females and 60.4% (142/235) of males, and 41.5% (255/614) were diagnosed with two or more mood and/or anxiety disorders including 42.2% (160/379) of females and 40.4% (95/235) of males. Of the patients, 45.1% (277/614) were diagnosed with panic disorder including 46.7% of females (177/379) and 42.6% of males (100/235), 28.2% (173/614) with social phobia including 29.0% (110/379) of females and 26.8% (63/235) of males, 41.2% (253/614) with MDD including 43.3% (164/379) of females and 37.9% (89/235) of males, and 21.0% (129/614) with PTSD including 19.8% (75/379) of females and 23.0% (54/235) of males.

Six hundred forteen patients completed the alcohol use questions, revealing that 6.19% (38/614) of the sample was heavy drinkers (defined as drinking two or more times/week and three or more drinks per drinking day) including 3.7% (14/379) of females and 10.2% (24/235) of males, and 8.31% (51/614) were frequent drinkers (drink four or more times per week) including 7.1% (27/379) of females and 10.2% (24/235) of males.

3.2. Analyses for any diagnosis

The first logistic regression equation predicted typical heavy drinking from age, gender and a dichotomous variable representing whether participants were diagnosed with any mood and/or anxiety disorder[1]. Only gender, with female as the reference group ($df=1$, $P=.001$, adjusted OR=3.29; 95% CI, 1.64–6.58), and age ($df=1$, $P=.001$, adjusted OR=0.95; 95% CI, 0.92–0.98) were significant. There were no significant interactions in the model between pairings of the predictor terms.

A second logistic regression equation evaluated whether frequent drinking was predicted from age, gender and the dichotomous variable representing the presence of one or more mood or anxiety disorder diagnoses. No predictors or interactions between predictors were significant.

3.3. Analyses for multiple co-occurring diagnoses

For the portion of the sample diagnosed with one or more mood and/or anxiety disorder(s), logistic regression equations modeled the association between typical heavy and frequent drinking, and age, gender and a dichotomous variable representing whether participants were diagnosed with multiple (two or more) co-occurring mood and/or anxiety disorders vs. only one disorder. For heavy drinking, only age and gender were significant predictors, whereas for frequent drinking, no predictors were significant. There were no significant interactions between any predictors.

Table 2
Bivariate odds ratios for heavy and frequent drinking (total $n=614$)

	Heavy drinking ($n=38$), bivariate OR (95% CI)	Frequent drinking ($n=51$), bivariate OR (95% CI)
Age[a]	0.96 (0.93–0.98)	1.01 (0.98–1.03)
Gender[b]	2.97 (1.50–5.86)	1.48 (0.83–2.64)
Panic disorder	0.62 (0.31–1.23)	1.83 (1.02–3.27)
Major depression	1.31 (0.68–2.52)	0.91 (0.51–1.64)
PTSD	2.06 (1.02–4.15)	1.04 (0.52–2.08)
Social phobia	0.46 (0.19–1.12)	0.68 (.34–1.36)

[a] Mean centered.
[b] Females as reference group.

3.4. Analyses for individual diagnoses: heavy drinking

For the final set of logistic regression equations, predictors of typical heavy and frequent drinking included each individual diagnosis, age and gender. Significant positive predictors of heavy drinking included being male, younger and having a diagnosis of PTSD (see Table 1). Significant negative predictors of heavy drinking included a diagnosis of social phobia and panic disorder. A diagnosis of major depression was a nonsignificant predictor of heavy alcohol use, though the coefficient was in the positive direction. No interaction terms were significant. Bivariate odds ratios are shown in Table 2.

3.5. Analyses for individual diagnoses: frequent drinking

For predicting frequent drinking from each individual diagnosis, age and gender, a diagnosis of panic disorder was a significant predictor in the full model (see Table 1). No interactions were significant, and bivariate odds ratios are displayed in Table 2.

4. Discussion

The primary objective of our analysis was to determine the association between diagnoses of anxiety and/or major depression and alcohol use in a primary care sample, adjusting for age and gender. Our results indicate that having multiple co-occurring disorders was not linked with typical heavy or frequent alcohol use. In addition, being diagnosed with merely any mood or anxiety disorder diagnosis was not associated with typical heavy or frequent alcohol use. Rather, the connection with typical heavy and frequent alcohol use differed significantly depending on the specific mood or anxiety disorder diagnosis. PTSD was significantly associated with typical heavy alcohol use, reflecting previous findings in the literature [7,8]. A diagnosis of major depression displayed a nonsignificant but positive association with typical heavy drinking, a trend that is consistent with previous findings of a positive

[1] SES (total household income) was not included in the analyses that follow because SES data were missing for 13.7% of the frequent drinkers and 34.2% of the heavy drinkers due to interview protocol that skipped the remainder of the interview, including SES questions, if participants endorsed signs of AUDs. However, if total household income was utilized as a categorical variable (to prevent extreme high values from skewing the distribution), and the median SES value was substituted for the missing SES data, the results were similar to those reported without SES.

association between major depression and alcohol use disorders in primary care samples [1,17].

The finding that panic disorder was negatively associated with typical heavy drinking is not consistent with the previous findings showing strong associations between this diagnosis and AUDs [3,5]. However, the finding that panic disorder was associated with frequent drinking may elucidate one potential basis of this inconsistency. Panic disorder was associated with frequent but less heavy alcohol consumption, signifying that panic-disordered patients drank significantly more frequently than patients without panic disorder, but consumed relatively small quantities of alcohol when they drank. Panic disorder is characterized by a fear of interoceptive cues and of experiencing internal bodily sensations associated with panic [18]. Thus, individuals with panic disorder may be more reluctant to drink high quantities of alcohol for fear of the accompanying changes in internal bodily sensations and functioning, and may use alcohol to "take the edge off" and relax but not to become inebriated.

By contrast, the finding that PTSD was associated with heavy but not more frequent drinking suggests that in this sample, PTSD patients tended to consume larger quantities of alcohol but not necessarily on a more frequent basis. This result is consistent with the notion that individuals with PTSD may use alcohol for inebriation or numbing purposes. The small but significant inverse relationship between social phobia and heavy alcohol use is not consistent with the previous findings [3,5]. Future studies will want to reexamine this relationship.

That typical heavy alcohol use was negatively associated with age is consistent with previous studies [18] and may perhaps be accounted for by age-related physical changes including increased brain susceptibility to alcohol and decreased rates of liver metabolism of alcohol. In addition, the finding that being male was associated with heavier drinking is consistent with the general finding that men have significantly higher rates of AUDs [3,6,19]. However, we did not make a lower heavy or frequent drinking cutoff for women than men, as has been done by some investigators in recent studies. The breakdown for the quantity alcohol question used in the current study offered the choice of "1 or 2" drinks or "3 or 4" per drinking day, and the cutoff for heavy drinking was "3 or 4" drinks per drinking day (two or more times per week). It did not seem accurate to lower the criteria for women to "1 or 2" drinks two or more times per week, because this does not constitute heavy drinking.

The current study's heavy drinking threshold differs from the current NIAAA consumption thresholds of 7+ drinks per week/>4 daily for women and 14+ per week/>5 daily for men [20]. The limited data available in the current study prevented strict adherence to the NIAAA guidelines. In addition, this study utilized the first two questions from the AUDIT rather than the third question, another limitation given the importance of episodic heavy drinking for efficient screening and assessing risk of AUDs in primary care [20,21]. Thus, the current study investigates lower-risk drinking behaviors that are infrequently reported in larger epidemiological studies focusing on AUDs, but that may have important implications for clinical screening and follow-up [14,15]. It should be noted that frequent drinking as defined in the current study (four or more times a week) is not per se a health risk factor for most primary care patients (i.e., not pregnant, no liver disease). Drinking frequency was examined to gain a more detailed understanding of alcohol consumption patterns associated with individual anxiety and mood disorders.

The overall percentages of typical heavy (6.19%) and frequent (8.31%) drinking in the current sample are below rates of risk drinking (14.6%) reported using a higher cutoff threshold ($\geq$5 AUDIT-C) in a recent large-scale U.S. population study [21]. However, these rates do not differ dramatically from a large study of HMO patients [22] in which 1.9% of patients typically consumed three or more drinks daily and 7.5% consumed one to three drinks a day. Nevertheless, given the high rates of co-occurrence between anxiety disorders and major depression, and AUDs [3,5,6], it would be expected that the current sample, oversampled for anxious and depressed patients, would have higher rates of typical heavy alcohol use. The relatively low rates may be due to the predominance of females in the sample or the characteristic of anxious and depressed patients within primary care settings who were willing to enter a treatment study and/or be interviewed.

One significant consequence of the relatively low numbers of typical heavy and frequent drinkers is that statistical power was limited. Therefore, null results should be interpreted with caution and may not be generalizable to the larger primary care population, as a larger sample would most likely detect additional significant predictors. Conversely, significant results likely reflect relatively large effect sizes. Future studies are needed to reinvestigate the associations with alcohol use in a larger primary care sample and with a broader variety of disorders (e.g., bipolar, specific phobia, GAD). The generalizability of this sample also may be limited by the fact that many participants expressed interest in treatment for anxiety. Investigations in samples that have not been required to participate in treatment will be important for future studies.

Finally, the sample was drawn from urban, university-based clinics and many patients were well-educated. However, patients were highly ethnically and racially diverse, and the education rate may be due to the study being conducted in English. Future studies would benefit from having multilingual staff and instruments available.

5. Conclusion

The overall results of the current study suggest that the strongest association with typical heavy or frequent alcohol use for predominantly treatment-willing primary care patients was not whether a patient had any mood or anxiety

disorder symptomatology, but rather, the nature of the specific diagnosis.

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