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## Substance Use and Mental Health Among Military Spouses and Partners

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### ABSTRACT

Research on the behavioral health of military spouses/partners is essential, yet lacking. Data on 344 civilian spouses were drawn from a study of U.S. Army Reserve/National Guard soldier couples. This project characterizes civilian spouses' behavioral health symptoms. Regression analyses assessed the relationship between substance use and mental health symptoms. Overall, findings indicate civilian spouses had behavioral health impairments. Mental health, alcohol use, and tobacco use did not differ by soldiers' deployment history; illicit drug use and nonmedical use of prescription drugs did at trend level. Support initiatives focusing on all military spouses, not just those of deployed soldiers, are needed.

### KEYWORDS

military spouses; Reserve; National Guard; depression; anxiety; anger; alcohol use; cigarette use; nonmedical use of prescription drugs; deployment

More than half (54.9%) of the 2.6 million post-9/11 veterans in the U.S. are married (Profile of Post-9/11 Veterans: 2014, 2016). Spouses and partners of military service members face unique stressors such as family separations due to deployments (Eaton et al., 2008), fear for the safety of their loved ones, and greater marital strain than civilian couples (de Burgh, White, Fear, & Iversen, 2011; Mansfield & Engel, 2011). There is also pressure put on the military spouse (i.e., spouses or partners of military personnel) to sustain the family in spite of these multiple layers of stress (Green, Nurius, & Lester, 2013), and they often must do so in an environment where they may be isolated from family readiness programs (Anderson Goodell, Homish, & Homish, 2018; Patzel, McBride, Bunting, & Anno, 2013).

In romantic partnerships between a military service member and their spouse, the service member's deployments may impact the spouse's health. For example, there is an association between number of deployments and increased stress (Padden, Connors, & Agazio, 2011a), with a demonstrated negative correlation between stress and mental health (Padden, Connors, & Agazio, 2011b). In a separate study, measures of subjective distress, among military spouses who were also parents, increased as the months of deployment increased (Lester et al., 2010). Prior research has documented the prevalence of emotional

(e.g., self-reports of "stress" or "emotional problems") and/or psychological problems (e.g., depression, anxiety) among National Guard soldiers (Renshaw, Rodrigues, & Jones, 2009) and military spouses (Eaton et al., 2008; Mansfield et al., 2010). Among one sample of military spouses (wives of active duty Army personnel), an electronic medical record review demonstrated associations between length of deployment and greater diagnoses of depression and anxiety disorders (Mansfield et al., 2010). There is a need to extend these results among military spouses of Reserve/National Guard soldiers. In a separate survey of military spouses seeking primary care services and whose partner was deployed, Eaton et al. (2008) found that 16.9% reported a moderate-to-severe emotional issue, alcohol use, or family problem. In fact, rates of mental health problems among these military spouses mirrored those of soldiers returning from combat (Eaton et al., 2008). A limitation of this work, however, was the reliance on recruitment of spouses of deployed soldiers. Therefore, a more diverse sample of spouses, regardless of service members' deployment status, is needed to more thoroughly understand the potential impact of military life on their psychological well-being (Mansfield & Engel, 2011).

It is possible these emotional and psychological problems may place military spouses at risk of substance use; in the general U.S. population, individuals

with mental health problems are more likely to have a substance use disorder, compared to people without mental health problems (Substance Abuse and Mental Health Services Administration, 2016). Moreover, the mental health problems prevalent among military spouses are commonly accompanied by substance use issues (Ahmadi & Green, 2011).

A second reason to suspect that military spouses may be at elevated risk for substance use problems is that previous research has demonstrated that partners can exert profound influence on each other's health-enhancing or deleterious behaviors (Craddock, vanDellen, Novak, & Ranby, 2015; Homish, Leonard, & Cornelius, 2010; Homish & Leonard, 2008a, 2008b; Leonard & Homish, 2008). Studies have demonstrated concordance between partners for various substance use behaviors, including smoking (Falba & Sindelar, 2008; Merline, Schulenberg, O'Malley, Bachman, & Johnston, 2008), alcohol use (Falba & Sindelar, 2008; Polenick, Birditt, & Blow, 2018), and marijuana use (Merline et al., 2008). Given the prevalence of problematic alcohol use among military service members (Seal, Bertenthal, Miner, Sen, & Marmar, 2007), which was as high as 29% among one population of National Guard service members (Blow et al., 2013), and the fact that prescription drug misuse has increased in this population (Bray et al., 2010), partner influence may also heighten military spouses' risk of substance use.

Military spouses are at risk of maladaptive coping strategies, especially during the soldier's deployment. However there is a dearth of research on the prevalence of substance use among military spouses (Ahmadi & Green, 2011) regardless of deployment status. A recent review of hazardous alcohol consumption among civilian spouses concluded that few papers, to date, have looked at substance use while simultaneously considering the impact of the service member's health and military experiences (Gribble, Thandi, Goodwin, & Fear, 2018). Additional research focusing on this subpopulation is needed to better understand the occurrence of substance use and related contextual factors, which can in turn inform prevention and treatment interventions.

Taken together, previous research suggests that military spouses have a number of risk factors that may increase the risk of substance use problems, yet actual substance use in partners of soldiers remains greatly understudied. In fact, multiple sources point out that evidence on substance use among military spouses is rare (Ahmadi & Green, 2011; Institute of Medicine, 2013) and there is a need for more research

directed specifically at military spouses (Mansfield & Engel, 2011), as the relationship between deployment, stress, and substance use among military spouses remains understudied (Mansfield & Engel, 2011). Specifically, research to understand the experiences of military spouses of U.S. Army Reserve and Army National Guard (USAR/NG) soldiers is warranted, given that these service members are at greater risk for mental health (Renshaw et al., 2009) and substance use disorder compared to their active duty counterparts (Cohen, Fink, Sampson, & Galea, 2015; Milliken, Auchterlonie, & Hoge, 2007).

An emerging literature examines behavioral health outcomes among military spouses, but heavily focuses on spouses whose military partner has been deployed (de Burgh et al., 2011; Fields, Nichols, Martindale-Adams, Zuber, & Graney, 2012; Green et al., 2013) or combat-exposed (Blow et al., 2013; Vest, Heavey, Homish, & Homish, 2017). An improved understanding of the impact of deployment on military spouses will yield important insights into the temporal pathways between spousal deployment and civilian behavioral health outcomes regardless of military partners' experiences with deployment (Rutherford et al., 2010). Indeed, growing evidence suggests that not being deployed is associated with its own stressors for soldiers, thus, the same may also be true for their spouses (Hoopsick, Homish, Bartone, & Homish, 2018).

To fill these critical gaps in the literature and contribute to a greater understanding of the effects of military life on the behavioral health of civilian spouses, this study (1) characterizes substance use and mental health symptoms among a sample of civilian spouses/partners of USAR/NG soldiers; (2) examines differences in civilian spouse substance use and mental health outcomes based on the soldier's deployment history; and (3) examines the relationship between substance use and mental health outcomes. Specifically, the current study compared civilian spouse substance use and mental health as a function of soldier's (a) deployment status (never/ever) and (b) number of deployments (one/multiple). Given the risk factors discussed above, we hypothesize increased soldier deployment history may significantly increase civilian spouses' behavioral health impairments.

## Methods

### *Participants & procedure*

Data for these analyses were drawn from Operation: SAFETY (Soldiers And Families Excelling Through

**Table 1.** Demographic characteristics of civilian spouses of U.S. Army Reserve and National Guard soldiers ( $N = 344$ ).

Variable	% (n) or $M$ ( $SD$ )
Sex	
Male	7.0% (24)
Female	93.0% (320)
Age	30.2 (6.83)
Race/ethnicity	
Non-Hispanic White	85.2% (293)
Non-Hispanic Black	2.6% (9)
Hispanic	4.4% (15)
Other	5.8% (20)
No response	2.0% (7)
Education	
<HS – HS grad	12.5% (43)
Some college	39.8% (137)
≥College	47.7% (164)
Relationship status	
Married	61.1% (210)
Cohabiting	38.9% (134)
Income	\$40,000–\$59,999

the Years), an ongoing longitudinal study of the health and well-being of U.S. Army Reserve and National Guard soldiers and their partners (Devonish et al., 2017; Heavey, Homish, Goodell, & Homish, 2017; Kozlowski, Homish, & Homish, 2017). Participants were recruited (Summer 2014–Fall 2015) from units in New York State. Soldiers were given a brief overview of the project at drill weekends and provided an opportunity to complete a one-page screening form. Project staff attended 47 recruitment events across New York State and met with 47 units; 1,653 completed screening forms indicating potential interest in participating and 922 did not qualify for the study (579 were single, 329 failed on one or more screening items [ $M = 1.5$ ,  $SD = .09$ ] and 14 forms were incomplete). The remaining 731 were eligible for the study. Following this in-person screening, all soldiers were contacted by telephone within 1 week regarding their eligibility status. Of those 731, 572 (78%) agreed to participate and 83% of couples ( $N = 472$ ) completed some part of the survey. Given that the nature of the main study was to examine spousal influence, only surveys where both partners completed the entire survey were included for follow-up ( $N = 418$ ).

Eligibility was determined based on six criteria: (1) couple is married/living as if married; (2) one partner is a current U.S. Army Reserve and National Guard soldier; (3) the soldier is age 18 to 45 (because one of the aims of the overarching study was to study intimate partner violence, which is less prevalent in couples over the age of 45); (4) both partners speak and understand English; (5) both partners are willing and able to participate; and (6) because abstainers tend to be different in other health behaviors compared to ever drinkers (Green & Polen, 2001), both partners

have had at least one alcoholic beverage in the past year. Participants received \$60 for completing the baseline survey. The protocol was approved by the University at Buffalo Institutional Review Board, the Army Human Research Protections Office, Office of the Chief, Army Reserve, and the Adjutant General of the National Guard.

The sample for the current analyses is comprised of 344 civilian partners of USAR/NG soldiers, hereafter referred to as *civilian spouses*. The average age of participants was 30.2 years ( $SD = 6.8$ ). Most participants were married (61.1%), with the remainder living as if married (38.9%). Additional sample characteristics are presented in Table 1.

## Measures

### Civilian spouse substance use

**Heavy drinking.** Engagement in heavy drinking over the past year was assessed, consistent with prior work (Homish & Leonard, 2007; Vest et al., 2017), as the maximum report of two items: (1) frequency of getting drunk in the past year and (2) the frequency of five or more drinks (for males) or four or more drinks (for females) in a single setting in the past year. Items were originally rated on a 9-point scale ranging from 1 (*did not drink this amount/get drunk in the past year*) to 9 (*every day*). Responses were rescaled to reflect the specific number of heavy drinking instances in the past year (i.e., scaled to 365 days).

**Alcohol problems.** Alcohol problems experienced over the past year were measured using the 10-item Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Example items include “How often during the last year have you had a feeling of guilt or remorse after drinking?” and “Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?” Items are rated on a 5-point scale ranging from 0 (*never*) to 4 (*4 or more times a week*), and scores are summed across items to create a total score ranging from 0 to 40 ( $\alpha = .78$ ). For the present analyses, alcohol problems were a continuous variable with higher scores indicating greater likelihood of alcohol problems (Babor & Del Boca, 1992).

**Cigarette use.** Current use of cigarettes was assessed with the item, “In your entire life, have you ever smoked 100 cigarettes?” Participants who responded “yes” were asked, “Do you currently smoke cigarettes?” Responses were coded to create a binary variable of current cigarette use. Participants who

responded “no” to either question were coded as 0, and participants who responded “yes” to the second question were coded as 1.

**Electronic cigarette use.** Current use of electronic cigarettes (e-cigarettes) was assessed with the item, “In your entire life, have you ever used an electronic cigarette, an e-cigarette, or vaping device (these battery powered devices produce vapor with nicotine, instead of smoke)? There are many types of e-cigarettes. Some common brands include Smoking Everywhere, NJOY, Blu, Vapor King, Pax, and Firefly.” Responses were coded to create a binary variable of current e-cigarette use. Those who answered “no” were coded as 0. Those who answered “yes” were asked, “Do you currently use e-cigarettes or a vaping device?” Those who answered “not at all” were also coded as 0, while responses of “every day” and “some days” were coded as 1.

**Drug use.** Illicit drug use and nonmedical use of prescription drugs (NMUPD) were assessed using the National Institute on Drug Abuse Modified Alcohol, Smoking and Substance Involvement Screening Test 2.0 (NIDA Modified ASSIST 2.0; WHO Assist Working Group, 2002). Participants’ responses regarding use of any illicit drugs (i.e., cannabis, cocaine, methamphetamine, inhalants, hallucinogens, street opioids, other illicit drugs) over the prior 3 months were combined into one binary variable (any/none). Participants’ responses regarding any non-medical use of prescription drugs (i.e., prescription stimulants, sedatives or sleeping pills, prescription pain medication, other prescription drugs) over the prior 3 months were combined into one binary variable (any/none).

### **Civilian spouse mental health**

**Depressive symptoms.** Depressive symptoms experienced over the past 2 weeks were measured using the 8-item Patient Health Questionnaire 8 (PHQ-8; Kroenke et al., 2009). Example items include “Feeling down, depressed or hopeless” and “Feeling bad about yourself—or that you are a failure or have let yourself or your family down.” Items are rated on a 4-point scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Scores are summed across items to create a total score ranging from 0 - 24, with higher scores indicating greater depressive symptom severity ( $\alpha = .91$ ).

**Anxiety symptoms.** Anxiety symptoms experienced over the prior 7 days was measured using 10 items based on the “emerging measures” from the DSM-5 (Craske et al., 2013). Example items include “I have felt anxious, nervous, or worried” and “Had thoughts of bad things happening, such as family tragedy, ill health,

loss of a job, or accidents.” Items are rated on a 5-point scale ranging from 0 (*never*) to 4 (*all the time*;  $\alpha = .91$ ). Scores range from 0 to 40 and are summed, with higher scores indicating greater severity of anxiety.

**Anger.** Anger experienced over the prior 7 days was measured using the 8-item Patient Reported Outcomes Measurement Information System (PROMIS) Anger scale (Pilkonis et al., 2011). Example items include “I felt like I was ready to explode” and “I stayed angry for hours.” Items are rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). Scores are summed across items to create a total score ranging from 8 to 40, with higher scores indicating greater anger severity ( $\alpha = .94$ ).

### **Soldier deployment history**

The soldier’s deployment history was assessed using their own self report. Whether the soldier in each couple had ever been deployed was assessed using the item, “Have you ever been deployed?” Participants who responded “Yes” were asked, “How many times have you been deployed?” Responses to this question were dichotomized to create a variable indicating one prior deployment and two or more prior deployments. In regression analyses, never/ever deployed and number of deployments were combined to create one variable indicating 0, 1, or 2+ deployments.

### **Analytic plan**

Data were drawn from the baseline wave of the study. Preliminary analyses included descriptive statistics to characterize service member military history variables. Focal analyses included using descriptive statistics to characterize civilian spouses’ current substance use, including heavy drinking, alcohol problems, cigarette use, e-cigarette use, illicit drug use, and NMUPD, as well as negative mental health symptoms, including depressive symptoms, anxiety symptoms, and anger (Aim 1). In addition, independent sample *t*-tests (for continuous outcomes) or tests of two proportions (for binary outcomes) were used to compare spouse substance use (i.e., alcohol, cigarette smoking, illicit drugs, NMUPD) and mental health symptoms (i.e., depressive symptoms, anxiety symptoms, anger) based on service member deployment history variables (Aim 2), including prior deployments (yes vs. no) and number of deployments (1 vs. 2+).

Given associations between mental health outcomes and substance use in the general population, we also assessed the civilian spouses’ relationship between substance use and mental health (Aim 3). To do so, separate negative binomial regressions (for alcohol

**Table 2.** Substance use and mental health symptoms of civilian spouses of U.S. Army Reserve and National Guard soldiers.

Variable	% (n) or M (SD)
Alcohol use	
Heavy drinking (instances per year)	10.6 (25.60)
Alcohol problem (total AUDIT score)	3.7 (3.67)
Current nicotine product use	
Cigarette use (yes/no)	15.1% (52)
e-cigarette use (yes/no)	2.6% (9)
Drug use	
Current illicit drug use (yes/no)	7.0% (24)
Current NMUPD (yes/no)	7.6% (26)
Mental health	
Depressive symptoms	4.4 (5.03)
Anxiety symptoms	6.56 (6.6)
Anger	19.2 (6.65)

Note. AUDIT = Alcohol Use Disorders Identification Test; NMUPD = nonmedical use of prescription drugs.

**Table 3.** Correlation matrix examining civilian spouses' substance use and mental health.

Variable	1	2	3	4	5	6	7
1. Alcohol problems	1.00						
2. Current smoking	0.21*	1.00					
3. Current illicit drug use	0.18*	0.16*	1.00				
4. Current NMUPD	0.14*	0.33*	0.14*	1.00			
5. Depression	0.22*	0.23*	0.03	0.12*	1.00		
6. Anxiety	0.34*	0.14*	0.07	0.12*	0.67*	1.00	
7. Anger	0.21*	0.13*	0.04	0.07	0.62*	0.62*	1.00

Note. NMUPD = nonmedical use of prescription drugs.

\* $p < 0.05$ .

problems, a count variable) and logistic regressions (for current smoking, illicit drug use, and NMUPD, binary variables) were conducted to examine the relationships between mental health outcomes and each of the previously named substance use variables. Analyses examined a number of covariates (e.g., age, marital status) that were not significant; therefore, for model parsimony, final models consider soldier's deployment history while controlling for covariates that were significant (i.e., education).

## Results

### Preliminary analyses

The majority of soldiers (61.3%) had been deployed at some point in their military career. Among those who had been deployed, 58.8% had been deployed only once. Previously deployed soldiers had an average of 1.6 deployments ( $SD = 0.8$ ). Approximately two thirds of the most recent deployments occurred as part of Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn (78.2%).

### Focal analyses

The first aim was to characterize civilian spouses' current substance use, including heavy alcohol use,

alcohol problems, cigarette smoking, e-cigarette use, illicit drug, and NMUPD use, as well as negative mental health symptoms, including depressive symptoms, anxiety symptoms, and anger. These results are presented in Table 2. On average, civilian spouses engaged in heavy drinking slightly less than once per month ( $M = 10.6$  times per year,  $SD = 25.6$ ). Civilian spouses had an average AUDIT score of 3.7 ( $SD = 3.7$ ), and 12.5% ( $n = 43$ ) had AUDIT scores greater than or equal to 8, which is indicative of problematic alcohol use. With respect to tobacco use, 15.1% ( $n = 52$ ) of civilian spouses currently smoked cigarettes and 2.6% ( $n = 9$ ) currently used e-cigarettes. With respect to drug use, 7.0% ( $n = 24$ ) currently used illicit drugs and 7.6% ( $n = 26$ ) engaged in non-medical use of prescription drugs. On average, nearly one third (30.0%) of spouses had at least mild depression, with mean scores of 4.4 ( $SD = 5.0$ ) for depressive symptoms, 6.6 ( $SD = 6.6$ ) for anxiety symptoms, and 19.2 ( $SD = 6.6$ ) for anger. More than half the sample had mild anxiety (68.3%), with more than 20% having moderate to extreme anxiety. Associations between substance use and mental health outcomes are presented in Table 3.

The second aim of the present research was to examine differences in substance use and negative mental health symptoms among civilian spouses based on their military partner's deployment history, including prior deployment and number of deployments. These results are presented in Table 4. Results revealed differences in proportion of civilian spouses currently engaging in illicit drug use based on soldiers' prior deployment history ( $z = 2.1$ ,  $p = 0.04$ ): More than double the proportion of civilian spouses of soldiers who had never deployed currently used illicit drugs (10.5%,  $SE = 2.7$ ) compared to spouses of those who had previously deployed (4.7%,  $SE = 1.5$ ). There were no differences in alcohol use, tobacco use, or mental health symptoms based on soldier spouse ever/never deployment history.

With respect to number of prior deployments, results revealed a trending difference in the proportion of civilian spouses currently engaging in non-medical use of prescription drugs ( $z = 2.0$ ,  $p = .05$ ; Table 4). More than four times the proportion of civilian spouses of soldiers who had one prior deployment currently engaged in non-medical use of prescription drugs (8.9%,  $SE = 2.6$ ) compared to spouses of soldiers with two or more prior deployments (2.3%,  $SE = 1.6$ ). There were no differences in alcohol use, cigarette smoking, or mental health symptoms based on the number of soldiers' prior deployments.

**Table 4.** Independent *t*-tests/test of two proportions comparing civilian spouses' behavioral health as a function of spousal soldier's deployment history.

Variable	Prior deployment, <i>t/z</i>		Number of deployments, <i>t/z</i>	
	0 <i>M</i> ( <i>SD</i> )	1+ <i>M</i> ( <i>SD</i> )	1 <i>M</i> ( <i>SD</i> )	2+ <i>M</i> ( <i>SD</i> )
<b>Alcohol use</b>				
Alcohol problems (AUDIT total score)		0.0		−0.4
	3.7 (3.7)	3.7 (3.6)	3.6 (3.7)	3.8 (3.6)
<b>Nicotine product use</b>				
Cigarette use (yes/no)		−0.3		−0.5
	14.3% (3.0)	15.6% (2.5)	14.5% (3.2)	17.2% (4.0)
<b>Drugs use</b>				
Current illicit drug use (yes/no)		2.1*		0.1
	10.5% (2.7)	4.7% (1.5)	4.8% (1.9)	4.6% (2.2)
Current NMUPD (yes/no)		1.2		2.0 <sup>†</sup>
	9.8% (2.6)	6.2% (1.7)	8.9% (2.6)	2.3% (1.6)
<b>Mental health</b>				
Depressive symptoms		−0.8		0.4
	4.1 (5.4)	4.6 (4.8)	4.7 (4.8)	4.4 (4.8)
Anxiety symptoms		−1.1		−0.0
	5.8 (6.1)	6.5 (6.8)	6.5 (6.8)	6.5 (6.8)
Anger		−1.1		−0.1
	18.7 (7.2)	19.5 (6.2)	19.5 (6.3)	19.6 (6.2)

Note. AUDIT = Alcohol Use Disorders Identification Test; NMUPD = nonmedical use of prescription drugs.

<sup>†</sup>*p* < 0.1.

\**p* < 0.05.

Aim 3 of the current study was to assess the relationship between substance use and mental health among civilian spouses. In the final, fully adjusted models, regression analyses indicated that higher depression scores were associated with significantly higher risk of alcohol problems (adjusted risk ratio [ARR] = 1.04; 95% Confidence Interval [CI] = 1.02, 1.05; Table 5), and significantly greater odds of current smoking (adjusted odds ratio [AOR] = 1.10; 95% CI = 1.04, 1.16). A similar pattern of association held for anger (ARR = 1.03; 95% CI = 1.02, 1.04 for alcohol problems and AOR = 1.06; 95% CI = 1.01, 1.11 for current smoking). Higher anxiety scores were associated with significantly higher risk for alcohol problems (ARR = 1.04; 95% CI = 1.03, 1.05), and significantly greater odds of current smoking and NMUPD (AOR = 1.05; 95% CI = 1.01, 1.10; AOR = 1.06; 95% CI = 1.01, 1.11, respectively). There were no significant relationships between any mental health outcomes and current illicit drug use. Finally, there was a trend for a difference in civilian spouses' mental health symptoms based on soldier partners' number of times deployed; civilian spouses of soldiers who deployed two or more times (compared to deploying once) had lower odds of NMUPD (see Table 5).

## Discussion

This study characterizes substance use and mental health conditions among spouses of military reservists. In this community-based subsample of civilian spouses/partners of USAR/NG service members, 12%

met the criteria for problematic drinking, which is at the high end of previous estimates among military spouses (Gribble et al., 2018). A recent review reports 3.0–10.7% of military spouses/partners met an AUDIT score that was indicative of problematic drinking; the highest estimate (10.7%) was obtained from a survey of spouses whose soldier partner had returned from deployment in the past three months (Gribble et al., 2018). Moreover, only three studies in the review considered the soldier partners' military experiences in relation to spouses' alcohol use (Gribble et al., 2018).

The current research found that cigarette use (15.1%) among civilian spouses was similar to rates of smoking among all U.S. adults (15.5%; Jamal et al., 2018). However, considering this subsample is primarily female, smoking rates in our study sample were higher than national averages for U.S. females (13.5%; Jamal et al., 2018).

Our findings add to the limited literature that currently exists on substance use among spouses of military service members. Previous work has found that military wives were more likely to use alcohol and binge drink compared to nonmilitary wives of similar ages (Lipari, Forsyth, Bose, Kroutil, & Lane, 2016). Among military spouses participating in the Millennium Cohort Family Study, approximately 17% of spouses currently used cigarettes, whereas 7% reported problem drinking (Trone et al., 2018). Current service member deployment was not a risk factor for current spousal smoking or drinking (Trone et al., 2018), which lends support to this study's findings.

**Table 5.** Regression analyses examining the relationship between substance use and mental health among civilian spouses of U.S. Army Reserve and National Guard soldiers.

Variable	Alcohol problems (total score) ARR [95% CI]	Current cigarette use AOR [95% CI]	Current illicit drug use AOR [95% CI]	Current NMUPD AOR [95% CI]
Depression				
Depression	<b>1.04**</b> [1.02, 1.05]	<b>1.10**</b> [1.04, 1.16]	1.02 [0.94, 1.10]	1.06 <sup>†</sup> [1.00, 1.13]
Deployments				
0 (v. 1)	1.08 [0.88, 1.32]	0.93 [0.42, 2.08]	2.29 [0.85, 6.17]	1.08 [0.46, 2.56]
2+ (v. 1)	1.04 [0.83, 1.31]	1.20 [0.51, 2.86]	0.96 [0.26, 3.50]	0.25 <sup>†</sup> [0.05, 1.15]
Education <sup>^</sup>	<b>1.28**</b> [1.07, 1.52]	<b>0.18**</b> [0.08, 0.43]	0.69 [0.29, 1.64]	0.43 <sup>†</sup> [0.17, 1.08]
Anxiety				
Anxiety	<b>1.04**</b> [1.03, 1.05]	<b>1.05*</b> [1.01, 1.10]	1.04 [0.98, 1.10]	<b>1.06*</b> [1.01, 1.11]
Deployments				
0 (v. 1)	1.09 [0.90, 1.33]	0.95 [0.43, 2.09]	2.36 <sup>†</sup> [0.87, 6.40]	1.12 [0.47, 2.65]
2+ (v. 1)	1.05 [0.85, 1.31]	1.17 [0.50, 2.76]	0.96 [0.26, 3.52]	0.24 <sup>†</sup> [0.05, 1.13]
Education <sup>^</sup>	<b>1.21*</b> [1.02, 1.43]	<b>0.16**</b> [0.07, 0.38]	0.68 [0.29, 1.61]	<b>0.39*</b> [0.16, 0.97]
Anger				
Anger	<b>1.03**</b> [1.02, 1.04]	<b>1.06*</b> [1.01, 1.11]	1.03 [0.97, 1.09]	1.04 [0.98, 1.10]
Deployments				
0 (v. 1)	1.08 [0.88, 1.33]	0.93 [0.42, 2.05]	2.31 <sup>†</sup> [0.86, 6.24]	1.08 [0.46, 2.53]
2+ (v. 1)	1.06 [0.85, 1.33]	1.18 [0.50, 2.78]	0.96 [0.26, 3.51]	0.24 <sup>†</sup> [0.05, 1.14]
Education <sup>^</sup>	<b>1.22*</b> [1.02, 1.45]	<b>0.16**</b> [0.07, 0.38]	0.68 [0.29, 1.62]	<b>0.40*</b> [0.16, 0.98]

Note. ARR = adjusted risk ratio; AOR = adjusted odds ratio; NMUPD = nonmedical use of prescription drugs.

NMUPD = non-medical use of prescription drugs.

<sup>^</sup>College degree or greater compared to some college or less.

<sup>†</sup> $p < 0.1$ .

\* $p < 0.05$ .

\*\* $p < 0.01$ .

Regarding mental health conditions, this sample of civilian spouses have greater anger than the general population (Pilkonis et al., 2011), more than 88% had mild to extreme anxiety, and 30% meet the criteria for, at least, mild depression. Taken together, these findings suggest that this community sample of civilian spouses experience behavioral health concerns and represent an important, though understudied (Kees, Nerenberg, Bachrach, & Sommer, 2015), subpopulation of focus.

This work further adds to the literature by also considering substance use and mental health as a function of the soldier's deployment history. Current illicit drug use was significantly greater among civilian spouses of soldiers who had never deployed, compared to spouses of those who had previously deployed. This may be a function of military service, wherein the act of being deployed, though stressful, provides spouses a sense of duty or obligation to abstain from illicit substance use. There was also a trending difference in the proportion of civilian spouses currently engaging in NMUPD, wherein more civilian spouses of soldiers who had one prior deployment currently engaged in nonmedical use of prescription drugs, compared to spouses of soldiers with two or more prior deployments (8.9% compared to 2.3%, respectively). In fact, in regression models, civilian spouses of soldiers who deployed two or more times (compared to deploying once) had a trend for

lower odds of NMUPD. If NMUPD is occurring as a result of maladaptive coping in response to deployment, higher use among spouses of soldiers with only one prior deployment may indicate the first deployment is particularly stressful for spouses, whereas subsequent deployments are not markedly more stressful. In fact, qualitative work with National Guard spouses provides support for potential benefits of experiencing deployment more than once, as the coping and practical skills developed during the first deployment period can be used in subsequent deployments (Patzel et al., 2013).

The final aim of this research was to assess the relationship between substance use and mental health among these civilian spouses. Similar to the general U.S. population (Substance Abuse and Mental Health Services Administration, 2016), our findings indicate that, after adjustment for number of deployments and education, significant associations between mental health and substance use were noted. These may have significant clinical implications, as health providers treating military spouses may wish to screen for these comorbidities.

We hypothesized spouses' behavioral health impairments would be exacerbated among those whose soldier partner has more deployments. This hypothesis was not supported by our findings. There were no differences in problem alcohol use, cigarette use, or mental health symptoms between partners whose military



spouse had deployed compared to those who had never deployed. Likewise, there were no differences in these outcomes for those whose soldier partner had deployed once compared to multiple deployments.

It is noteworthy that this study considers spouses of deployed as well as nondeployed military service members. Finding no significant differences in alcohol use, tobacco use, or mental health symptoms based on spousal service member's ever/never deployment history was somewhat unanticipated, though may speak to an important but overlooked facet of being a military spouse. Whereas deployment brings a unique set of stressors, it may be the case that the experience of being a military spouse, regardless of the service members' specific military experiences, is stressful, as deployment history did not compound most behavioral health outcomes in this current study. In addition, it is possible that the lack of effects for deployment status may be related to soldiers' experiences of nondeployment. Recent work provides evidence that not deploying may be stressful for military service members (Hoopsick et al., 2018). These negative non-deployment emotions are also associated with negative mental health outcomes, including anger, anxiety, depression, and posttraumatic stress disorder symptoms in the soldier (Hoopsick et al., 2018). It is possible that the stress of nondeployment felt by the soldier is shared by the civilian spouse. Additional research is needed to better understand soldier nondeployment and its effects on military spouses.

Alternatively, it is possible the general lack of effects for deployment indicate that civilian spouses are resilient throughout the deployment cycle. In qualitative interviews with wives of deployed Army Reserve soldiers, themes of wives gaining strength, independence (Marnocha, 2012), and self-confidence emerged (Aducci, Baptist, George, Barros, & Goff, 2011). Additional benefits of a deployment, such as increased self-sufficiency and self-discovery, have been documented elsewhere (Davis, Ward, & Storm, 2011). Acknowledging the benefits of deployment may be important for continuing to foster resilience and protect against negative behavioral health outcomes among military spouses, though this needs to be further explored.

Family readiness programs are available throughout the United States to provide support to service members and their families. They are often targeted to deployed families, although can be used by nondeployed families, as well (Anderson Goodell et al., 2018). However, recent studies report that a

significantly lower proportion of non-deployed USAR/NG couples and families have accessed family readiness programs compared to those experiencing a deployment (Anderson Goodell et al., in press; Burrell, Durand, & Fortado, 2003). Reasons for noninvolvement include less access (geographically) (Patzel et al., 2013), but also feelings that support services are geared toward families with young children and not well-positioned to support other types of families (e.g., male civilian spouses; Runge, Waller, MacKenzie, & McGuire, 2014). The current study provides initial evidence that spouses of nondeployed USAR/NG soldiers may also benefit from support services. These support programs should consider improving outreach efforts to reach this demographic.

### Limitations

This study has some limitations worth noting. The subsample was comprised primarily of female spouses; thus, the lack of representative numbers of male spouses precludes exploration of sex differences in behavioral health. However, it is worth noting that few studies focusing on substance use among military spouses have included male spouses (Gribble et al., 2018) and, therefore, our inclusion of male spouses is a strength of this current research.

Heterogeneity in measurement made it difficult to compare rates of substance use between these civilian spouses in our sample and national or community samples. For example, this work measured use of illicit and nonmedical drug use using the NIDA Modified ASSIST 2.0 (WHO Assist Working Group, 2002), which measures use in the past 3 months. National estimates publish past 30 day estimates, complicating the ability to make comparisons to the general population. In addition, participants were recruited based on having had at least one drink in the past year; it is possible this may have biased the results and result in an overestimate of alcohol use. Finally, this data provides a foundation for future work and adds to the limited data on the behavioral health of civilian spouses.

### Conclusions

This work makes an important contribution to understanding the behavioral health of civilian spouses of USAR/NG soldiers. These findings suggest significant substance use and behavioral health symptomology, even among partners of soldiers who have never been deployed. The limited effects of soldiers' deployment

history on spouses behavioral health underscores the need for targeted outreach efforts to support spouses of non-deployed USAR/NG soldiers. Future research that adopts dyadic measures and interventions are needed to elucidate the impact of military service on soldiers, their spouses, and potential cross-spouse influences.

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