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Social networks, mental health problems, and mental health service utilization in OEF/OIF National Guard veterans

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Abstract

Purpose Low social support and small social network size have been associated with a variety of negative mental health outcomes, while their impact on mental health services use is less clear. To date, few studies have examined these associations in National Guard service members, where frequency of mental health problems is high, social support may come from military as well as other sources, and services use may be suboptimal.

Methods Surveys were administered to 1448 recently returned National Guard members. Multivariable regression models assessed the associations between social support characteristics, probable mental health conditions, and service utilization.

Results In bivariate analyses, large social network size, high social network diversity, high perceived social support, and high military unit support were each associated with lower likelihood of having a probable mental health condition (*p* < .001). In adjusted analyses, high perceived social support (OR .90, CI .88–.92) and high unit support (OR .96, CI .94–.97) continued to be significantly

associated with lower likelihood of mental health conditions. Two social support measures were associated with lower likelihood of receiving mental health services in bivariate analyses, but were not significant in adjusted models.

Conclusions General social support and military-specific support were robustly associated with reduced mental health symptoms in National Guard members. Policy makers, military leaders, and clinicians should attend to service members' level of support from both the community and their units and continue efforts to bolster these supports. Other strategies, such as focused outreach, may be needed to bring National Guard members with need into mental health care.

Keywords Social support · Social network · PTSD · Depression · Veteran · National Guard

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Introduction

Social support can be conceptualized as the comfort or assistance received through contact with others [1]. Social support is robustly associated with mental and physical health outcomes across a variety of contexts and for a wide range of individuals [2–5]. For example, low social support is associated with greater mortality, suicidal ideation, dementia, and depression [2–5]. Reservists and National Guard service members report lower social support than the active component of the armed forces [6, 7] and thus may be at increased risk for negative mental health outcomes [6, 8].

Social support is a multidimensional construct that can be assessed through both structural social support and perceived social support [9, 10]. Structural social support is

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often measured by the size of one's social network (the number of members in the network) and by the diversity of one's network (the different types of supportive roles filled by those network members) [9, 10]. Perceived social support is one's subjective perception of the support received or available from one's social network [9, 10]. Both types of support are associated with mental health outcomes [9, 10] and may be associated with mental health treatment participation [11–15].

Several lines of evidence suggest that larger social network size may be associated with better mental health in National Guard. Social network size is inversely associated with mental health problems in community samples [9, 10, 16–18], veterans [19–21], and other groups including cancer survivors [22]. One study found an inverse linear relationship between social network size and mental health conditions in veterans such that the probability of having a mental health condition was 38.3 % for those reporting no social network members, 28.1 % for those reporting one to two members, 18.5 % for those reporting three to five members, and 13.1 % for those reporting six or more members [20]. Social network size is also inversely associated with the severity of mental health problems [19], and social support may deteriorate as mental health conditions progress. For example, social network size decreased in Vietnam era veterans who developed PTSD as compared to veterans who did not [23]. However, the relationship between social network size and mental health has not been assessed in National Guard soldiers, who may have social networks in both civilian and military sectors, but also have prolonged periods of physical separation from both networks. There may also be unique links between community versus military social networks and mental health.

Perceived social support is another facet of social support that is likely related to mental health in National Guard. Low perceived social support has been associated with increased risk for depression [10, 24–31], posttraumatic stress disorder (PTSD) [9, 32–35], psychological distress [36–38], and poor quality of life [22, 39] in multiple populations. This relationship may be particularly strong in military and veteran populations [21, 23, 34–36, 40–42]. In National Guard veterans, perceived post-deployment social support has been associated with fewer PTSD symptoms, depression symptoms, and psychosocial difficulties [43–45]. However, it is unknown what the independent contributions of perceived and structural social support are on mental health in National Guard.

A specific component of perceived social support relevant to military populations is military unit support, defined as support from peers and leadership in one's unit [46]. Low unit support is associated with higher incidence [43–45, 47, 48] and severity [49, 50] of depression and PTSD in active duty and veteran samples. Reservists report lower

unit support than regular armed forces [6]; thus National Guard service members may be at particular risk for negative outcomes associated with low unit support. Prior findings of the relative effects on mental health functioning of perceived unit support versus perceived support from other sources have been mixed. In some studies, military social support has a larger impact than community (friend or family) support on mental health symptoms and service utilization in returning veterans [45, 51, 52]. However, one investigation of returning veterans found that community support was more protective against PTSD than unit support [53]. Given the dual social roles (military and civilian) inhabited by National Guard soldiers, the relationship between unit support and mental health problems would be better assessed in models that also included social network size and diversity, as well as perceived community support.

Some have argued that perceived social support is more closely associated with mental health than structural social support [54–57]. This argument is supported by studies that have found that perceived support mediates the effect of structural support on mental health problems or is a stronger predictor of mental health problems [16, 17, 21, 58–61] or of health care utilization [62, 63] than structural support. However, concerns have arisen that perceived social support might be influenced by negative mood states [64]. Thus, structural social support may potentially constitute a more "objective" way to measure social support because it is less influenced by concurrent mood. Furthermore, in at least one national survey, diversity of social support was more strongly associated with lower levels of PTSD symptoms than the perception of strong social support [9]. Thus, an assessment of social support that incorporates perceived support and structural components of the social network is critical to examining the relationship between support and health outcomes of interest to military populations.

Although the relationship between social support and mental health conditions tends to be relatively consistent, findings on the relationship between social support and mental health service utilization remain equivocal [52, 65–71]. Social networks and perceived social support may have both stress-reducing functions (reducing the psychological impact of stress) and positive referral functions (encouraging treatment when it is needed) [63]. Evidence for the referral function comes from the fact that social support has been associated with greater levels of mental health service utilization amongst individuals with PTSD [11–15]. This relationship extends to veteran samples [15, 52, 72]. A study by Harpaz-Rotem and colleagues [52] suggested that unit support might have particularly strong influence over mental health service initiation in veterans. The authors interpreted this finding to suggest that the unique relationships between soldiers during military

service can have long-lasting effects on both subsequent mental health symptoms and on veterans' attitudes about seeking mental health treatment when they do have symptoms [52]. In this case, social support may act as an enabling factor to facilitate treatment initiation [73].

In other studies with veteran samples, greater levels of social support are associated with reduced levels of mental health service utilization [74–77], suggesting a potential stress-reduction function. From this perspective, social support acts as a buffer to symptoms, thus reducing the need for care [78]. However, the source of support may alter the impact on service utilization. For instance, in a community sample of individuals who had experienced a stressful life event, greater perceived support from a spouse was associated with increased use of medical services, but greater support from friends and relatives was associated with decreased use of services [63]. Since different sources of social support may have different roles in facilitating or discouraging mental health service utilization, this remains an important topic of investigation in National Guard members.

Given the significant interrelationships between social support and mental health, the current study was designed to test the association between social support, social network characteristics, mental health symptoms, and mental health service utilization in National Guard service members with recent deployments to Iraq or Afghanistan. Though previous studies have addressed some of these topics in Vietnam era veterans, few have examined them in veterans from recent (OEF/OIF) conflicts, where the frequency of mental health problems is high [79, 80] but service utilization remains low [74, 81]. Since the experiences of service members from different combat eras may differ, as may levels of social support upon their return from deployments [23], this remains an important area of investigation. Furthermore, many previous studies have been limited by assessing only one facet of social support or social network characteristics [2], and no studies to date have concurrently assessed all four components of social support examined here (social network size, social network diversity, perceived unit support, and perceived general social support) or examined which aspects of social support are most closely connected to mental health in returning veterans. In addition, few previous investigations have controlled for mental health symptom severity in testing the relationship between social support and mental health service utilization, which is an important step since severity of mental illness is associated with both social support and with service utilization [15]. In the current study, we hypothesized that risk for mental health conditions would be independently associated with small social network size, low social network diversity, low perceived social support, and low perceived military unit support. We

also hypothesized that greater rates of mental health service utilization would be associated with higher levels of perceived social and unit support and larger and more diverse social networks.

Methods

Participants and procedures

Participants were recruited from returning National Guard soldiers in a Midwestern state who completed surveys as part of a larger study to examine the health status of National Guard veterans and the implementation of a peer support program. Data collection extended from August 2011 to December 2013, with data being collected approximately 12 months following the soldiers' return from overseas deployments to Iraq or Afghanistan. Soldiers were recruited in person via group announcements during monthly drill weekends and by mail using a slightly modified version of the Dillman method [82]. A total of 1448 National Guard members returned the survey, constituting 53 % of eligible National Guard members. The study was approved by the Institutional Review Board of the Department of Veterans Affairs Ann Arbor Healthcare System and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Data were collected under an approved waiver of written informed consent. For further details of the study, please see [83, 84].

Outcome variables

Probable mental health conditions

Probable mental health conditions were assessed via validated measures for PTSD, depression, generalized anxiety, and suicide risk. Suicide risk was included in this metric because a moderate-to-high level of suicidal behavior is often indicative of a mental health condition. Participants were coded as having a probable mental health condition if they had a positive screen on any one or more of the measures. PTSD symptoms were measured using the Posttraumatic Stress Disorder Checklist-Specific Version (PCL-S), a self-report measure of the 17 DSM-IV PTSD symptoms [85]. Probable PTSD was determined by a PCL-S score of ≥ 50. Depression was assessed with the Patient Health Questionnaire (PHQ-9). The PHQ-9 assesses nine DSM-IV symptoms of depression over a 2-week period and has a sensitivity of 88 % and a specificity of 88 % for major depression [86]. Probable depressive disorder was determined by a PHQ-9 score of ≥ 10 [87–90]. Generalized anxiety was assessed using the GAD-7 [91], a brief

measure for assessing generalized anxiety disorder with a sensitivity of 89 % and a specificity of 82 % [91]. Probable GAD was determined by a GAD-7 score of ≥10. Suicidal ideation was assessed using the Suicide Behaviors Questionnaire-Revised (SBQ-R), a 4-item measure that assesses different dimensions of suicidal thoughts and behaviors [92]. Suicide risk was determined by an SBQ-R score of ≥7. A composite measure was then generated in which participants were coded as either having at least one probable mental health condition or not having any probable mental health conditions. A positive score on any of the screening instruments was used to create a dichotomous (yes/no) variable reflecting any probable mental health condition.

Mental health service utilization

Mental health service utilization in the past year was assessed from 14 items that asked participants to indicate if they "had received mental health services for a stress, emotional, alcohol, or family problem" from either general medical or mental health providers in several different settings, including military, civilian, Veterans Affairs health clinics, or Vet Centers (see [83]). An affirmative response to receiving treatment from any of these providers in the past year was used to create a dichotomous variable reflecting any mental health treatment.

Independent variables

Social network size

A measure of social network size was created from the number of people (0–10) in a participant's self-generated list of "of all the people you would go to if you needed support or help during a stressful time in your life." Social network size was then dichotomized based on a median split [following 9, 10, 63].

Social network diversity

A measure of social network diversity was created from the number of relationship types (0–7) that a participant indicated receiving support from. For each individual in the participant's self-generated list of social network members, the participant was asked to indicate his or her relationship with that person. Options included spouse or partner, family member, friend, coworker, professional help-giver, religious leader, or National Guard member. Participants were asked to check all options that applied. A participant was coded as receiving support from a particular type of relationship if they categorized at least one social network member as belonging to that relationship type. Social network diversity score was then dichotomized at the median.

Perceived social support

Perceived social support was assessed via the interpersonal support evaluation list-12 (ISEL-12), 12 items assessing perceived interpersonal support [93–95]. Items included statements such as, "If I were sick, I could easily find someone to help me with my daily chores", and "If I wanted to go on a trip for a day, (for example, to the country or mountains), I would have a hard time finding someone to go with me." Responses to each item were rated on a four-point scale ranging from 0, definitely false, to 3, definitely true. Negative items were reverse coded. Higher scores indicate higher levels of social support. The ISEL-12 has good convergent and divergent validity and adequate test–retest and internal reliability [35, 95, 96]. In the present sample, the ISEL-12 evidenced good internal consistency ($\alpha = .89$)

Deployment Risk and Resilience Inventory Unit Support Scale

The Unit Support Scale [46, 97] is a 10-item self-report instrument from the Deployment Risk and Resilience Inventory (DRRI) that assesses the amount of assistance and encouragement that an individual perceives from the military in general, unit leaders, and other unit members. Items include statements such as, "My unit was like family to me" and, "The commanding officer(s) in my unit were supportive of my efforts." Responses to each item were rated on a 5-point Likert scale from 1, strongly disagree, to 5, strongly agree. The Unit Support Scale has good internal consistency and content validity [46]. In the present sample, the Unit Support Scale evidenced excellent internal consistency ($\alpha = .94$).

Covariates

Age group (18–21, 22–30, 31–40, 41–50, and >50), sex (male/female), race/ethnicity (White/Nonwhite), income (<$25,000, $25,000–50,000, >$50,000), educational attainment (High School/GED, Some College/Associate's Degree, Bachelor's Degree or higher), rank (Enlisted, Noncommissioned Officer, Officer), and marital status (In/Not in Committed Relationship) were determined by soldiers' responses to demographic items on the survey.

Hazardous alcohol use

Hazardous alcohol use was assessed using the Alcohol Use Disorders Identification Test (AUDIT-C), a 3-item alcohol

screen for hazardous drinking and active alcohol use disorders [98]. In men, a score of 4 or more is considered positive, and in women, a score of 3 or more is considered positive.

Combat exposure

Combat exposure was assessed via three questions from the Post-deployment Health Assessment, in regards to the most recent or any prior deployment: "Did you encounter dead bodies or see people killed or wounded?" (endorsed by 51 %), "Were you engaged in direct combat where you discharged a weapon?" (endorsed by 19 %), and "Did you ever feel that you were in great danger of being killed?" (endorsed by 57 %). 27 % reported exposure to one item, 25 % to two items, and 17 % to all three items. An affirmative response to at least one of the three questions was used to create a dichotomous measure of combat exposure status for each participant [99].

Physical health

Physical health was assessed via the Short Form-12 Health Survey Physical component score, which provides a brief, overall summary of physical health functioning for the past four weeks [100]. Items assess the participant's subjective opinion of his/her health (e.g., "excellent" to "poor") and the extent to which physical health limits the participant's day-to-day activities. The physical health component has a score range of 0–100, with higher scores indicating better health.

Data analysis

All of the analyses for this study were conducted using SAS version 9.3 (SAS Institute, Inc., 2010). Descriptive statistics were used to characterize social network and social support levels in the sample. Wilcoxon–Mann–Whitney tests examined the relationships between social network measures and probable mental health conditions and between social network measures and mental health services utilization. Multivariable logistic regression was used to calculate adjusted odds ratios (ORs) with 95 % confidence intervals (CIs) for the dependent variables of mental health condition and mental health service utilization.

Due to prior work demonstrating a strong association between mental health service utilization and mental health need [15, 101], mental health need was added as a covariate in models predicting utilization. For these models, the number of probable mental health conditions was categorized as 0, 1, 2, 3, or 4.

Results

Descriptive statistics

The final sample consisted of 1448 soldiers, including 441 (30.6 %) who had screening scores consistent with meeting diagnostic criteria for at least one mental health condition. Demographic characteristics are presented in Table 1. The average number of people listed in the social network was almost 4 (mean ± SD = 3.9 ± 3.1). Family members, other than a spouse, were the most commonly reported relationship in a participant's social network, listed by 59 % of the sample. 55 % of the sample listed a spouse, 55 % listed a friend, and 26 % listed a National Guard unit member in their social network. Correlations between dichotomous measures of social support were small to medium in size (see Table 2).

Table 1 Demographic characteristics of the full cohort (N = 1448)

Characteristic	N	%
Male	1327	91.8
Age		
18–21	100	6.9
22–30	652	45.2
31–40	344	23.9
41–50	283	19.6
>50	63	4.4
Nonwhite race	245	17.0
Annual income		
<$25,000	443	30.8
$25,000–50,000	497	34.5
>$50,000	500	34.7
Education		
High school/GED	386	26.8
Some college/associate's	812	56.3
Bachelor's or higher	244	16.9
In committed relationship	893	61.8
Rank		
Enlisted	654	45.2
Noncommissioned	651	45.0
Officer	142	9.8
Cumulative probable mental health conditions		
0	999	69.4
1	182	12.6
2	111	7.7
3	100	6.9
4	48	3.3
Hazardous alcohol use	650	45.5
Combat exposure	960	69.0
SF-12 physical health score (mean ± SD)	50.4 ± 9.0	

Table 2 Correlations (Phi coefficient) between dichotomous measures of social support ($N = 1448$)

Characteristic	SN size	SN diversity	ISEL score	DRRI US score
SN size	1	.55	.17	.13
SN diversity		1	.11	.06
ISEL score			1	.23
DRRI US score				1

DRRI US score deployment risk and resilience inventory unit support score, *ISEL* interpersonal support evaluation list-12, *SN* social network

Table 3 Bivariate comparisons of social network characteristics in those with versus without probable mental health conditions and in those using versus not using mental health services

Characteristic	Full cohort		Probable mental health condition					Mental health service utilization				
	($N = 1448$)		Yes ($N = 441$)		No ($N = 999$)			Yes ($N = 431$)		No ($N = 1002$)		
	M	SD	M	SD	M	SD	Z	M	SD	M	SD	Z
SN size	3.9	3.1	3.1	2.9	4.2	3.1	−6.7***	3.8	3.0	4.0	3.1	−.95
SN diversity	2.2	1.4	1.9	1.5	2.3	1.4	−4.7***	2.2	1.5	2.2	1.4	.39
ISEL score	26.6	7.4	22.2	7.6	28.5	6.4	−14.2***	24.7	7.5	27.4	7.1	−6.5***
DRRI US score	34.1	9.5	30.1	10.1	35.9	8.6	−10.0***	32.0	9.8	35.0	9.3	−5.3***

DRRI US score deployment risk and resilience inventory unit support score, *ISEL* interpersonal support evaluation list-12, *SN* social network

* $p < .05$; ** $p < .01$; *** $p < .001$

Bivariate analyses

Participants with probable mental health conditions listed fewer individuals (M ± SD = 3.1 ± 2.9 vs. 4.2 ± 3.1, $p < .001$) and fewer types of relationships (1.9 ± 1.5 vs. 2.3 ± 1.4, $p < .001$) in their social network, and reported lower perceived social support (ISEL score of 22.2 ± 7.6 vs. 28.5 ± 6.4, $p < .001$) and lower unit support (DRRI US score of 30.1 ± 10.1 vs. 35.9 ± 8.6, $p < .001$; see Table 3). There were no differences in the number of people or types of relationships by receipt of mental health treatment, but those who received mental health treatment reported lower perceived support (M ± SD = 24.7 ± 7.5 vs. 27.4 ± 7.1, $p < .001$) and lower unit support (32.0 ± 9.8 vs. 35.0 ± 9.3, $p < .001$).

Logistic regression analyses

Table 4 presents results from the adjusted logistic regression model estimating the association between social network measures and probable mental health condition as the outcome. Greater perceived social support (OR .90, CI .88–.92) and greater unit support (OR .96, CI .94–.97) were significantly associated with lower likelihood of having a probable mental health condition. Social network size and diversity were not significantly associated with likelihood of having a mental health condition. For every 1 point increase in perceived social support score, there was a 10 % decrease in the odds of having a mental health

condition. For every 1 point increase in unit support score, there was a 4 % decrease in the odds of having a mental health condition.

Since perceived social support may be correlated with mood, we conducted a supplementary analysis in which only structural elements of social support (social network size and social network diversity) were included as predictors of mental health conditions. In this model, larger social network size (OR .58, CI .42–.78) but not social network diversity was significantly associated with lower likelihood of having a probable mental health condition.

Table 5 presents results from the logistic regression model estimating the association between social network measures and mental health service utilization as the outcome.

In models that were unadjusted for mental health symptoms, perceived social support and unit support were significantly associated with reduced likelihood of service utilization (data not shown). However, after adjusting for probable mental health conditions, these associations were no longer significant. Significant predictors of service utilization included mental health conditions, combat exposure, and poor physical health (see Table 5). The likelihood of mental health service utilization increased with greater numbers of mental health conditions. Sensitivity analyses were conducted to test the impact on services use of the interaction between measures of social support and mental health symptoms. These interaction terms were not significant.

Table 4 Results from the adjusted multivariable logistic regression model estimating the associations between social network characteristics and having at least one probable mental health condition (N = 1,271)

Characteristic	AOR	95 % CI	p
Male	1.20	.69–2.07	.52
Age			
18–21	REF		
22–30	1.30	.70–2.42	.41
31–40	1.57	.78–3.15	.21
41–50	1.34	.64–2.82	.44
>50	.66	.24–1.81	.42
Nonwhite race	1.25	.88–1.80	.22
Income			
<$25,000	REF		
$25,001–50,000	1.11	.78–1.59	.56
>$50,000	1.16	.76–1.76	.49
Education			
High school/GED	REF		
Some college/associate's	.97	.70–1.35	.86
Bachelor's or higher	.66	.38–1.12	.13
In committed relationship	1.09	.79–1.50	.59
Rank			
Enlisted	REF		
Noncommissioned	.78	.54–1.14	.20
Officer	.80	.40–1.61	.54
SF-12 physical health score	.96	.95–.98	<.001
Combat exposure	2.16	1.55–3.02	<.001
Hazardous alcohol use	1.66	1.26–2.21	<.001
SN number (high vs. Low)	.83	.59–1.16	.27
SN diversity (high vs. low)	.94	.66–1.33	.71
ISEL score (continuous)	.90	.88–.92	<.001
DRRI US score (continuous)	.96	.94–.97	<.001

All characteristics listed were included together in the same multivariable model

AOR adjusted odds ratio, *CI* confidence interval, *DRRI US* deployment risk and resilience inventory unit support score, *ISEL* interpersonal support evaluation list-12 *SN* social network

Table 5 Adjusted multivariable logistic regression model estimating the associations between social network characteristics and mental health service utilization (N = 1268)

Characteristic	AOR	95 % CI	p
Male	.83	.50–1.39	.48
Age			
18–21	REF		
22–30	1.58	.78–3.19	.20
31–40	1.96	.90–4.24	.09
41–50	1.90	.85–4.27	.12
>50	2.40	.91–6.34	.08
Nonwhite race	1.23	.86–1.76	.25
Income			
<$25,000	REF		
$25,001–50,000	.96	.67–1.38	.83
>$50,000	.82	.54–1.25	.35
Education			
High school/GED	REF		
Some college/associate's	1.06	.76–1.49	.73
Bachelor's or higher	1.37	.82–2.31	.23
In committed relationship	1.05	.76–1.44	.77
Rank			
Enlisted	REF		
Noncommissioned	1.01	.69–1.46	.97
Officer	1.14	.60–2.17	.39
SF-12 physical health score	.97	.95–.98	<.001
Combat exposure	1.45	1.05–2.01	.03
Hazardous alcohol use	.94	.71–1.25	.67
Probable mental health conditions			
0	REF		
1	3.77	2.54–5.59	<.001
2	5.68	3.54–9.11	<.001
3	8.38	4.91–14.31	<.001
4	11.13	5.04–24.62	<.001
SN number (high vs. low)	1.12	.80–1.57	.52
SN diversity (high vs. low)	1.27	.91–1.79	.16
ISEL score (continuous)	1.00	.98–1.02	.72
DRRI US score (continuous)	.99	.98–1.01	.30

All characteristics listed were included together in the same multivariable model

AOR adjusted odds ratio, *CI* confidence interval, *DRRI* deployment risk and resilience inventory unit support score, *ISEL* interpersonal support evaluation list-12, *SN* social network

Discussion

To our knowledge, this is the first investigation into the relationship between multiple measures of social networks and perceived social support, mental health, and mental health service utilization in returning National Guard veterans. Using data from 1,448 recently returned OEF/OIF National Guard veterans, we found that network size and perceived support were lower than has been reported for other veteran populations [19, 23, 35]. We also found that social support was closely connected to mental health. In particular, all four social network or support measures were associated with mental health conditions in bivariate

analyses, and perceived social support and military unit support remained significant in adjusted analyses. Social support appeared less relevant to mental health service utilization than to mental health symptoms.

Our findings linking social networks to mental health are largely consistent with previous studies showing that social networks [16–22], perceived social support [21–42], and

unit support [43–50] are all related to mental health symptoms. We replicated previous findings in National Guard that perceived support and unit support are important predictors of mental health [43–45], and also demonstrated that social network size may be another important predictor. We did not find a significant association between social network diversity and mental health problems. This lack of association may be due in part to a restriction of range in the types of relationships assessed (0–6 types of social network members). It may also be due in part to the moderate correlation between network size and network diversity. Nonetheless, on the whole, our findings indicate that several aspects of National Guard service members' social networks are significantly related to mental health, including their overall amount of perceived support and the amount of support perceived from unit members.

Our results also suggest that social network and perceived social support scores may be comparatively low in National Guard. The social network size in our sample was lower than in other veteran [19, 23] and civilian [9] samples. Similarly, social support scores as measured via the ISEL were lower than those of other veteran populations [35] and the general population [9]. It is possible that recent returns from deployment may have a detrimental impact on one's social network. Social network theorists hypothesize that life transitions alter social networks in several ways. They may be altered because one identifies oneself in new ways, compares oneself to new reference groups, or perceives weakened ties with previous social networks due to decreased perceptions of similarity with those networks [102]. Decreases in social support upon return from deployment may also be due to difficulty adjusting back to civilian life, a sense of being unable to share experiences with others, or a negative community response to war or to service members [23]. However, the change in social support upon return from deployment may vary by combat era [23], highlighting the importance of studying this association in OEF/OIF era veterans. Veterans returning to their communities rather than military bases may be at particular risk for the negative effects of low social support, since, as compared to active duty members, separated veterans report smaller social networks and participation in fewer social activities outside work [20]. Further research is needed to determine the causes of reduced social network size in returning National Guard veterans and the implications of this finding on longer-term health outcomes.

Though social network measures were linked to mental health symptoms, we did not find an association between these measures and mental health service utilization. Previous research indicates that social support may have a bidirectional effect on treatment seeking. For instance, in a qualitative study of returning veterans, Sayer and colleagues [70] found that social network facilitation and encouragement were associated with increased likelihood of engaging in treatment, but that other social network functions (societal rejection, negative homecoming experiences, withdrawal from social networks, or social network discouragement of health-seeking) were considered barriers to treatment [70]. Thus, one's social network may have a facilitating or an impeding role on mental health service utilization, depending on the messages provided by network members. Another study found that having either no social network or having a large network was associated with greater mental health service utilization [103]. Consequently, the relationship between social network size and likelihood of treatment utilization may not be linear. It is also possible that individuals on opposite ends of the social network continuum may access care for different reasons. In our sample, need factors including mental health and physical health problems appeared to be more important determinants of mental health service utilization than social network measures. Given that social network measures were significantly related to mental health service utilization in unadjusted models but were no longer significant in adjusted models, it is possible that this association may be driven at least in part by increased levels of mental health problems. However, since these are cross-sectional and not longitudinal data, casual implications cannot be determined. Future work should further examine the facilitatory and inhibitory properties of social networks of different sizes and compositions.

The current findings should be interpreted in light of several limitations. First, we used self-report questionnaires to indicate probable mental health conditions. Though these measures are highly correlated with clinician-administered diagnostic interviews [104], they may be subject to response bias. Secondly, our findings are cross-sectional; thus no conclusions can be drawn about causality. Low social support may increase the risk for mental health symptoms [105, 106], or mental health symptoms may cause deterioration of social support [107]. Furthermore, any causal relationships between mental health and social support levels may vary over the course of a person's mental illness and the influence of social networks on treatment utilization may require a longer timeframe than the yearlong period examined in this study [107]. Third, in our model predicting service utilization, we did not restrict our sample to just those individuals who had probable mental health conditions at the time of the 12-month survey. We decided to include currently non-symptomatic individuals in the sample because they represented 42 % of the veterans who had received mental health services in the past year. Fourth, our sample was 92 % men, so further investigation is needed to determine whether these findings apply to women. Finally, only 53 % of the eligible samples

returned the survey, thus it is possible that unmeasured selection pressures introduced bias.

In conclusion, the current study tested the association between mental health symptoms, service utilization, and several social network and social support measures, including social network size, social network diversity, perceived social support, and military unit support. We found that both general and military-specific perceived social support were associated with the presence of probable mental health conditions. Given this association, military leaders and treatment providers might wish to continue efforts to bolster social supports in National Guard's communities and in their military units. Clinicians might facilitate the development of augmented social networks for their patients through group, couples, or family therapy or through other social or informational groups [2]. Treatment might also focus on enhancing social functioning, including promoting interactions with a greater number of individuals outside the preexisting social network or improving relationships with individuals already in the network. In addition, future work could investigate ways to boost National Guard cohesion in between drill weekends or ways to leverage social support to normalize and encourage mental health treatment when it is needed. Other strategies, such as targeted outreach programs, might also be needed to increase mental health treatment use among National Guard members with mental health need.

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