Alcohol Use, Anxiety, and Insomnia in Older Adults with Generalized Anxiety Disorder

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Objectives: *To examine alcohol consumption among older primary care patients with generalized anxiety disorder (GAD); its relationship to demographic variables, insomnia, worry, and anxiety; and its moderating role on the anxiety-insomnia relationship. We expected alcohol use to be similar to previous reports, correlate with higher anxiety and insomnia, and worsen the anxiety-insomnia relationship.* **Design:** *Baseline data from a randomized controlled trial.* **Setting:** *Michael E. DeBakey VA Medical Center and Baylor College of Medicine.* **Participants:** *223 patients, 60 years and older, with GAD.* **Measurements:** *Frequency of alcohol use, insomnia (Insomnia Severity Index), worry (Penn State Worry Questionnaire - Abbreviated, Generalized Anxiety Disorder Severity Scale), and anxiety (State-Trait Anxiety Inventory - Trait subscale, Structured Interview Guide for the Hamilton Anxiety Rating Scale [SIGH-A]).* **Results:** *Most patients endorsed alcohol use, but frequency was low. Presence and frequency were greater than in previous reports of primary care samples. Alcohol use was associated with higher education, female gender, less severe insomnia, and lower worry (Generalized Anxiety Disorder Severity Scale) and anxiety (State-Trait Anxiety Inventory-Trait subscale; SIGH-A). Whites reported more drinks/week than African-Americans. More drinks/week were associated with higher education and lower anxiety (SIGH-A). Weaker relationships between worry/anxiety and insomnia occurred for those drinking. Drink frequency moderated the positive association between the Penn State Worry Questionnaire-Abbreviated and insomnia, which was lower with higher frequency of drinking.* **Conclusions:** *Older adults with GAD use alcohol at an increased rate, but mild to moderate drinkers do not experience sleep difficulties. A modest amount of alcohol may minimize the association between anxiety/worry and insomnia among this group.* (Am J Geriatr Psychiatry 2013; ■:■−■)

Key Words: Alcohol use, generalized anxiety disorder, insomnia

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Anxiety and insomnia are common in geriatric patients,[1] and these conditions share substantial overlap.[2–4] Generalized anxiety disorder (GAD) is one of the most common anxiety disorders in older adults, with community prevalence ranging from 1.2%–7.3%[5,6] and even higher rates in primary care.[7,8] A significant number of older people with GAD (52%) have insomnia.[2]

Among adult patients whose insomnia is chronic and untreated, alcohol is frequently used as a sedative.[1,9] Alcohol use among patients with anxiety may exacerbate this condition and associated sleep problems by leading to fragmented, nonrestorative sleep. Among older adults in primary care settings, 70.0% do not consume alcohol, 21.5% drink moderately (1–7 drinks per week), 4.1% are at-risk drinkers (8–14 drinks per week) and 4.5% are heavy drinkers or binge drinkers (14 drinks per week).[10] Although one study has examined the relationship between alcohol use and insomnia among older adults,[11] it had limitations and did not assess the impact of alcohol on those with anxiety (i.e., those at greater risk of experiencing insomnia).[1]

Although acute alcohol use may promote sleep, tolerance to alcohol's sleep-enhancing effects develops within 3–9 nights of daily use, and chronic alcohol use leads to disruption of the normal sleep pattern.[12] There are overlapping changes in the sleep of the elderly,[13] patients with anxiety,[14] and patients with alcohol use. The combination of alcohol and anxiety may have an additive negative influence on sleep. Although slow-wave sleep is considered to be the most restorative aspect of sleep,[15,16] aging, chronic alcohol use, and anxiety can have a negative impact on slow-wave sleep.

The current study examined the presence and frequency of alcohol consumption among older primary care patients with GAD and the relationship of these factors to demographic variables (age, gender, race, ethnicity, and education), insomnia symptoms, worry, and anxiety. We expected alcohol use distribution in our sample to be similar to that of previous reports with older adults in primary care,[10] and we expected alcohol use to be associated with higher levels of anxiety and insomnia, given the previous literature demonstrating similar findings.[10,12] A third aim of the study was to examine the moderating role of alcohol use on the relationship between anxiety and insomnia. We expected that alcohol use would worsen the relationship between anxiety and insomnia, given that alcohol leads to more nocturnal awakenings,[17,18] which present increased opportunities for worry that likely delay return to sleep.

METHODS

Participants

The study sample was drawn from a randomized controlled trial of cognitive behavioral therapy among older primary care patients with GAD and used only baseline data from an ongoing clinical trial. From October 2008 to April 2012, a total of 223 patients, aged 60 years and older, with *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV),[19] GAD diagnoses were recruited from internal medicine, family practice, and geriatric clinics at two diverse healthcare settings: the Michael E. DeBakey VA Medical Center and Baylor College of Medicine. Potential patients were identified in collaboration with primary care providers (PCPs) through the electronic medical record and by self-referral. We targeted patients with a documented electronic medical record diagnosis of GAD or anxiety not otherwise specified for recruitment, as well as patients with anxiety symptoms noted on the problem list or those having a prescription for antianxiety or antidepressant medication. With PCP approval, identified patients received a letter of invitation from the PCP and the senior author (M.A.S.) to participate in the study. A telephone call followed the letters to invite patients to participate in the study unless patients called to decline participation. We also recruited patients by using educational brochures in waiting and examination rooms.

Patients who expressed interest in participating were asked two anxiety screening questions from the Primary Care Evaluation of Mental Disorders tool,[20] and we scheduled those responding affirmatively to at least one of the two questions for an in-person visit to review the consent form. At the consent appointment, they responded again to the two anxiety screening questions and completed a demographic questionnaire. At either this meeting or a subsequent

appointment, trained study staff members administered the six-item Screener[21] and the full Structured Clinical Interview for DSM-IV Disorders (SCID).[22] We audiotaped all SCID interviews to allow rating of a random 20% by a second clinician to assess interrater agreement. Kappa coefficients indicated adequate agreement for GAD (0.68), depression (major depression or dysthymia; 0.91), and other anxiety disorders (0.75).

Included patients had a principal or co-principal DSM-IV diagnosis of GAD of at least moderate severity (4 on 0–8 scale) according to the SCID. The principal diagnosis was the disorder with the highest severity rating. When two diagnoses met these criteria, we categorized them as co-principal diagnoses. Patients with any coexistent anxiety, affective, and somatization disorder diagnoses were included, as well as those with coexistent medical conditions. We also allowed previous and current psychological or pharmacologic treatments, but psychotropic medication use needed to be stable over the previous month. Medication use was assessed with patient self-report questions about the type and frequency of medications used over the previous 3 months. Patients had to be able to speak English, although English did not have to be their first language. We excluded patients for conditions that threatened their safety or precluded participation (e.g., active suicidal intent, current psychosis or bipolar disorder, substance abuse within the past month, cognitive impairment according to a Mini–Mental State Examination score ≤23, patients with a DSM-IV–defined alcohol use disorder). We also excluded patients who had participated in a previous trial of cognitive behavioral therapy for late-life anxiety. Excluded patients were offered appropriate referrals.

Measures

The study measures addressed alcohol use, insomnia, worry, and anxiety. Measures of worry and anxiety included both self-report and clinician-rated instruments to allow for a multitrait, multi-method approach.

Alcohol use. We assessed alcohol use during the prior month with questions derived from previous studies of alcohol use in older adults.[10] Specifically, we asked patients whether they had consumed any alcohol in the past month and, if so, how many drinks they had consumed in an average week over the past month. In line with previous reports, moderate drinking was defined as ≤7 drinks per week, at-risk drinking was 8–14 drinks per week, and heavy drinking was >14 drinks per week.

Insomnia. We assessed insomnia by using the Insomnia Severity Index (ISI).[23] The ISI is a 7-item, self-report measure of sleep difficulties and interference, based on DSM-IV criteria for insomnia. Items assess severity of problems with sleep onset, sleep maintenance, and early-morning awakening; dissatisfaction with sleep; interference with daily functioning; impact on quality of life; and worry about sleep problems. The measure has good internal consistency, concurrent validity, and sensitivity to change among younger and older adults.[2,24,25] Internal consistency of the ISI in the current sample was 0.90.

Worry. Self-reported worry severity was rated by using the abbreviated Penn State Worry Questionnaire (PSWQ-A), an 8-item inventory derived from the original 16-item Penn State Worry Questionnaire.[26] Among older adults, the PSWQ-A has strong internal consistency, adequate test–retest reliability, unidimensional factor structure, and significant correlation with the full PSWQ;[27,28] it is widely used in clinical trials of late-life GAD.[25,29–31] The PSWQ-A is useful for identifying GAD in older primary care patients[32] and demonstrates change after treatment.[33] Internal consistency of the PSWQ-A in the current sample was 0.89.

Clinician-rated worry severity was assessed with the Generalized Anxiety Disorder Severity Scale (GADSS), which includes six items that assess DSM-IV criteria. Initial psychometric data suggest high internal consistency, good convergent and discriminative validity, and sensitivity to change among younger primary care patients.[34] Data with older adults indicate good internal consistency and interrater agreement, unidimensional factor structure, and adequate convergent validity.[35,36] GADSS scores differ significantly between patients with and without GAD, and distress/interference items reliably predict diagnoses.[36] Internal consistency of the GADSS in the current sample was 0.84.

Anxiety. We evaluated self-reported anxiety severity by using the trait subscale of the State-Trait Anxiety Inventory (STAI-T). The STAI-T is

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a 20-item, self-report measure of general anxiety symptoms[37] that is appropriate for older adults, given its lack of focus on physiologic symptoms. The STAI-T has good internal consistency and adequate convergent validity among older adults, as well as sensitivity to change after treatment.[25,29,38,39] Internal consistency of the STAI-T in the current sample was 0.85.

Clinician-rated anxiety was assessed by using the Structured Interview Guide for the Hamilton Anxiety Rating Scale (SIGH-A), which was developed to increase the reliability of the Hamilton Anxiety Rating Scale,[40] a well-known measure used routinely in psychosocial and pharmacologic clinical trials of late-life GAD.[29,31,41] Shear et al.[42] reported good test−retest and interrater agreement for both the SIGH-A and Hamilton Anxiety Rating Scale but more consistently high interrater agreement for the SIGH-A. The SIGH-A also has adequate interrater agreement among older adults.[43] Internal consistency of the SIGH-A in the current sample was 0.85.

Procedures

After participant inclusion into the study, a master's-level independent evaluator (IE) administered the baseline measures via telephone; IEs were not involved in any other way with the project and had no other contact with study participants. The fifth author (J.A.C.) held regular calibration meetings with the IEs with audiotaping of all interviews so that a second clinician could review at least a random 10% of each IE's interviews to estimate interrater agreement. Intraclass correlation coefficients indicated excellent agreement for both the GADSS (0.98) and the SIGH-A (0.96).

Data Analysis

Descriptive statistics were gathered to describe the presence and weekly frequency of alcohol use, examining associations of these variables with age, gender, race, ethnicity, education, and use of hypnotic/sleep medications (yes/no) by means of independent sample t tests, zero-order correlations, and χ^2 analyses. Correlational analyses examined the relationships between monthly alcohol use (point biserial correlations) and weekly frequency (Pearson zero-order correlations) and insomnia, worry, and

anxiety. Further analyses tested presence (yes/no) and frequency of alcohol use (average number of drinks per week) as separate moderators of the relationships between worry/anxiety and insomnia. We conducted eight main-effects models (Step 1) and eight interaction models (Step 2), each predicting insomnia. For each of the four anxiety/worry measures (PSWQ-A, GADSS, STAI, and SIGH-A), four models were conducted to examine the following: 1) the main effects of the presence of alcohol use and the worry/anxiety measure; 2) the interaction between presence of alcohol use and the worry/anxiety measure; 3) the main effects of weekly frequency of alcohol use and the worry/anxiety measure; and 4) the interaction between weekly frequency of alcohol use and the worry/anxiety measure. We controlled significant associations between demographic characteristics and alcohol use in all models. To examine the direction of any significant two-way interactions between the presence (or weekly frequency) of alcohol use and each of the anxiety or worry measures, we derived equations for the simple slopes of the relationship between the anxiety or worry measure and insomnia.[44] Significant slopes were depicted at 1 standard deviation (SD) above and 1 SD below the mean for each anxiety/worry measure for either: 1) those who drink and those who do not drink (for presence of drinking analyses); or 2) those who are lower weekly drinkers (1 SD below the mean) and those who are greater weekly drinkers (1 SD above the mean) (for weekly frequency of drinking analyses). All analyses were conducted by using SAS version 9.2 (SAS Institute, Inc., Cary, NC).

RESULTS

Descriptive Data

Patient characteristics. A total of 3,115 potential participants were referred by letters, direct referrals by PCPs, and self-referrals. Of the 2,458 (78.9%) patients whom we were able to contact, 1,149 (46.7%) completed the telephone screen; 1,282 (52.2%) were not interested; 9 (0.4%) were too young; 8 (0.3%) were not patients at the participating hospitals; 6 (0.2%) were deceased; 2 (0.08%) were cognitively impaired; and 2 (0.08%) were severely hearing impaired. Of the

1,149 patients who completed the telephone screen, 150 (13.1%) screened negative. Of the 999 (86.9%) who screened positive at the telephone screen, 562 (56.3%) signed consent to participate. Of the 562 consented patients, 3 (0.5%) were too young and 10 (1.8%) screened negative at the in-person visit, leaving 549 (97.7%) eligible for diagnosis, 493 (90.0%) of whom participated in a diagnostic interview.

Of the 493 patients who completed a diagnostic interview, 239 (48.5%) met inclusion criteria, 8 (1.6%) served as nonstudy clinical-training cases, and 246 (49.9%) met exclusion criteria for the following reasons: no GAD (n = 185; 37.5%), GAD not principal or co-principal (n = 20; 4.1%), psychosis or bipolar disorder (n = 8; 1.6%), alcohol or other substance abuse (n = 11; 2.2%), current suicidal intent (n = 7; 1.4%), or cognitive impairment (n = 15; 3.0%). Of the 239 patients who met inclusion criteria, 223 (93.3%) completed the baseline assessment and are therefore included in the current analyses.

The mean (SD) age of the 223 included patients with GAD was 66.9 (6.64) years. There were 119 (53.4%) women and 104 (46.6%) men. Racial distribution was as follows: 176 (78.9%) white, 40 (17.9%) African American, 3 (1.3%) Asian, 1 (0.5%) American Indian/Alaskan Native, and 3 (1.3%) multiracial. Twenty-four (10.8%) patients were Hispanic. Their mean education level was 15.5 (2.92) years.

TABLE 1. Zero-Order Correlations Between Drinking and Anxiety and Worry Measures

	Alcohol Use[a] (0 = no, 1 = yes)	No. of Drinks/Week[b]
Insomnia		
ISI	−0.15[c]	−0.10
Worry		
PSWQ-A	−0.12	−0.11
GADSS	−0.17[c]	−0.11
Anxiety		
STAI-T	−0.19[d]	−0.11
SIGH-A	−0.18[d]	−0.16[c]

Notes: GADSS: Generalized Anxiety Disorder Severity Scale; ISI: Insomnia Severity Index; PSWQ-A: Penn State Worry Questionnaire−Abbreviated; SIGH-A: Structured Interview Guide for the Hamilton Anxiety Rating Scale; STAI-T: trait subscale of the State-Trait Anxiety Inventory.
[a]Point-biserial correlation.
[b]Pearson's zero-order correlations, all *df* = 223.
[c]p <0.05.
[d]p <0.01.

Alcohol Use

Most patients (n = 123 [55.2%]) endorsed alcohol use (yes/no) in the past month, but the overall average weekly frequency for the entire sample was low, with a mean number of 2.97 (5.69) drinks per week. Among those who endorsed alcohol use in the past month, the mean weekly frequency of drinks was 5.38 (6.78). With regard to frequency of use over an average week in the past month, 41.7% of participants (n = 93) drank moderately (i.e., an average of ≤7 drinks per week), 8.5% participants (n = 19) reported at-risk drinking (i.e., an average of 8−14 drinks per week), and 4.9% (n = 11) indicated heavy drinking (i.e., an average of >14 drinks per week). These frequencies differed significantly from those reported in a general study of older adults in primary care (χ^2 [3] = 73.98, p <0.0001).[9] Relative to this previously published report, fewer older adults in the current study reported not drinking (44.8% versus 70.0%) and more reported moderate (41.7% versus 21.5%) and at-risk (8.5% versus 4.1%) weekly drinking.

Average weekly frequency of alcohol use was positively skewed, with five participants who were outliers (i.e., scoring at least 3 SDs above the mean). Results of all analyses after removing the outliers were the same as results of those analyses that included them. Alternately, the variable was transformed by taking its square root to achieve normality. We reran analyses on the entire sample with the transformed variable, and results remained the same as they were before transformation. Based on these findings, we report results only for the nontransformed weekly frequency of alcohol use variable that included all participants.

Patients who reported using alcohol in the past month (yes/no) were more educated (mean: 16.22 [2.68] years) than those who denied use of alcohol during that time period (mean: 14.65 [2.98] years; *t* [220] = −4.13, p <0.0001). Alcohol users also were more likely to be women (n = 73 [59.4%]) than men (n = 50 [40.6%]) (X^2[1] = 3.95, p = 0.047). The majority of both women and men who used alcohol reported moderate drinking (86% of female drinkers [n = 63]; 60% of male drinkers [n = 30]), but more men reported either at-risk or heavy drinking (33% of female drinkers [n = 10]; 40% of male drinkers [n = 20]). Higher levels of education were associated

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TABLE 2. Presence of Drinking and Anxiety Measures Predicting ISI

| | Anxiety/Worry Measures | | | | | | | | | | | |
| | PSWQ-A | | | GADSS | | | STAI-T | | | SIGH-A | | |
	F^a	β^b	p	F^a	β^b	p	F^a	β^b	p	F^a	β^b	p
Step 1: covariates and main effects												
Years of education	0.32	−0.04	0.57	0.08	−0.02	0.78	0.01	0.00	0.94	0.01	0.01	0.91
Gender (0 = male, 1 = female)	0.18	−0.03	0.67	0.14	0.02	0.71	0.00	0.00	0.97	0.08	0.02	0.78
Drink (yes/no)	1.78	−0.09	0.18	1.07	−0.06	0.30	0.86	−0.06	0.35	0.97	−0.06	0.33
Anxiety/worry measure	39.64	0.39	<0.0001	73.72	0.51	<0.0001	66.76	0.49	<0.0001	81.17	0.53	<0.0001
Step 2: interaction												
Drink * anxiety/worry measure	3.98	−0.42	0.047	5.96	−0.41	0.015	7.00	−0.75	0.009	7.85	−0.38	0.006
Full model R^2		0.19			0.29			0.28			0.32	

Notes: ISI: Insomnia Severity Index; PSWQ-A: Penn State Worry Questionnaire-Abbreviated; GADSS: Generalized Anxiety Disorder Severity Scale; SIGH-A: Structured Interview Guide for the Hamilton Anxiety Rating Scale; STAI-T: trait subscale of the State-Trait Anxiety Inventory.
[a]Step 1 covariates and main effects: $df_{numerator} = 1$, $df_{denominator} = 217$; Step 2 interaction: $df_{numerator} = 1$, $df_{denominator} = 216$.
[b]Standardized beta weight.

with a greater number of drinks per week ($r[222] = 0.20$, $p = 0.003$], and white subjects reported more drinks per week (mean: 3.46 [6.19]) than African-American subjects (mean: 1.11 [2.62]) ($t(147.6) = −3.77$, $p = 0.0002$). All other associations with presence and weekly frequency were nonsignificant, including use of sedative-hypnotic medications (yes/no) (all, $p > 0.05$).

Zero-Order Correlations of Alcohol Use and Frequency With Insomnia, Worry, and Anxiety. Table 1 presents zero-order correlations between both alcohol use

(yes/no) and weekly frequency and insomnia, worry, and anxiety. Alcohol use in the past month was associated significantly with less severe insomnia, lower self-reported anxiety, and less clinician-rated worry and anxiety (all, $p < 0.05$). The number of drinks per week was significantly associated with clinician-rated anxiety such that more drinks per week were associated with lower anxiety.

Moderation analyses. Tables 2 and 3 present regression coefficients for moderator analyses. We controlled demographic variables that were

TABLE 3. Weekly Frequency of Drinking and Anxiety Measures Predicting ISI

| | Anxiety/Worry Measures | | | | | | | | | | | |
| | PSWQ-A | | | GADSS | | | STAI-T | | | SIGH-A | | |
	F^a	β^b	p	F^a	β^b	p	F^a	β^b	p	F^a	β^b	p
Step 1: covariates and main effects												
Years of education	1.22	−0.07	0.27	0.21	−0.03	0.64	0.08	−0.02	0.78	0.07	−0.02	0.79
Race (0 = African American, 1 = white)	9.16	−0.19	0.003	2.75	−0.10	0.10	6.04	−0.15	0.01	2.35	−0.09	0.13
No. of drinks/week	0.06	−0.02	0.81	0.20	−0.03	0.66	0.14	−0.02	0.71	0.01	0.00	0.94
Anxiety/worry measure	42.19	0.40	<0.0001	69.47	0.50	<0.0001	64.33	0.48	<0.0001	77.00	0.52	<0.0001
Step 2: Interaction												
Drinks/week * anxiety/worry	4.26	−0.40	0.04	2.90	−0.27	0.09	2.71	−0.43	0.10	1.67	−0.15	0.20
Full model R^2		0.22			0.29			0.28			0.31	

Notes: ISI = Insomnia Severity Index; PSWQ-A = Penn State Worry Questionnaire-Abbreviated; GADSS = Generalized Anxiety Disorder Severity Scale; SIGH-A = Structured Interview Guide for the Hamilton Anxiety Rating Scale; STAI-T = Trait subscale of the State-Trait Anxiety Inventory.
[a]Step 1 covariates and main effects: $df_{numerator} = 1$, $df_{denominator} = 210$; Step 2 interaction: $df_{numerator} = 1$, $df_{denominator} = 209$.
[b]Standardized beta weights.

significantly related to presence of drinking (i.e., education, gender) in all presence (yes/no) analyses, and we controlled demographic variables significantly related to frequency of drinks per week (i.e., education, race) in all drinking frequency analyses. For all eight main effects models, higher levels of anxiety and worry (whether self-reported or clinician-rated) were related to higher levels of insomnia symptoms. However, neither presence nor weekly frequency of alcohol use was related to insomnia symptoms. Importantly, moderation analyses revealed significant interactions between the presence of drinking and all anxiety or worry measures predicting insomnia (all, $p < 0.05$). Simple slope analyses revealed that the relationships between the PSWQ-A, GADSS, STAI-T, and SIGH-A and insomnia were lower for those who reported drinking (beta coefficients between 0.29 and 0.40), relative to those who reported not drinking (beta coefficients between 0.49 and 0.63). Figure 1 illustrates the pattern for all four worry/anxiety variables. However, the frequency of drinks per week significantly moderated only the association between PSWQ-A and insomnia (Figure 2), such that the positive association between self-reported worry and insomnia was lessened the more weekly drinks reported.

FIGURE 1. Interaction between presence of drinking and Penn State Worry Questionnaire–Abbreviated (PSWQ-A) predicting Insomnia Severity Index (ISI).
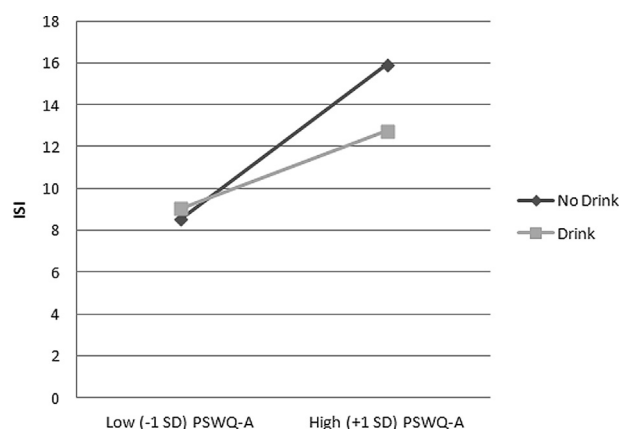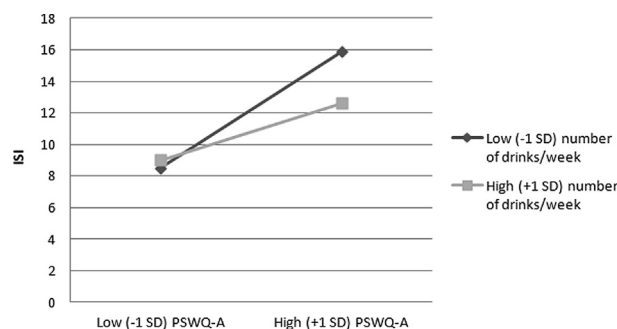

FIGURE 2. Interaction between weekly frequency of drinking and Penn State Worry Questionnaire–Abbreviated (PSWQ-A) predicting Insomnia Severity Index (ISI).

CONCLUSIONS

The majority of older primary care patients with GAD in the current study reported some alcohol use (55%), and frequency was higher overall than in a previous report of geriatric patients in primary care.[10] This finding is particularly notable given that patients with alcohol abuse were excluded from the current study. Although most alcohol use among the older GAD sample was moderate, subjects labeled as at-risk and heavy drinkers were also more common than in the sample of Kirchner et al. Because alcohol consumption decreases with age,[45] differences in patterns of alcohol use between these two samples may reflect age differences (mean age: 67 years versus 72 years). However, differences may also reflect the prominent role of anxiety/worry for patients in the current study. Moderate alcohol use in the late-life GAD sample may serve a self-medicating function, a notion that is supported by our data suggesting that self-reported alcohol use was associated with lower levels of anxiety, worry, and insomnia. Alcohol use also seemed to have a "protective" effect on the relationship between anxiety/worry and insomnia, such that patients who reported some alcohol use showed a weaker relation between anxiety and sleep disturbance. In a similar vein, Kirchner et al.[10] found that nondrinkers reported more depressive/anxiety symptoms than moderate drinkers, and Jaussent et al.[11] also found some alcohol use to be protective against insomnia in

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a subgroup of elderly individuals. Our data, however, need to be considered in light of our exclusion of patients with alcohol abuse. Hypotheses about differential effects of alcohol use for heavy drinkers and bingers could not be tested adequately because of the small number of heavy drinkers. As such, the current study findings are unlikely to be generalizable to populations of older adults with higher average amounts of alcohol use. Number of drinks per week also was associated only with clinician-rated anxiety and did not consistently moderate relationships between anxiety/worry and insomnia.

Female gender and higher education level among older patients with GAD were associated with a higher incidence of alcohol use in the previous month. White subjects and more educated patients reported consuming more drinks per week than African-American subjects or patients with lower education levels. Previous data have suggested similar racial and ethnic differences, with white subjects reporting more moderate or at-risk drinking than African-American, Hispanic/Latino American, and other ethnic minority, older patients.[10] However, in previous reports, older men typically report more alcohol use than older women.[10,45,46] Gender differences across reports may be explained in part by differential gender distributions in study samples (e.g., the sample of Kirchner et al.[10] was 81% men). However, the increased use of alcohol among women in the current study may reflect the reinforcing properties of moderate drinking for sleep difficulties and anxiety that are generally more common in

women.[11] Other factors that warrant further attention in future research include differential roles of chronic illness and social interactions that affect alcohol use. Future research also might include objective measures of sleep, including actigraphy or polysomnography, to examine whether findings reflect perceptions or actual patterns of sleep.

Older adults with GAD seem to use alcohol at an increased rate, but mild to moderate drinkers do not seem to experience negative effects of alcohol with regard to sleep difficulties. In fact, the use of a modest amount of alcohol may be beneficial for minimizing the association between anxiety/worry and insomnia among older adults with GAD. Nevertheless, these findings may be limited, given the exclusion of patients with alcohol use disorders and the overall low frequency of alcohol use in the study sample.

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