Resilience as a moderating factor between stress and alcohol-related consequences in the Army National Guard

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HIGHLIGHTS

• Higher stressors and lower resilience were associated with more alcohol-related consequences.
• Resilience moderated the relationship between stress and alcohol-related consequences.
• This study contextualizes the stress-alcohol relationship in terms of behaviors.
• Resilience acts as a threat-activated protective factor against alcohol-related behaviors.

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ABSTRACT

Due to the current prolonged conflicts in Iraq and Afghanistan, members of the United States National Guard and Reserve have shifted from a historically support-based role to an integral segment of combat efforts. Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. It is widely understood that excessive alcohol use is an issue among military personnel. The aim of this paper is to describe risk factors for alcohol-related serious consequences in a study of Army National Guard service members, as well as the role of resilience in protecting against these risks. Members of the National Guard (N = 320) participated in the survey. We conducted a multiple regression to predict alcohol-related serious consequences and a simple moderation analysis was performed. After controlling for race, education, and deployment history, several variables emerged as significant predictors of alcohol-related consequences. Higher stressors, lower resilience, younger age, being unmarried and not living as married, being male, and identifying as non-Hispanic were associated with higher levels of serious alcohol-related consequences. Results revealed that resilience significantly moderated the relationship between stress and alcohol-related consequences. This study furthers our understanding of the alcohol-stress relationship by contextualizing it in terms of behaviors related to alcohol, as opposed to measuring consumption only. Most importantly, our work extends prior research in its examination of resilience as a moderator of the relationship between stress and serious alcohol-related consequences.

1. Introduction

Due to the current prolonged conflicts in Iraq and Afghanistan, members of the United States National Guard and Reserve (collectively, the Reserve Component) have shifted from a historically support-based role to an integral segment of combat efforts (Dunn III, 2016). In fact, by the end of 2010, one-third of all service members who had deployed in support of Operation Enduring Freedom, Operation Iraqi Freedom, and/or Operation New Dawn were from the Reserve Component (Committee on the Assessment of the Readjustment Needs of Military Personnel, Veterans, and Their Families, et al., 2013). Although stress is well-documented in military personnel, the stress experienced by National Guard personnel is thought to be greater than their active duty counterparts; indeed, a longitudinal study of mental health following deployment showed that Reserve Component Soldiers were more likely than their active duty counterparts to screen positive for posttraumatic stress disorder (PTSD), depression, and overall mental health risk, and were more likely to be subsequently referred for mental health concerns as well (Milliken, Auchterlonie, & Hoge, 2007). This may be due to several factors, including the added difficulty of balancing civilian and military responsibilities, and increased pressure during reintegration and readjustment to civilian life following deployment. Additionally,

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active duty military members are more likely to remain in consistent contact with their “battle buddies” and other military support systems upon return from deployment, whereas National Guard service members typically return to civilian work duties while living in civilian housing, preventing daily contact with those with whom they served or any other combat veterans. Thus, they may lack the social support or institutional support afforded to their active duty peers.

Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. In one report, a substantial number of veterans from Afghanistan and Iraq met screening criteria for co-occurring mental health problems (Seal et al., 2008). Often, the substance abuse problem is a result of PTSD symptoms, and this temporal understanding can be helpful in identifying onset, assessment, and shaping of treatment programs (Tanielian & Jaycox, 2008).

1.1. Characterizing alcohol-related serious consequences

It is widely understood that excessive alcohol use is an issue among military personnel (Bray et al., 2009, 2010). Indeed, the prevalence rates for illicit drug use among all military more than doubled between 2005 (5%) and 2008 (12%), and alcohol use has been steadily increasing (Bray et al., 2009). Additionally, excessive alcohol use in the military has been linked to serious consequences and loss of productivity, both of which are detrimental to retention and readiness (Bray, Brown, & Williams, 2013; Mattiko, Olmsted, Brown, & Bray, 2011). While much of the research has focused on alcohol dependence, alcohol misuse, or binge drinking, it is necessary to measure alcohol-related behaviors and consequences as well. It is the measurement of these behaviors that best quantify the cost to military readiness.

1.2. Stress and sociodemographic characteristics as risk factors for alcohol misuse

Several sociodemographic characteristics have been identified as risk factors for alcohol misuse in the military, including single marital status (Ferrier-Auerbach et al., 2009; Furgi & Allen, 1996), male gender (Bray et al., 2013; Green, Beckham, Youssef, & Elbogen, 2014; Naimi et al., 2003; Nolen-Hoeksema, 2004), younger age (Bray et al., 2003; 2013; Ferrier-Auerbach et al., 2009; Green et al., 2014; Stahre, Brewer, Fonseca, & Naimi, 2009), lower levels of education (Ames & Cunradi, 2004; Bray et al., 2003), and White race (Bray et al., 2003; Naimi et al., 2003; Nolen-Hoeksema, 2004) or Hispanic ethnicity (Bray et al., 2013).

Although some studies have examined the link between stress and alcohol use in the military (e.g., Bray, Fairbank, & Marxen, 1999), the majority of research has focused on the link between alcohol use and PTSD, or traumatic stress, specifically (Schumm & Chard, 2012). Scientific evidence suggests that there is indeed a link between PTSD and alcohol use or misuse, and particular PTSD symptom clusters that may be the greatest risk factors (Jakupcak et al., 2010; Shipherd, Stafford, & Tanner, 2005). Possible PTSD in active-duty service members has been related to several alcohol use outcomes, including heavy drinking, binge drinking, and harmful alcohol use (Bray et al., 2013). The scant research that has been published in regards to stress and alcohol showed that men in the military experiencing high levels of stress at work were more likely to drink heavily, but there was no relationship found between alcohol use and stress for military women (Bray et al., 1999).

1.3. Resilience

There has been a shift in the fields of psychology and mental health, from a focus on treating pathology after it arises to developing and reinforcing positive skills and resources that contribute to resilience before serious problems develop (Peterson & Seligman, 2004). The term “resilience” is frequently used in the military as a generic or imprecise term to indicate an overarching priority for developing and maintaining a fit force. Resilience refers to the ability to “bounce back” or return to one’s original state, and in psychology can be characterized as “processes or patterns of positive adaptation and development in the context of significant threats to an individual’s life or function” (Masten & Wright, 2010, p. 215). It is important to note that resilience is not a characteristic of a person or a static trait, and that some individuals may be more likely to experience resilient outcomes in some circumstances and not others, or at certain times in one’s life and not others (Masten & Wright, 2010). The construct of psychological resilience is also, however, thought to be a somewhat stable set of positive coping skills that protect against the development of traumatic stress (Charuvastra & Cloitre, 2008; Hoge, Terhakopian, Castro, Messer, & Engel, 2007; King, King, Fairbank, Keane, & Adams, 1998) and depression (Southwick, Vythilingam, & Charney, 2005). Resilience has been shown to protect against the development of PTSD following combat in Vietnam veterans (King et al., 1998; Waysman, Schwarzwald, & Solomon, 2001) and Army Reserve soldiers (Bartone, 1999). There has been a growing interest in research on resilience in identifying compensatory factors that may increase the likelihood of resilient outcomes; these have been referred to as “assets, resources, and promotive factors” as well as of having “protective or moderating effects” and a “buffering or ameliorative influence” (Masten & Wright, 2010, p. 215). The January 2011 issue of American Psychologist was devoted to the topic of resilience in military populations and, as noted, one of the biggest challenges facing the military today may be the development of a more resilient military force (Casey, 2011). This issue also described the military’s current efforts to increase resilience (Lester, McBride, Blesie, & Adler, 2011). Studies have also shown that resilience predicts better health and fewer symptoms in soldiers exposed to a range of stressors (Bartone, 2005). In a study of older Reserve/National Guard OEF/OIF veterans, those with PTSD scored significantly lower on a measure of resilience (Pietrzak & Southwick, 2011).

The existing literature is limited in two important ways. First, extant research has linked stress to alcohol consumption or alcohol misuse in military samples, but not to alcohol-related behaviors or consequences. Secondly, although resilience has been associated with better outcomes, no studies have examined the moderating or buffering effect of resilience on relationships between stress and alcohol. To fill these gaps, the aim of this paper is to describe risk factors for alcohol-related serious consequences in a study of Army National Guard service members, as well as the role of resilience in protecting against these risks.

2. Methods

2.1. Participants

Following study approval by the RTI International Institutional Review Board (IRB) and the U.S. Army Medical Research and Materiel Command Office of Research Protections, participants (N = 320) were invited to the study through an onsite in-person introduction to National Guard service members in military units throughout two southern states. This introduction consisted of a review of the information provided on a study brochure. From December 2014 through August 2016, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups.

2.2. Measures

2.2.1. Demographics

Standard demographic and background data were obtained.
Information included age, gender, race/ethnicity, education, marital status, rank, and state of service. Gender was defined as male (1) or female (0). For the purposes of describing the sample, we followed the current U.S. Bureau of the Census classification and personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians). For the purposes of the regression modeling, we divided race into White (1) and non-White (0), and ethnicity into Hispanic (0) and Non-Hispanic (1). Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates. Age of respondents was defined as current age at the time of the survey. For descriptive statistics, estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older. Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1–W5/O1–O6. Marital status was divided into two groups: Married or Living as Married (1) and Not Married (0) (including personnel who were single, widowed, or divorced). State was defined as the state in which the service member was currently serving.

2.2.2. Alcohol-related serious consequences

The measure of alcohol-related serious consequences refers to the occurrence of the following problems in the past 30 days: (a) driven a car after drinking too much to drive safely; (b) felt sick or thrown up after drinking; (c) been late for duty because of drinking, a hangover, or an illness caused by drinking; (d) gotten into physical fights when drinking; (e) had relationship problems because of drinking; (f) neglected obligations to self, work, or family for 2 or more days in a row because of drinking; (g) gotten into sexual situations later regretted because of drinking; (h) been arrested for drunken driving or other drunken behavior; (i) been unable to remember part of a prior evening after drinking; (j) needed more alcohol to feel any effect or could no longer get drunk on the amount of alcohol that used to get one drunk; and (k) had a headache or hangover the morning after drinking.

Responses were measured on a 4-point scale of zero times (0), one time (1), two times (2), and three or more times (3). Scales were summed to create a total number of alcohol-related consequences experienced in the prior month, with a range of 0–33. The maximum score in the sample was 26.

2.2.3. Number and intensity of stressors

Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none at all (0), a little (1), some (2), a lot (3) and does not apply (−9). Scores range from 0 to 72. In the current sample, internal consistency for this scale was good (Cronbach’s α = 0.85).

2.2.4. Resilience

Resilience was measured with the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). The CD-RISC contains 25 items geared toward measuring an individual’s ability to “bounce back” following stressors, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is rated based on how the subject has felt over the past month. Example items include “I am able to adapt when change occur” and “Having to cope with stress can make me stronger.” The total score ranges from 0 to 100, with higher scores reflecting greater resilience. Internal reliability for CD-RISC scores was excellent in this sample (Cronbach’s α = 0.96).

2.3. Statistical analyses

All data were analyzed using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA). Descriptive statistics were run to describe the sample and estimate average levels of alcohol-related serious consequences, stressors, and resilience. Bivariate correlations were analyzed to assess collinearity and identify significant associations. We then conducted a multiple regression to predict alcohol-related serious consequences using PROC SURVEYREG, with sociodemographic characteristics such as age, marital status, gender, ethnicity, race, education, and deployment history, as well as level of reported stressors and resilience, as predictors. Next, a simple moderation analysis (See Fig. 1) was performed using the Hayes PROCESS macro for mediation, moderation, and conditional process analyses, specifically Hayes’ Model 1 (Hayes, 2013). See Hayes (2013) for the statistical model and equation of this simple moderation model. Bias-corrected 95% bootstrap confidence interval estimates of the indirect effects using 10,000 bootstrap samples were obtained, and normal theory (Sobel) tests for indirect effects were also calculated (Hayes, 2013).

3. Results

3.1. Descriptive and bivariate

A total of 320 National Guard members from two southern states were included in this study (62.1% Georgia; 37.9% North Carolina). The majority of the sample was White, male, and had completed at least some college. The average participant age was 32.10 years (SD = 8.65) and most were E4–E6 ranks. Almost two-thirds of the sample was married or living as married and one-third had not previously deployed (see Table 1). Among those who had previously deployed, the average time since return from the most recent combat deployment was 5.00 years (SD = 3.14, range = 3 months–18.58 years). Multiple deployments among participants were also common, with 42.5% reporting more than one deployment and 29.1% reporting three or more deployments. Results of bivariate Pearson correlations statistically significant correlations between stressors and resilience (r = −0.39, p < 0.001), stressors and alcohol-related consequences (r = 0.30, p < 0.001), and resilience and alcohol-related consequences (r = −0.24, p < 0.001).

3.2. Multivariate

Table 2 provides the results of the regression model with stressors, resilience, age, marital status, gender, ethnicity, race, education, and deployment history predicting serious alcohol-related consequences. Overall, the model predicting alcohol-related consequences was significant and accounted for 22.9% of the variance, F(9, 315) = 3.44, p < 0.001, R² = 0.229. After controlling for race, education, and deployment history, several variables emerged as significant predictors, including stressors, resilience, age, marital status, gender, and ethnicity (see Table 2). Specifically, higher stressors, lower resilience, younger age, being unmarried and not living as married, being male, and
silience was stronger than that for medium levels of resilience. Fig. 2 plots this interaction.

4. Discussion

Our findings support the putative relationship between stress and alcohol, and the results of this study are congruent with prior findings that younger age, male sex, and single marital status confer risk in relation to alcohol. However, the finding that identifying as non-Hispanic was predictive of a greater number of alcohol-related consequences in somewhat inconsistent with prior studies. This study furthers our understanding of the alcohol-stress relationship by contextualizing it in terms of behaviors related to alcohol, as opposed to measuring consumption only. Most importantly, our work extends prior research in its examination of resilience as a moderator of the relationship between stress and serious alcohol-related consequences.

Our results regarding resilience as a moderator are notable for several reasons. First, it is important to understand that in this study, resilience operated as a protective factor only under conditions of stress. This means that at the lowest levels of stress, the behaviors exhibited by Reserve Component Soldiers did not differ between those with high, medium, or low levels of psychological resilience; their resilience scores didn’t matter. At medium levels of stress, we began to see differences related to stress vis-à-vis serious consequences related to alcohol use, but it was at the highest levels of stress that resilience mattered the most. At the highest levels of stress, the number of alcohol-related consequences was twice as many for the low resilience group as for the high resilience group. Put another way, as stress increased, those with average levels of psychological resilience saw increasing in alcohol-related consequences; this increase was even more drastic for those with low levels of resilience. For the high resilience Soldiers, however, this increase in stress did not confer the same risk; the change in alcohol-related consequences was not significant.

Taken together, these findings have practical significance to the military, as well as to civilian occupations that tend to have higher levels of stress exposure. Namely, the importance of psychological resilience is exacerbated as stress levels increase, and high levels of stress are related not only to increased alcohol consumption or risk of alcohol misuse, but to behaviors and related consequences as well. We also understand psychological resilience as malleable; it is a psychological construct that can be targeted and enhanced through prevention training efforts.

A number of protective systems exist that increase the likelihood of an individual experiencing resilient outcomes following adversity (Masten & Wright, 2010). Six protective systems have been identified in promoting resilience in individuals, including attachment relationships and social support; intelligence or problem-solving skills; self-regulation skills (involved in directing or inhibiting attention, emotion, and action); agency, mastery motivation, and self-efficacy; meaning making; and cultural traditions (Masten & Wright, 2010). These factors can be protective across a variety of adverse experiences throughout the lifespan (Masten & Wright, 2010). Thus, any efforts to support these systems may make resilient outcomes more likely.

4.1. Limitations and future directions

There are a few limitations to this study that should be noted. As these results are based on a convenience sample, they may not be generalizable to all Reserve Component Soldiers. This study also used self-report for measures of psychological resilience, stress, and alcohol-related consequences, which may be biased by desirability. These limitations notwithstanding, this study advances our understanding of the relationship between stress and alcohol-related consequences, as well as the nuanced manner in which resilience operates to mitigate these effects. Future research should examine these relationships within and across specific military occupational specialty and civilian careers, as well as in other samples experiencing increased levels of stress due to

Table 1

Demographic characteristics of the sample.

<table>
<thead>
<tr>
<th>Sociodemographic characteristics</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>96</td>
<td>30.0</td>
</tr>
<tr>
<td>Male</td>
<td>224</td>
<td>70.0</td>
</tr>
<tr>
<td>Race/ethnicity</td>
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<tr>
<td>White</td>
<td>199</td>
<td>64.0</td>
</tr>
<tr>
<td>Black</td>
<td>72</td>
<td>23.2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>23</td>
<td>7.4</td>
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<tr>
<td>Other</td>
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<td>5.5</td>
</tr>
<tr>
<td>Education</td>
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<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>38</td>
<td>11.9</td>
</tr>
<tr>
<td>Some college</td>
<td>156</td>
<td>48.8</td>
</tr>
<tr>
<td>College graduate or higher</td>
<td>124</td>
<td>38.8</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–20</td>
<td>19</td>
<td>5.9</td>
</tr>
<tr>
<td>21–25</td>
<td>63</td>
<td>19.7</td>
</tr>
<tr>
<td>26–34</td>
<td>123</td>
<td>38.4</td>
</tr>
<tr>
<td>35–60</td>
<td>114</td>
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<td>Paygrade</td>
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<tr>
<td>E1–E3</td>
<td>29</td>
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<tr>
<td>E4–E6</td>
<td>189</td>
<td>59.4</td>
</tr>
<tr>
<td>E7–E9</td>
<td>48</td>
<td>15.1</td>
</tr>
<tr>
<td>W1–WS/O1–O6</td>
<td>52</td>
<td>16.3</td>
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<tr>
<td>Marital status</td>
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<tr>
<td>Married or living as married</td>
<td>202</td>
<td>63.4</td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>117</td>
<td>36.6</td>
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<tr>
<td>Deployment</td>
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<tr>
<td>Not previously deployed</td>
<td>105</td>
<td>32.9</td>
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<tr>
<td>Noncombat deployed</td>
<td>28</td>
<td>8.8</td>
</tr>
<tr>
<td>Combat deployed</td>
<td>187</td>
<td>58.4</td>
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<tr>
<td>State</td>
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<tr>
<td>Georgia</td>
<td>198</td>
<td>62.1</td>
</tr>
<tr>
<td>North Carolina</td>
<td>121</td>
<td>37.9</td>
</tr>
</tbody>
</table>

Table 2

Predictors of alcohol-related serious consequences.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model statistics</th>
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</thead>
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<tr>
<td></td>
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<tr>
<td>Intercept</td>
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<tr>
<td>Stressors</td>
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<tr>
<td>Resilience</td>
<td>0.02</td>
</tr>
<tr>
<td>Age</td>
<td>0.14</td>
</tr>
<tr>
<td>Marital status</td>
<td>0.21</td>
</tr>
<tr>
<td>Gender</td>
<td>0.19</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.02</td>
</tr>
<tr>
<td>Race</td>
<td>0.14</td>
</tr>
<tr>
<td>Education</td>
<td>-0.09</td>
</tr>
<tr>
<td>Deployment history</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Note. N = 316.

identifying as non-Hispanic were associated with higher levels of serious alcohol-related consequences.

Finally, results of our moderation analysis revealed that when resilience, stressors, and the resilience *x* stressors interaction term were entered simultaneously into a predictive model of serious alcohol-related consequences, resilience was no longer a significant predictor (*p* = 0.743), but stressors (β = 0.21, SE = 0.05, *t* = 4.04, *p* < 0.001) and the interaction term (β = −0.01, SE = 0.01, *t* = −2.73, *p* = 0.007) were. Simple slopes for the association between stressors and alcohol-related consequences were tested for low (< 1 SD below the mean), medium (mean), and high (>1 SD above the mean) levels of resilience. The association between stressors and alcohol-related consequences was significant for both the medium (β = 0.10, SE = 0.02, *t* = 5.02, *p* < 0.001) and low levels of resilience (β = 0.06, SE = 0.02, *t* = 3.25, *p* = 0.001), but not for high resilience (β = 0.02, SE = 0.03, *t* = 0.87, p = 0.386). Additionally, the slope for low resilience was stronger than that for medium levels of resilience. Fig. 2

Note. N = 316.
occupational or environmental factors, and evaluate the effectiveness of resilience-building interventions to forestall negative consequences of alcohol use.

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Contributors

Janice Brown designed the study and wrote the protocol. Jessica Kelley Morgan conducted literature searches and conducted the statistical analyses. Jessica Kelley Morgan wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

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