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Associations of warzone veteran mental health with partner mental health and family functioning: Family Foundations Study

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Abstract

Introduction: Warzone participation is associated with increased risk of stress-related psychopathology, including posttraumatic stress disorder (PTSD) and depression. Prior research suggests that the mental health of spouses of warzone veterans (WZVs) is linked to that of their partners. Additionally, PTSD among WZVs has been associated with marital dysfunction. Less is known about the effects of depression among WZVs on partner mental health and family relationships. We sought in this study to examine associations between WZV PTSD and depression and partner mental health and relationship outcomes.

Methods: Using a nationally dispersed sample of Iraq and Afghanistan veterans and their married and unmarried intimate partners, 245 dyads completed structured psychiatric interviews and psychometric surveys assessing family functioning and relationship aggression.

Results: Adjusted regression analyses indicated that depression among WZVs was associated with partner depression and anxiety disorders. WZV PTSD and depression were also associated with partner-reported relationship dysfunction, dissatisfaction, and communication issues, and higher rates of intimate partner aggression victimization and perpetration.

Conclusions: Mental health consequences of war extend beyond WZVs to the mental health of their intimate partners and their relationships with intimate partners.

Keywords

anxiety/anxiety disorders; depression; family/marital; PTSD/posttraumatic stress disorder; trauma

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

1 | INTRODUCTION

The psychological consequences of deployment to the wars in Iraq and Afghanistan have been well-documented and include increased risk of mental health disorders, including both posttraumatic stress disorder (PTSD) and depression (e.g., Ramsey et al., 2017; Vasterling et al., 2016). Growing evidence suggests that the adverse mental health consequences of warzone participation extend beyond the warzone veteran (WZV) to their intimate partners (see De Burgh, White, Fear, & Iversen, 2011 for a review). Yet much remains unanswered about both the mental health of intimate partners of WZVs and the integrity of the dyadic and family units of WZVs, particularly among veterans of recent wars.

With approximately 57% of U.S. service members married at the time of recent deployments (Wenger, O'Connell, & Cottrell, 2018), and an unknown proportion of unmarried, cohabitating intimate partners, the public health significance of mental health outcomes among intimate partners of WZVs, including both those currently in the military and those separated from military service, is considerable. At the early stages of the wars in Iraq and Afghanistan, the prevalence of mental health concerns among the spouses of active duty service members who deployed mirrored those of service members (Eaton et al., 2008). More recently, Steenkamp et al. (2018) found that over one-third of the spouses of a large probability-sampled cohort study of U.S. junior military personnel met criteria for at least one mental disorder. Mental disorders in their sample were especially prevalent among the spouses of combat deployed, as compared with noncombat deployed and nondeployed, service members.

Psychiatric symptoms among WZVs may also present challenges to relationships. Both military and civilian studies have indicated increased intimate relationship dysfunction, including poorer communication, relationship dissatisfaction, lower family cohesion, and higher intimate partner violence (IPV), among dyads in which one member reports PTSD symptoms (e.g., Campbell & Renshaw, 2018; Lambert, Engh, Hasbun, & Holzer, 2012; Taft, Watkins, Stafford, Street, & Monson, 2011). Compared to current and former service members without PTSD, those with PTSD are more likely to display interpersonal hostility, exhibit fewer affirming behaviors, and convey greater distress-maintaining attributions toward their partners (Knobloch-Fedders, Caska-Wallace, Smith, & Renshaw, 2017; Miller et al., 2013). Major depression has also been associated with negative relationship outcomes among both civilians (e.g., Beck, Grant, Clapp, & Palyo, 2009; Whisman & Uebelacker, 2009) and WZVs (e.g., Evans, McHugh, Hopwood, & Watt, 2003; Renshaw, Rodrigues, & Jones, 2008; Sayers, Farrow, Ross, & Oslin, 2009). Among married couples, effect sizes of associations between marital satisfaction and depressive symptoms range from medium to large (Whisman, 2001). Depressed individuals are more likely to elicit rejection from others via seeking negative feedback, which increases hostility and stress in relationships, ultimately exacerbating depression (Joiner & Metalsky, 1995; Starr, 2015).

Research examining associations between the mental health of WZVs and family wellbeing has been limited in several respects. First, although associations between WZV PTSD and partner mental health outcomes are well-documented, research examining WZV depression and partner outcomes remains scarce (see Renshaw et al., 2008; Sayers et al., 2009 for

exceptions). Yet WZV are at increased risk of depressive symptoms, with approximately 15% of OIF/OEF Army soldiers reporting clinically significant depressive symptoms following deployment (Hoge et al., 2004; Lapierre, Schwegler, & LaBauve, 2007). Additionally, evidence that WZV depression may account for more variance in relationship impairment than do trauma-specific symptoms (Campbell & Renshaw, 2018; Evans et al., 2003) highlights the importance of better understanding the interpersonal cost of depression in military families.

Second, most studies of military families have concentrated on married couples, but declining marriage rates among young adults (Stevenson & Wolfers, 2007) suggest a need to additionally examine mental health concerns among unmarried intimate partners of WZVs. Third, research in this area has typically relied on assessment of psychopathology solely with written questionnaires, which are often more vulnerable to reporting biases than structured interviews (McDonald & Calhoun, 2010). Finally, the literature has relied primarily on small convenience or clinical samples, although exceptions exist (e.g., Steenkamp et al., 2018; Tanielian, Karney, Chandra, & Meadows, 2014). Steenkamp et al. (2018), for example, examined diagnostic concordance, including depression, within dyads in a large, population-based sample of service members and spouses. More work, however, is needed in other contemporary nationally dispersed nonclinically recruited samples to examine the effects of WZV depression on a broad range of partner mental disorders.

The goal of this study was to examine associations of WZV PTSD and depression with partner mental health diagnoses and partner-reported family functioning outcomes in a sample of service members and military veterans participating in the Family Foundations study (Vasterling et al., 2015). Our methodology builds on prior research by including (a) measurement of both partner mental health symptoms and partner-reported relationship functioning, (b) both married and unmarried intimate partners of WZVs, (c) structured interviews in addition to psychometric instruments, and (d) a nationally dispersed, nonclinically recruited sample of Iraq and Afghanistan WZVs.

Based on prior studies (e.g., Knobloch-Fedders et al., 2017; Lambert et al., 2012; Renshaw et al., 2008), we hypothesized that PTSD and depression among WZVs would be associated with greater risk of partner mental health problems and IPV, and poorer partner-reported relationship satisfaction, family adjustment, and family communication.

2 | MATERIALS AND METHODS

Procedures were approved by the Veterans Affairs (VA) Boston Healthcare System and Boston University Medical Center institutional review boards and conducted in accordance with the Declaration of Helsinki. Informed consent was obtained by phone, with written documentation of consent waived.

2.1 | Participants

Participants included 245 Iraq and Afghanistan WZVs and their cohabitating partners. WZVs were drawn from the Neurocognition Deployment Health Study (NDHS; Vasterling et al., 2006), a cohort of Army soldiers followed longitudinally since before, for most, their

first deployment to the Iraq War and for a 6- to 8-year follow-up as part of VA Cooperative Study Program #566 (CSP#566; Aslan et al., 2014). Created in April 2003, the NDHS cohort is now comprised of both current and former service members.

A full description of NDHS sampling methods can be found elsewhere (Brailey, Vasterling, Proctor, Constans, & Friedman, 2007; Vasterling et al., 2006). In summary, NDHS sampling procedures entailed cluster-based sampling at the battalion level and on-site (at military installations) recruitment of regular Active Duty Army soldiers and activated Army National Guard soldiers. Reflecting geographic and occupational dispersion within the NDHS cohort, CSP#566 recruited participants remotely at the individual level, using a stratified randomization procedure based on initial battalion assignments at the time of NDHS enrollment. Because eligibility criteria for WZVs to participate in Family Foundations initially required participation in CSP#566, most WZVs were recruited from this source. WZV eligibility for Family Foundations was later expanded to include non-CSP#566 NDHS cohort members who deployed to either Iraq or Afghanistan. WZV participants were also required to have an English- or Spanish-speaking partner who had been living within their household for 1 year at the time of consent, and prior consent to be contacted for future studies. Eligibility for WZV participation included consent to contact partners.

WZVs were contacted for recruitment immediately after their participation in CSP #566, as applicable. Other potential participants were recruited in random order from potentially eligible NDHS cohort members. Partners were approached following WZV consent. Figure 1 depicts sample derivation.

2.2 | Procedures

As a nationally dispersed sample, participants completed study procedures remotely. If WZVs completed CSP#566 procedures within 180 days of Family Foundations participation, we used archived CSP#566 measures of PTSD, depression, and alcohol use (see descriptions below). Unless otherwise indicated, CSP#566 and Family Foundations data were gathered using the same methods (e.g., telephone interview conducted by doctoral level psychologists, written questionnaire), with the exception that Family Foundations offered WZVs and partners the choice of completing the written questionnaire by mail or a secure web-based platform (PsychData, <http://psychdata.com>). The majority of WZVs (63.3%; $n = 135$) and partners (63.5%; $n = 153$) completing questionnaires ($n = 213$ WZV; $n = 241$ partners) did so via web-based platform.

2.3 | Measures

2.3.1 | Demographic and military information—WZV deployment and duty status information was confirmed with Defense Manpower and Data Center records. Participants self-reported demographic information. Partners reported on military service history, relationship duration with the WZV, household income, number of children in the household, and number of months the WZV was away over the past year (including both military- and nonmilitary leave).

2.3.2. | Psychopathology and distress outcomes—*WZV PTSD* was assessed by telephone interview using the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995), a structured clinical interview based on the *Diagnostic and Statistical Manual, Fourth Edition, Text Revision* (DSM-IV; APA, 2000) criteria. In addition to diagnostic symptom congruency, PTSD diagnosis required: (a) an overall severity score of ≥ 45 (Orr, 1997); (b) duration of symptoms for ≥ 1 month; and (c) a score of ≥ 2 on either the distress or functional impairment item. To minimize respondent burden among partners, who reported on more outcome elements than veterans, we assessed partner PTSD with the PTSD Checklist-Civilian Version (PCL-C; Ruggiero, Del Ben, Scotti, & Rabalais, 2003) by phone. Consistent with prior research (Terhakopian, Sinaii, Engel, Schnurr, & Hoge, 2008), partner PTSD cases were defined as DSM-IV symptom congruency plus a score of ≥ 34 .

WZV and partner depressive disorders (operationalized as current major depressive episode or dysthymia), and partner *anxiety disorders* (operationalized as current panic disorder, agoraphobia, or generalized anxiety disorder) were screened using the Mini-International Neuropsychiatric Interview (MINI) version 5.0 (Sheehan et al., 1997). *WZV and partner current alcohol use* was assessed with written responses to the Alcohol Use Disorders Identification Test and classified as nonproblematic or harmful/hazardous, using published cutpoints (Saunders, Aasland, Babor, De la Fuente, & Grant, 1993).

Inter-rater reliability, calculated on a randomly selected subset of 14% of the WZV and 12% of the partner Family Foundations administered interviews, was high for CAPS PTSD ($\kappa = 0.99$) and MINI (κ s ranging from 0.86 for anxiety to 1.0 for depression) diagnoses.

2.3.3 | Family outcomes—*Satisfaction with the family and family communication* were measured by partner report on the 10-item Satisfaction and Communication subscales of the Family Adaptability and Cohesion Evaluation Scales-IV (FACES-IV; Olson, Gorall, & Tiesel, 2008). Response options for the Satisfaction subscale reflected the extent (1 = *very dissatisfied* to 5 = *extremely satisfied*) to which respondents reported satisfaction with their family functioning (e.g., “your family’s ability to cope with stress”); response options for the Communication subscale reflected the degree (1 = strongly disagree to 5 = strongly agree) to which respondents endorsed various facets of communication within the family (e.g., “Family members try to understand each other’s feelings”). Higher summary scores (range: 10–50 for each) indicate higher satisfaction and better communication.

Relationship adjustment was measured by partner report on the 32-item Dyadic Adjustment Scale (DAS; Kurdek, 1992; Spanier, 1976). Response options reflected the degree (0 = *always disagree* to 5 = *always agree*) to which respondents believed they and their partners agreed on certain events (e.g., “making major decisions”) or frequency of agreement/disagreement (0 = *all the time* to 5 = *never*) for others (e.g., “How often do you and your mate quarrel?”). Higher summary scores (range: 0–160) indicate better adjustment.

Relationship aggression was measured using the Revised Conflict Tactics Scales (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996), which was completed by both the WZV and partner and includes the 8-item Psychological Aggression and 12-item Physical Assault subscales. Response options for both subscales ranged from never to *more than 20 times*.

Psychological Aggression items were recoded to reflect the estimated frequency of each behavior, with midpoints used for responses containing a range of scores (e.g., 3–5 times received a score of 4) and reports of more than 20 times recoded as 25 (Straus et al., 1996). Physical Aggression items were recoded into two categories (0 = no instance of aggression in the past 6 months, 1 = one or more instances of aggression in the past 6 months) and summed to reflect a total “variety score” (Moffitt et al., 1997). This approach reduces skewness, reduces estimation errors possibly occurring during recall, and has been shown to be as reliable as frequency scores (Vega & O’Leary, 2007). To offset the tendency to underreport one’s own IPV (Taft, Macdonald, Creech, Monson & Murphy, 2016), for each item, the higher score reported by either partner was used as the final score.

2.4 | Analysis

Data were screened for normality and patterns of missingness. Skew and kurtosis values were within normal limits (Kline, 2015) except for CTS-2 scale scores, which were square-root transformed. Data were missing for <5% of the sample, except for partner problematic alcohol use, which was missing for 7% (n = 18). If any primary predictor (e.g., veteran PTSD) or outcome data (e.g., problematic alcohol use) were missing, participants with missing data were not included in the relevant model; thus, sample sizes varied by model, ranging from 226 to 244. To handle missing covariate data, we generated maximum likelihood estimates of missing covariates based on participants’ responses to all variables in the analytic model (Graham, 2012). This approach assumes that data were missing at random and produces unbiased estimates provided that correlates of missingness have been incorporated in the estimation model (Graham, 2012). To assess nonresponse bias among WZVs, we used χ^2 tests and t tests to compare the demographic and military characteristics of eligible WZVs referred from CSP#566 (our predominant recruitment strategy; n = 351) with the sample of CSP#566 referred WZVs who completed Family Foundations outcomes assessments (n = 243). We similarly compared CSP#566-referred WZVs with non-CSP#566 participants recruited from NDHS. Logistic regression was used to examine associations between WZV and partner mental health diagnoses. WZV PTSD and depression were entered into separate regression analyses for each partner mental health category examined (PTSD, depression, anxiety, harmful/hazardous alcohol use). Separate linear regression models were used to examine associations of WZV PTSD and depression with continuous family functioning variables (relationship adjustment, family satisfaction, family communication, psychological and physical IPV victimization and perpetration). Candidate covariates in multivariate models were included in the models if their bivariate associations with outcome variables were statistically significant. All multivariate models were adjusted for WZV military status (Active Duty, National Guard, military veteran), self-reported ethnic minority status (Caucasian vs. other), household income, relationship length (0–5, 6–10, 11+ years), and WZV problematic (i.e., harmful/hazardous) alcohol use.

3 | RESULTS

3.1 | Sample characteristics

WZVs who completed CSP#566 and enrolled in the Family Foundations study did not differ significantly on demographic, military, mental health, or family characteristics from eligible

CSP#566 participants who did not enroll in Family Foundations or from WZVs recruited from the NDHS cohort who had not participated in CSP#566 (data not shown).

As shown in Table 1, the WZV sample included both current service members and military veterans. Over 20% of the WZVs met criteria for either PTSD ($n = 51$) or depression ($n = 56$); 15% ($n = 37$) met criteria for both. On average, compared with the original DAS normative sample comprised of married and divorced individuals (Spanier, 1976), partners reported relationship adjustment scores indicative of nondistressed couples. Compared with the original FACES-IV normative sample comprised of a convenience sample of students and their family members (Olson et al., 2008), partners reported moderately high family communication (65th percentile), reflecting that they generally felt good about their communication with family members; however, partners reported somewhat lower family satisfaction than the normative sample (35th percentile; Olson et al., 2008). Experienced and perpetrated psychological IPV occurred frequently in most couples (approximately weekly over the past 6 months); physical IPV occurred less frequently (approximately 73% of couples reported no instance of experiencing or perpetrating physical IPV over the past 6 months). IPV rates in our sample reflect typical community prevalence rates reported on the Conflict Tactics Scale (e.g., Frye & Karney, 2006).

3.2 | Associations of WZV mental disorders with partner mental health and family functioning

Coefficients from fully adjusted logistic regression models examining associations between WZV and partner mental disorders are displayed in Table 2. WZV PTSD was not significantly associated with partner mental health outcomes, but WZV depression was associated with higher odds of partner depression and partner anxiety. WZV alcohol use was associated with partner alcohol use. No covariate was significantly associated with a partner mental health diagnosis.

Coefficients from fully adjusted linear regression models examining associations between WZV mental disorders, partner-related family functioning, and frequency of psychological and physical IPV experienced and perpetrated by partners are displayed in Table 3. WZV PTSD and depression were each associated with poorer relationship adjustment, lower family satisfaction, and poorer family communication. WZV PTSD and depression were additionally associated with psychological IPV experienced and perpetrated by partners, but not physical IPV victimization or perpetration. Lower household income and WZV problematic alcohol use were associated with greater psychological IPV perpetration; shorter relationship length and WZV problematic alcohol use were associated with greater physical IPV perpetration.

3.3 | Post hoc analyses

Because research suggests potential contributions of individual mental health symptoms to relationship dysfunction, indicating that both WZV and partner mental disorders may contribute to relationship dysfunction (see Monson, Fredman, & Dekel, 2010 for a review), we explored associations between partner mental health with relationship variables as post hoc analyses. Results of bivariate correlational analyses indicated that poorer relationship

functioning across all relationship measures were associated with partner depression and anxiety disorders ($ps = <.001-.044$). Similarly, all relationship functioning variables except physical IPV perpetration, were associated with partner PTSD ($ps = <.001-.016$). Only family communication was associated with partner alcohol problems ($p = .026$).

4 | DISCUSSION

This study examined associations of WZV PTSD and depression with partner mental health diagnoses and partner-reported family and relationship outcomes. Partially supporting our hypotheses, WZV depression, but not PTSD, increased risk of partner mental disorders, including depression and anxiety. Consistent with expectations, partners of WZVs with PTSD and depression were more likely to report poorer relationship adjustment, lower family satisfaction and worse communication. Further, WZV mental disorders were significantly associated with higher rates of psychological (but not physical) IPV victimization and perpetration.

Our finding that WZV depression increased risk of mental disorders among partners aligns with research demonstrating associations between partner and WZV anxious/depressive disorders (e.g., Toomey et al., 2019). In contrast, PTSD experienced by the WZV was not associated with partner mental health, which differs from research indicating significant associations between PTSD and a range of negative partner mental health outcomes (e.g., Donoho et al., 2018; Manguno-Mire et al., 2007). Though most research examining WZV mental health has focused on the burden of PTSD, as opposed to depression, on partner mental health, prior work suggests that PTSD symptoms overlapping with dysphoria may explain the greatest variance in negative relationship outcomes (e.g., Erbes, Meis, Polusny, & Compton, 2011). Finally, we did not find significant associations between either WZV PTSD or depression and problematic partner alcohol use. Consistent with literature suggesting bidirectional influence among dyads on alcohol consumption, problematic WZV alcohol use was significantly associated with problematic partner alcohol use (Leonard & Homish, 2008; McLeod, 1993). Although our cross-sectional analyses preclude examination of mediating factors or directionality of effects, greater prevalence of mental health problems among partners of depressed WZVs may reflect several factors, including assortative mating, in which individuals with mental disorders may be more likely to couple (e.g., Nordsletten et al., 2016), reintegration challenges persisting for years following deployment (e.g., altered family roles), and indirect effects of WZV mental health on partner psychopathology via increased relationship discord.

In support of the latter possibility and consistent with research across military and civilian populations (e.g., Campbell & Renshaw, 2018; Pflieger et al., 2018), WZV PTSD and depression were both associated with partner reports of relatively lower levels of relationship adjustment, family satisfaction, and family communication. In turn, posthoc analyses revealed significant associations between partner mental health (PTSD, depression, anxiety, and problematic alcohol use) and relationship problems, supporting possible dynamic associations among WZV, partner, and family functioning. Of note, however, dyads participating in the study generally reported average relationship functioning (Olson et al.,

2008; Spanier, 1976), with the exception of moderately low satisfaction. Therefore, observed decrements in our sample were only relative.

In addition to relative difficulties in relationship adjustment, satisfaction, and communication, we found that WZV PTSD and depression were associated with higher rates of IPV. Specifically, partners of WZVs with PTSD and depression reported more frequent psychological perpetration *and* victimization, consistent with research indicating that IPV is often reciprocal (e.g., Follingstad & Edmundson, 2010). For example, Teten et al. (2010) found that, compared with male OIF/OEF WZVs without PTSD, those with PTSD were 2.5 times more likely to report perpetration and 1.6 times more likely to report IPV victimization. Findings align with prospective research demonstrating that PTSD (e.g., Marshall et al., 2019) and depression (e.g., Melander, Noel, & Tyler, 2010) predict subsequent family violence. Finally, consistent with research identifying links between drinking behaviors and IPV (Foran & O’Leary, 2008), WZV problematic alcohol use was associated with psychological and physical IPV perpetration.

Our findings add to a growing body of research highlighting the interpersonal consequences of WZV psychological distress. PTSD and depression symptoms are associated with both intrapersonal (e.g., behavioral withdrawal, avoidant coping, emotion dysregulation), and interpersonal (e.g., reduced emotional and physical intimacy, lower support provision, communication deficits) processes, which can adversely affect dyadic functioning (e.g., cohesion, conflict, satisfaction), and exacerbate symptoms of depression and anxiety in partners (e.g., Campbell & Renshaw, 2018; Don & Mickelson, 2012; Monson et al., 2010). Continued longitudinal research will help distinguish mechanisms contributing to increased risk of partner mental health diagnoses and relationship problems among military families.

Our findings also have implications for clinical care at both the individual and couple-level. Research has suggested that symptoms of *both* partners (as opposed to one member alone) reciprocally influence the risk of intimate relationship dysfunction (e.g., Creech et al., 2019; Whisman & Uebelacker, 2009), which in turn, may influence the development and course of mental disorders (see Campbell & Renshaw, 2018; Monson et al., 2010). As such, development and evaluation of interventions aimed at alleviating both individual *and* couple-level distress may be warranted. For example, Conjoint Cognitive Behavioral Therapy for PTSD and Behavioral Couples Therapy are couple-level interventions for PTSD and depression, respectively, associated with decreased psychological distress across partners, as well as decrements in relationship distress (see Fischer, Baucom, & Cohen, 2016 for a review).

Several methodological limitations warrant consideration. First, our sample was limited in racial/ethnic diversity, which allowed us to examine only White versus racial/ethnic minority status as a factor, potentially masking important cultural differences across different ethnic minority groups. Second, though we assessed WZV PTSD via a structured clinical interview (i.e., CAPS), we assessed partner PTSD with the PCL-C to minimize respondent burden. Although structured clinical interviews are considered to be gold standards, the PCL-C, which was clinician-administered by phone in our study, is validated against structured interviews (e.g., Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Third, our study

did not capture the WZV's perspective on relationship functioning, which may differ from that of the partner. We intentionally structured this study around partner perspectives of relationship functioning, however, to help offset the potential for inflated associations between WZV-reported mental health problems and WZV perceptions of relationship functioning. Finally, data were cross-sectional, precluding conclusions regarding directionality. Future investigations incorporating repeated measurements will enable a more nuanced understanding of how associations between WZV mental health, partner mental health, and family outcomes evolve over time.

5 | CONCLUSIONS

Limitations notwithstanding, our findings contribute to the growing body of research demonstrating that partners of WZVs with mental health diagnoses are themselves at greater risk of mental disorders, intimate relationship dysfunction, and IPV. Continued examination of the conditions under which WZV psychopathology influences the development of family mental health concerns and relationship dysfunction will be critical to helping guide effective channeling of resources and outreach to potentially vulnerable military and veteran families.

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FIGURE 1.

Consort diagram of final analyzed study sample. WZV, Warzone Veteran

TABLE 1

Characteristics	WZVs, <i>M</i> (<i>SD</i>) or no. (%)	Partners, <i>M</i> (<i>SD</i>) or no. (%)
1a. Sample characteristics (<i>N</i> = 245 dyads)		
Sex, male, no. (%)	235 (95.9)	10 (4.1)
Age, years, <i>M</i> (<i>SD</i>)	36.0 (6.0)	34.6 (6.5)
Race/ethnicity, no. (%)		
Caucasian	178 (73.3)	180 (74.7)
African-American	24 (9.9)	18 (7.5)
Hispanic/Latino	29 (11.9)	24 (10.0)
Other	12 (4.9)	19 (7.9)
Education, no. (%)		
<High school/high school/GED	32 (15.5)	45 (18.7)
Some college/Associates	113 (54.6)	105 (43.6)
College/advanced degree	62 (30.0)	91 (37.8)
Military status, no. (%)		
Ever served	245 (100)	41 (17.0)
Active Duty (current)	84 (34.3)	
National Guard (current)	28 (11.4)	
Military Veteran (current)	131 (53.9)	
Number of deployments, no. (%)		
1	77 (37.2)	-
2	57 (27.5)	-
3 or more	73 (35.4)	-
Months away in past year, <i>M</i> (<i>SD</i>)	1.54 (2.30)	-
Diagnoses, no. (%)		
PTSD ^a	51 (20.8)	28 (11.6)
MINI Depressive disorder	56 (23.0)	26 (10.8)
AUDIT problematic alcohol use	35 (14.4)	14 (6.2)
MINI partner Anxiety disorder	-	46 (19.1)
1b. Family Characteristics (<i>N</i> = 245 dyads)		
Married, no. (%)		224 (92.9)
Relationship length, years, <i>M</i> (<i>SD</i>)		10.8 (6.7)
No. children in home, <i>M</i> (<i>SD</i>)		1.6 (1.2)
Income, no. (%)		
<\$25,000		14 (10.4)
\$25,000 to \$49,999		61 (45.2)
\$50,000 to \$74,999		91 (67.4)
\$75,000 to \$99,999		44 (32.6)
\$100,000 and above		25 (18.5)
Partner-reported family functioning, <i>M</i> (<i>SD</i>)		
DAS Relationship Adjustment		109.84 (21.16)
FACES-IV Satisfaction		34.66 (8.83)

Characteristics	WZVs, <i>M (SD)</i> or no. (%)	Partners, <i>M (SD)</i> or no. (%)
FACES-IV Communication		38.75 (8.10)
CTS-2 Psychological Victimization		23.12 (25.36)
CTS-2 Psychological Perpetration		19.56 (20.96)
CTS-2 Physical Victimization		0.60 (1.39)
CTS-2 Physical Perpetration		0.54 (1.19)

Abbreviations: AUDIT, Alcohol Use Disorders Identification Test; CTS-2, conflict tactics scale—2; DAS, Dyadic Adjustment Scale; FACES-IV, Family Adaptability and Cohesion Scales—IV; GED, general education diploma; MINI, Mini-International Neuropsychiatric Interview; PTSD, posttraumatic stress disorder; WZV, warzone veteran.

^aWZVs completed the Clinician-Administered PTSD Scale; partners completed the PTSD Checklist-civilian version.

TABLE 2

Logistic Regression Examining Associations Between WZV and Partner Mental Health

2a. Associations between WZV PTSD diagnosis and partner mental health					
Partner diagnosis					
	PCL-C PTSD OR [95% CI]	MINI Depression OR [95% CI]	MINI Anxiety OR [95% CI]	AUDIT alcohol problems OR [95% CI]	
Military status of WZV [†]					
National Guard	0.26 [0.03, 2.13]	0.00 [0.00, inf]	0.54 [0.16, 1.76]	0.61 [0.07, 5.55]	
Active Duty	0.85 [0.35, 2.05]	0.50 [0.19, 1.31]	0.54 [0.25, 1.17]	0.81 [0.23, 2.86]	
Minority status [‡]					
Racial or ethnic minority	0.90 [0.35, 2.29]	2.41 [0.98, 5.90]	0.65 [0.29, 1.50]	0.16 [0.02, 1.33]	
Household income	1.01 [0.73, 1.40]	0.74 [0.50, 1.10]	0.83 [0.62, 1.10]	1.04 [0.67, 1.62]	
Relationship length [§]	0.94 [0.57, 1.56]	0.78 [0.46, 1.34]	0.95 [0.62, 1.44]	1.28 [0.62, 2.67]	
WZV problematic alcohol use [¶]	1.39 [0.50, 3.88]	1.56 [0.57, 4.24]	1.50 [0.63, 3.57]	4.77 [1.30, 17.48] [*]	
WZV CAPS PTSD diagnosis	2.05 [0.85, 4.93]	1.90 [0.76, 4.72]	1.96 [0.93, 4.10]	0.75 [0.18, 3.10]	
2b. Associations between WZV depressive disorder and partner mental health					
Partner diagnosis					
	PCL-C PTSD OR [95% CI]	MINI Depression OR [95% CI]	MINI Anxiety OR [95% CI]	AUDIT alcohol problems OR [95% CI]	
Military status of WZV [†]					
National Guard	0.24 [0.03, 1.98]	0.00 [0.00, inf]	0.50 [0.15, 1.65]	0.64 [0.07, 5.73]	
Active duty	0.84 [0.35, 2.04]	0.51 [0.19, 1.35]	0.53 [0.24, 1.15]	0.87 [0.24, 3.08]	
Minority status [‡]					
Racial or ethnic minority	0.86 [0.34, 2.20]	2.26 [0.91, 5.59]	0.62 [0.27, 1.43]	0.17 [0.02, 1.38]	
Household income	1.03 [0.74, 1.43]	0.77 [0.52, 1.16]	0.84 [0.63, 1.13]	1.07 [0.69, 1.66]	
Relationship length [§]	0.89 [0.53, 1.49]	0.75 [0.44, 1.29]	0.90 [0.59, 1.38]	1.24 [0.59, 2.59]	
WZV problematic alcohol use [¶]	1.26 [0.45, 3.54]	1.38 [0.50, 3.81]	1.34 [0.56, 3.22]	4.06 [1.09, 15.16] [*]	
WZV MINI Depression diagnosis	2.27 [0.94, 5.47]	2.97 [1.22, 7.25] [*]	2.25 [1.08, 4.70] [*]	1.38 [0.39, 4.96]	

Note: OR = Odds Ratio; CI = Confidence Interval; WZV = warzone veteran; PTSD = Posttraumatic Stress Disorder; PCL-C = PTSD Checklist - Civilian version; CAPS = Clinician Administered PTSD Scale; MINI = Mini-International Neuropsychiatric Interview Version 5.

[†]Reference = military veteran.

[‡]Reference = White non-Hispanic/Latino.

[§]Coded 0–5, 6–10, 11+ years.

[¶]Based on Alcohol Use Disorders Identification Test (non-problematic versus harmful/hazardous).

^{*} $p < .05$.

TABLE 3

Linear Regression Examining Associations Between WZV Mental Health and Family Functioning

3a. Associations between WZV PTSD diagnosis and family functioning						
	DAS Relationship Adjustment B (SE)	FACES-IV Family Satisfaction B (SE)	FACES-IV Family Communication B (SE)	CTS-2 Psychological Victimization B (SE)	CTS-2 Psychological Perpetration B (SE)	CTS-2 Physical Perpetration B (SE)
Military status of WZV [†]						
National Guard	6.19 (4.43)	-0.21 (1.85)	1.38 (1.73)	-0.88 (0.54)	-0.38 (0.48)	-0.11 (0.15)
Active Duty	-1.90 (2.92)	-0.17 (1.22)	-0.26 (1.14)	-0.65 (0.36)	-0.20 (0.32)	-0.12 (0.10)
Minority status [‡]						
Racial/ethnic minority	0.20 (3.09)	0.54 (1.30)	0.08 (1.21)	-0.18 (0.38)	0.15 (0.34)	0.08 (0.10)
Household income	1.66 (1.08)	0.81 (0.45)	0.32 (0.42)	-0.24 (0.13)	-0.27 (0.12)*	-0.05 (0.04)
Relationship length [§]	-0.69 (1.71)	0.58 (0.72)	0.18 (0.67)	-0.16 (0.21)	-0.27 (0.19)	-0.07 (0.06)
WZV problematic alcohol use [¶]	-5.65 (3.84)	-2.19 (1.61)	-0.74 (1.50)	0.82 (0.47)	1.02 (0.42)*	0.15 (0.13)
WZV CAPS PTSD diagnosis	-13.40 (3.31)***	-5.45 (1.39)***	-4.95 (1.29)***	1.06 (0.41)*	0.79 (0.36)*	0.16 (0.11)
3b. Associations between WZV depressive disorder and family functioning						
	DAS Relationship Adjustment B (SE)	FACES-IV Family Satisfaction B (SE)	FACES-IV Family Communication B (SE)	CTS-2 Psychological Victimization B (SE)	CTS-2 Psychological Perpetration B (SE)	CTS-2 Physical Perpetration B (SE)
Military status of WZV [†]						
National Guard	7.12 (4.45)	-0.09 (1.81)	1.53 (1.70)	-0.92 (0.54)	-0.42 (0.48)	-0.12 (0.15)
Active Duty	-1.65 (2.95)	-0.30 (1.20)	-0.34 (1.13)	-0.65 (0.36)	-0.20 (0.32)	-0.12 (0.10)
Minority status [‡]						
Racial/ethnic minority	0.48 (3.12)	0.69 (1.27)	0.22 (1.19)	-0.20 (0.38)	0.13 (0.34)	0.08 (0.10)
Household income	1.48 (1.10)	0.61 (0.45)	0.16 (0.42)	-0.21 (0.13)	-0.25 (0.12)*	-0.05 (0.04)
Relationship length [§]	-0.05 (1.72)	0.87 (0.70)	0.44 (0.66)	-0.21 (0.21)	-0.31 (0.19)	-0.08 (0.06)
WZV problematic alcohol use [¶]	-4.58 (3.93)	-1.28 (1.60)	0.01 (1.50)	0.68 (0.48)	0.93 (0.42)*	0.14 (0.13)
						0.31 (0.12)*

3a. Associations between WZV PTSD diagnosis and family functioning

	DAS Relationship Adjustment B (SE)	FACES-IV Family Satisfaction B (SE)	FACES-IV Family Communication B (SE)	CTS-2 Psychological Victimization B (SE)	CTS-2 Psychological Perpetration B (SE)	CTS-2 Physical Victimization B (SE)	CTS-2 Physical Perpetration B (SE)
WZV MINI Depression diagnosis	-11.53 (3.29) **	-6.79 (1.34) ***	-5.84 (1.26) ***	1.14 (0.40) **	0.82 (0.36) *	0.15 (0.11)	-0.02 (0.10)

Note: B = Unstandardized Regression Coefficient; SE = Standard Error; WZV = warzone veteran; PTSD = Posttraumatic Stress Disorder; CAPS = Clinician Administered PTSD Scale; MINI = Mini-International Neuropsychiatric Interview Version 5; DAS = Dyadic Adjustment Scale; FACES-IV = Family Adaptability and Cohesion Scales – IV; CTS-2 = Conflict Tactics Scale – 2.

[†]Reference = military veteran.

[‡]Reference = White non-Hispanic/Latino.

[§]Coded 0–5, 6–10, 11+ years.

[¶]Based on Alcohol Use Disorders Identification Test (non-problematic versus harmful/hazardous).

* $p < .05$

** $p < .01$

*** $p < .001$.