

Women in Combat: Stress, Social Support, and Health

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ABSTRACT

Few efforts have been dedicated to understanding experiences of female Service members. This study offers insight into the perceived social support from the unit, physical health, and combat experiences of deployed females. Survey responses from deployed Service members were assessed retrospectively. Surveys were collected by Mental Health Advisory Teams between 2005- 2012. The original sample included 570 females and 4,759 males. To investigate differences between males and females a matched sample was created based on key variables. Concerning social support, females reported significantly lower unit morale, unit cohesion, and marital quality. In terms of exposure to stressors, females reported significantly less combat exposures, yet did not differ from males in their report of other stressful life events during deployment. For health and functioning, women reported significantly more somatic symptoms and sick call visits than men, yet did not differ significantly on several other physical health variables. Health outcomes investigated in relation to combat exposure, found men but not women reported significantly greater functional impairment as the number of combat exposures increased. Both males and females reported more somatic symptoms, more sick call visits, greater difficulty falling asleep and sleeping less than six hours per night as combat exposures increased. Importantly, the association between combat exposure and several health variables were similar for males and females. Defining, understanding, and then fostering social support is necessary for males and females to ensure readiness for military missions by reducing effects of stress on health.

1.0 INTRODUCTION

To date there have been very few efforts dedicated to understanding the experience of female Service members. Fewer still are the studies generating empirical evidence related to how military service, or more specifically deployment and combat experiences, affect the health and readiness of these individuals. The current study offers insight into the perceived social support from female Service members' unit, physical health, and combat experiences - all of which were assessed in theatre. Whereas some data have been analysed and results published on both males and females in theatre, gender-specific data are not regularly analysed or reported (McGraw, 2016). To our knowledge, this is the first study to assess women's combat experiences, their perceptions of unit support, and their physical health while deployed.

At this point in time, females are being integrated into 52 combat-related military occupational specialties (MOSs) in the U.S. military that were previously closed to women. This change was brought about by the repeal of the 1994 Direct Ground Combat Definition and Assignment Rule (DGCAR) by the Secretary of Defense and Chairman of the Joint Chiefs of Staff in 2013. Given these changes and the increasing

proportion of females in the military, it is important to build a literature on stress, social support, and health among female service members.

Since the repeal of the DGCAR, a flurry of discussion has been generated, regarding the suitability of females to hold combat positions. A Women in Combat Symposium was held in Virginia in 2014 to assess the state of the science and policy on the topics of performance, leadership and peer behaviours, and physical and psychological health of females serving in the military. Several gaps in both research and policy were identified and recommendations were offered to address these gaps (Tepe et al., 2016). In addition, several initiatives have been conducted to gauge the impact of integrating females into combat positions and assess effects on readiness of the force. However, for the most part, these efforts were limited in scope and lacked scientific rigor. Further, a majority of these studies were conducted with the intention of demonstrating why females could not be integrated into combat positions, instead of how to successfully integrate women into said positions. The few studies that were conducted with an experimental approach, increased understanding about females' ability to complete physical tasks, and importantly provided evidence necessitating job specific physical fitness standards and tests (Foulis et al., 2017). Several of the other Women in Services Studies (U.S. Department of Defense, 2018) resoundingly concluded the key roles of the leader in setting standards and of a culture which emphasizes and facilitates respect and equitable treatment of all members. While this finding may be apt and worthy, it seems this task may be easier said than done. Without a good understanding of the experience of military females, and how it is similar and different from military males, what guidance exists for helping leaders with this task? The purpose of the study presented here was to examine the relationship among stress, social support, and health of deployed female Service members and to begin to build a knowledge base for leaders regarding these variables.

This study is the first to date to report on data collected during deployment to Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF) with a specific focus on females. Previous reports, using similar data generated from Mental Health Advisory Teams (MHATs) in Iraq and Afghanistan, did not report on females, did not have sufficient number of females to make a comparison or were collected during peace time operations and therefore did not investigate effects of combat exposure. The objectives of this study were to answer the following questions: do deployed males and females differ regarding stress, social support, and health; what is the relationship among these variables in a deployed military sample; and finally, does that relationship differ for males and females?

1.1 Stress

The perception, experience, and response to stress is highly individualized and, according to a growing stress literature on the subject, may be particularly different for males and females (e.g., Dickerson and Kemeny, 2004). Taylor, and colleagues (2000; 2006) theorized that males and females respond differently to stress at the physiological level based on adaptation via differences in evolutionary necessity. Briefly, the female stress response evolved because females, of any species, may be pregnant or responsible for caring for their young and may not be able to fight an enemy or flee from a threat. Their conceptualization has come to be known as the tend and befriend response to stress and it stands in contrast to the classic fight or flight response developed by Cannon primarily based on studies of males. Cannon's work demonstrated the role of epinephrine and norepinephrine (a.k.a. adrenaline and noradrenaline) in preparing the body to meet the physical demands in response to the stressor with a fight or by running away, flight (e.g., increased heart rate, increased energy for large muscle groups). Tend and befriend is based on the release of neurochemicals oxytocin and endogenous opioid peptides in females in response to stress (Taylor et al., 2000). These chemicals better prepare the body for the social behaviors of tending or protecting self and offspring to mitigate distress and initiate befriending which establishes and preserves social networks for protection. Several studies have used this theory to account for differences in behaviors or psychological responses of males and females exposed to stress (e.g., Klein & Corwin, 2002; Motzer & Hertig, 2004; Kaplow et al., 2005). It is this additional response that makes many suggest that social support is especially important for

females who experience stress. In this study, the experience of stress was assessed using responses to survey questions related to stress, emotional, and financial problems; stressful life events; and combat exposures.

1.2 Health

Physical and mental health are key to a Service member's readiness for deployment and combat. Several studies have been conducted with a focus on mental health and there is a growing literature on female service member reproductive health, traumatic brain injury, and sexual trauma. General physical health is important for day to day functioning and can affect performance. Stress can lead to poor health as well as worsen existing problems. Social support, on the other hand, has been demonstrated to reverse negative effects of stress on health. In this study physical health was assessed by self-reported sick-call visits, missed work days, overall health, and functional impairment.

1.3 Social Support and Health

The stress buffering hypothesis was first described by Cohen and Wills (1985) to explain how the availability of social support can reduce the negative effects of stress. In this way, social support represents the availability of help, assistance, and understanding provided by others via structural (i.e., social ties like marital, family, or church affiliations; McNally & Newman, 1999) or functional means (i.e., not just available, but available and able to meet the person's needs with specific resources). For Service members, positive environments within the unit facilitate social support and help individuals to cope with stress (Ryan, Burrell, Laurence, & Mathews, 2012). Further, the quality of the social environment plays a key role in the relationships between work stress and morale and between work stress and depression (Bliese & Britt, 2001). Conversely, individuals who lack social support are at risk for developing physical and psychological problems (Helgeson, Cohen, & Fritz, 1998; House, Robbins, & Metzner, 1982; Reifman, 1995).

Service members may need the most social support in deployed or combat environments, but because they are removed from their primary social networks of family and non-unit friends while facing new stressors, support from their unit members and leadership may be even more crucial in the deployed setting. Being able to rely on and trust members of one's unit is part of military culture and key to successful integration into military life. A Soldier who successfully integrates into their unit is likely to achieve a sense of belonging and increased self-worth, which contributes to positive health outcomes (Greenberg & Jones, 2012). In contrast, an individual who does not integrate into a group may experience negative health effects (Loo, Lim, Koff, Morton, & Kiang). Further, individuals who lack social support from supervisors and peers display worse psychological wellbeing and more unfavourable work outcomes (Kaniasty, 2012). Of direct relevance to the present study, social support is a significant factor in the psychological health of females who have deployed (Vogt et al., 2011).

In this study, social support is estimated based on responses to questions related to unit cohesion, unit morale, support from non-commissioned officers (NCOs) and officers, organizational support, emotional support, and marital quality.

2.0 METHODS

2.1 Participants

Survey responses from service members deployed to Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), and African Command (AFRICOM) were assessed retrospectively. Surveys were collected by Mental Health Advisory Teams (MHAT) between 2005 and 2012 (full reports available from the Army Medical Department website <http://armymedicine.mil/Pages/reports.aspx>), under the Land Combat Studies conducted by the Walter Reed Army Institute of Research (WRAIR). This large, ongoing program assesses

the effects of combat deployment on mental health and wellbeing of Soldiers. Protocols for each data collection were approved by the WRAIR institutional review board and specific procedures and samples have been described previously (e.g., Killgore et al., 2006). Within each data collection using the WRAIR Deployed Soldier Well-being Survey, females made up less than 14% of participants. This small representation limited analysis of responses from females and comparison to male responses. By combining datasets from four collections, this study was able to assess responses from a sufficient number of deployed female Soldiers and compare to matched male Soldiers. Before matching, responses from 570 females and 4,759 males were assessed. After matching 458 females and 458 males were assessed.

2.2 Survey Instrument

The Deployed Soldier Well-being survey assesses a broad range of topics related to mental and physical health and wellbeing using novel and validated items and scales. For the purposes of combining data collected using four different iterations of the survey, items and scales that appeared on all four surveys were selected for analysis in this study. Selected items and scales contained questions related to demographics, stressors, health and wellbeing, and social support factors. Demographic questions included: age, education, rank, gender, service component, and marital status.

Stressors were assessed with questions about stressful life events, emotional, marriage, family, and financial problems, deployment injuries, and combat experiences. The Combat Experiences Scale (CES) assess the frequency of combat experiences (Hoge, Castro, Messer, McGurk, Cotting, and Koffman, 2004), has been widely used in studies of deployed military populations (e.g., Cabrera, Hoge, Bliese, Castro, & Messer, 2007; Wilk, Bliese, Kim, Thomas, McGurk, & Hoge, 2010), and has demonstrated internal and external validity (Guyker, et al., 2013).

Physical health was assessed with questions about sick-call visits, missed work days, self-reported health, and functional impairment. The Walter Reed Functional Impairment Scale is a 14 item scale which measures functional impairment across physical, occupational, social, and personal responsibility domains (Herrell, Edens, Riviere, Thomas, Bliese, & Hoge, 2014) and has been used in similar surveys among military members (Hoge, Riviere, Wilk, Weathers, 2014).

Social support was assessed with questions related to support from leadership (non-commissioned officer [NCO] and officer) and the organization, as well as questions about unit cohesion and moral.

2.3 Procedure

The available surveys were assessed for items related to the variables of interest (stress, health, social support). Three investigators discussed the potential category for each item to be included. A systematic process was completed to reduce the number of items within each variable. This process was based on number of females within the dataset for which there were responses, correlation among variables (i.e., items that were not significantly correlated or were multicollinear ($r > .9$) were not included).

To investigate differences between males and females we created a matched sample. We performed a direct match using the following variables: age (four categories), education (three categories), rank (three categories), component, marital status (three categories), member of dual military couple, and having at least one child. Data analysis included chi-square and t-tests on the demographics and average social support, stress, and health variables. Linear and logistic regressions were conducted on the interactions of stress and health and social support and health. Finally, regression models with social support and stressor interaction terms were conducted.

3.0 RESULTS

The original sample included 570 females and 4,759 males. Males and females were significantly different on several demographic variables, including: education, marital status, years married, dual military couple and having at least one child (see Table 3-1). These variables were used to create a match sample. Characteristics of the matched sample can be found in Table 3-2.

Table 3-1. Demographic Characteristics of the Entire Sample

	Female (n=570)	Male (n=4,759)	Test Statistic for Difference	p value
Age, n (%)				
18-24	232 (41%)	1934 (41%)	X2 (3df)=0.97	0.808
25-29	158 (28%)	1287 (27%)		
30-39	128 (22%)	1138 (24%)		
40 or older	52 (9%)	394 (8%)		
Education				
Some High School	2 (0.5%)	14 (0.4%)	X2(4df)=88.14	0.000
HS Diploma/GED	85 (21%)	1768 (45%)		
Some college/AA	227 (56%)	1606 (41%)		
Bachelors Degree	68 (17%)	433 (11%)		
Graduate Degree	23 (6%)	120 (3%)		
Rank				
E1-E4	301 (53%)	2567 (55%)	X2 (2df)=2.15	0.341
E5-E9	200 (35%)	1701 (36%)		
Officer/Warrant Officer	64 (11%)	443 (9%)		
Primary Component				
Active	210 (63%)	1262 (61%)	X2(2df)=10.14	0.006
Reserve	57 (17%)	248 (12%)		
National Guard	68 (20%)	548 (27%)		
Marital Status				
Single, Never Married	214 (39%)	1589 (35%)	X2(4df)=62.95	0.000
Married	226 (41%)	2488 (54%)		
Separated	39 (7%)	221 (5%)		
Divorced	76 (14%)	290 (6%)		
Widowed	0	8 (0.2%)		
Years Married to Spouse, mean (SE)	4.29 (0.32)	5.49 (0.12)	t=3.11	0.002
Dual Military Couple	68 (52%)	444 (35%)	X2(1df)=14.12	0.000
At least 1 child	221 (40%)	2158 (47%)	X2 (1df)=9.12	0.003

Table 3-2. Demographic Characteristics of the Matched Sample

Demographic Variable	Female (n=458)	Male (n=458)	Test Statistic for Difference	p value
Age, n (%)				
18-24	203 (44%)	203 (44%)	X2 (3df)=0	1.000
25-29	127 (28%)	127 (28%)		
30-39	102 (22%)	102 (22%)		
40 or older	26 (6%)	26 (6%)		
Education				
HS Diploma/GED	81 (24%)	81 (24%)	X2 (2df)=0	1.000
Some college/AA	194 (58%)	194 (58%)		
Bachelors/Graduate Degree	62 (18%)	62 (18%)		
Rank				
E1-E4	258 (56%)	258 (56%)	X2 (2df)=0	1.000
E5-E9	153 (33%)	153 (33%)		
Officer/Warrant Officer	46 (10%)	46 (10%)		
Primary Component				
Active	166 (70%)	166 (70%)	X2 (2df)=0	1.000
Reserve	27 (11%)	27 (11%)		
National Guard	43 (18%)	43 (18%)		
Marital Status				
Single, Never Married	182 (41%)	182 (41%)	X2 (4df)=0	1.000
Married	181 (41%)	181 (41%)		
Separated/Divorced	83 (19%)	83 (19%)		
Years Married to Spouse, mean (SE)	4.33 (0.36)	4.69 (0.41)	t=0.631	0.529
Dual Military Couple	39 (46%)	39 (46%)	X2 (1df)=0	1.000
Have at least 1 child	178 (40%)	178 (40%)	X2 (1df)=0	1.000

Note. Due to missing data, not all numbers sum to the total number of Soldiers included in the analysis.

Concerning sources of social support, females reported significantly lower unit morale, unit cohesion, and marital quality (see Figure 3-1). Male and female soldiers did not significantly differ in self-report of NCO, officer, organizational or emotional support ($p > .05$). In terms of exposure to stressors, females reported significantly less combat exposures and deployment related injuries, yet did not differ from males in their report of stressful life events, marriage infidelity or having experienced a stress, emotional, alcohol or family problem during deployment (see Table 3-3). When queried about their health and functioning, women reported significantly more somatic symptoms and sick call visits than men, yet did not differ significantly in their functional impairment, self-reported overall health, missed work days, use of any medication or meeting diagnostic criteria for major depressive disorder. Women were significantly less likely to report sleeping five or fewer hours per night, while women and men did not differ in their report of difficulty falling or staying asleep (see Table 3-4).

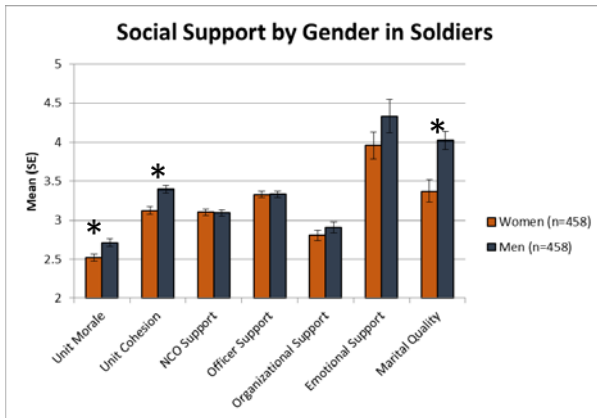


Figure 3-1. Social Support by Gender in Soldiers
* Significant difference between groups, p<0.005.

Table 3-3. Stressors Experienced by Female and Male Soldiers

Stress Variable	Female (n=458)	Male (n=458)	Test Statistic for Difference	p value
Number of Stressful Life Events, mean(SE)	2.4 (0.11)	2.36 (0.12)	t=-0.252	0.801
Moderate or Severe Stress, Emotional, Alcohol or Family Problem During this Deployment, n(%)	22.74%	21%	X2(1df)=0.249	0.618
Possible or Definite Marriage Infidelity, n(%)	38%	32%	X2(1df)=1.489	0.222
Combat Exposures	3.98 (0.20)	7.31 (0.29)	t=9.367	0.000
Number of Deployment Injuries	0.49 (0.05)	0.98 (0.08)	t=4.94	0.000

Table 3-4. Health Related Reports for Female and Male Soldiers

Health Outcome Variable	Women (n=442)	Men (n=442)	p value
Functional Impairment	1.511	1.514	0.946
Somatic Symptoms, mean	1.489	1.376	0.000
Self-reported health	2.461	2.344	0.220
Missed work days, mean	0.271	0.216	0.347
Sick call visits, mean	0.877	0.649	0.003
Taken medication, n(%)	8%	5%	0.227
Average hours of sleep per day, mean(SE)	2.629	2.53	0.264
Difficulty Falling/Staying Asleep, mean(SE)	1.868	1.749	0.077
Major Depressive Disorder, n(%)	17.0%	18.1%	0.658

When health outcomes were investigated in relation to combat exposure, men but not women reported significantly greater functional impairment as the number of combat exposures increased, yet there was no significant difference in the strength of the association between men and women. Both males and females reported more somatic symptoms, more sick call visits, greater difficulty falling asleep and sleeping less than six hours per night as combat exposures increased. Females, but not males, endorsed significantly lower self-ratings of health as combat exposures increased, and gender was a significant moderator of these

associations. Missed work days, taking medication and meeting diagnostic criteria for major depressive disorder were not associated with combat exposure in males or females (see Table 3-5).

Table 3-5. Association of Combat Exposures with Health Outcomes in Male and Female Soldiers

Health Outcomes	Combat Exposures					
	Females		Males		Difference: Females-Males	
	Regression Coefficient	p value	Regression Coefficient	p value	Regression Coefficient	p value
Functional Impairment	0.01	0.146	0.01	0.029	0.00	0.814
Somatic Symptoms	0.01	0.010	0.01	0.002	0.00	0.651
Self-reported health	0.04	0.032	-0.02	0.138	0.06	0.009
Missed work days	0.01	0.472	0.00	0.859	0.01	0.468
Sick call visits	0.03	0.012	0.02	0.023	0.01	0.407
Taken medication	OR=1.06	0.335	OR=1.04	0.425	OR=1.02	0.825
Average hours of sleep per day	-0.05	0.000	-0.05	0.000	0.00	0.808
Sleeping 6 or more hours per night	OR=0.91	0.000	OR=0.93	0.000	OR=0.98	0.449
Difficulty Falling/Staying Asleep	0.04	0.000	0.02	0.001	0.01	0.273
Major Depressive Disorder	OR=1.03	0.270	OR=1.02	0.357	OR=1.01	0.672

We conducted preliminary analyses on whether sources of social support moderated the association between combat exposures and the measured health outcomes. For the model of NCO support as a moderator, we found NCO support moderated the association of combat exposure on functional impairment in males, with male Soldiers who had low NCO support, combined with high combat exposures showing higher levels of functional impairment (see Figure 2). The model in females appears to be slightly different than males, but the moderation was not significant (see Figure 3).

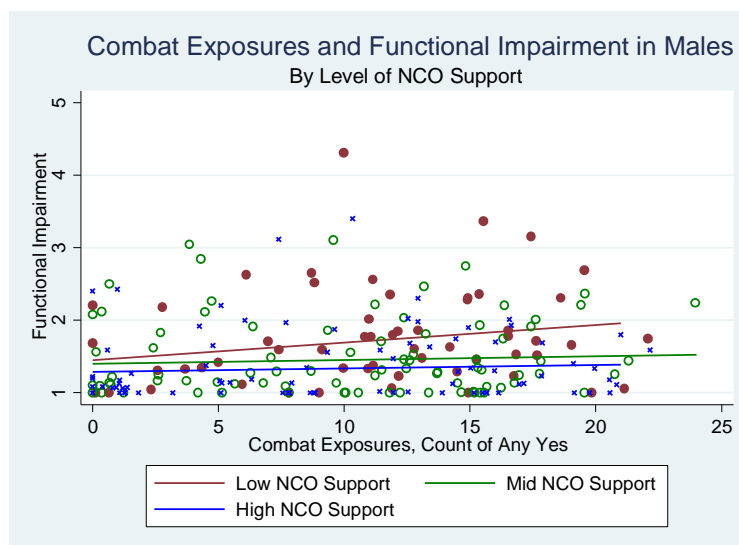


Figure 2. Moderation of the association between combat exposure and functional impairment by level of NCO support for males.

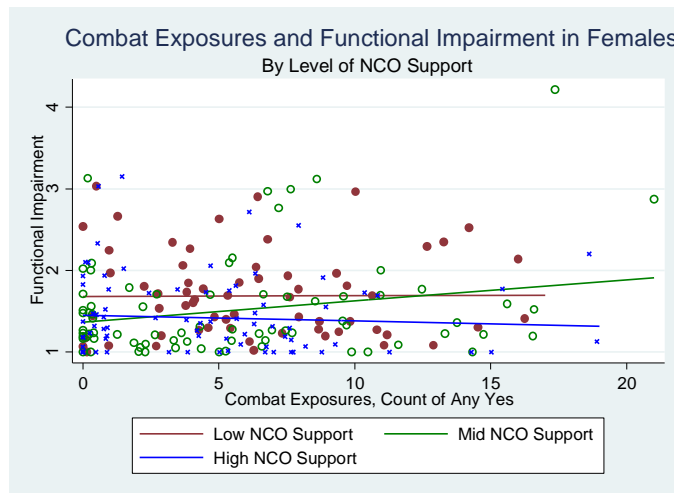


Figure 3. Moderation of the association between combat exposure and functional impairment by level of NCO support for females.

4.0 DISCUSSION

This study is the first to focus on female Service members while examining stress, social support, and health using data collected during deployment to OIF/OEF. Overall, our results suggest there are similarities between males and females when it comes to effects of stress on health and the role that social support plays in buffering these effects. However, our data suggest that females do not report the same levels of social support as matched males. We can use our results to highlight areas of potential intervention for leaders to improve social support for their female subordinates and to help them successfully integrate in to primarily male units.

4.1 Stress, health, and combat exposure

The first aim of the study was to describe similarities and difference in stress experienced by males and females. Results showed that females and males reported similar levels of stressful life events, infidelity, and stress, emotional, or financial problems, but different combat exposures and deployment related injuries. Consistent with reports to date (Vogt et al., 2008), females experienced lower levels of combat exposures than males. This is one of the first reports of data collected from women while deployed in a sufficient number to reflect a more generalizable sample as well as a comparison to demographically matched male peers. Previous reports using MHAT data had lower numbers of females and did not match based on demographic variables. Of potentially important note, the rates of stressful life events and stress, emotional, or financial problems were greater for females than males in the full sample (i.e., before matching). It may be relevant that individuals not included after the match were more likely to be 40 or older, less likely to only, more likely to have attended college, more likely to be senior enlisted or an officer, more likely to be in a reserve component, less likely to be married, more likely to be separated or divorced, and more likely to be a dual military couple; suggesting females with these demographic variables may have more stress while deployed than the females included in the matched sample.

Since combat exposure rates were different for males and females, they were used to predict responses related to health, which will contribute to the ongoing discussion concerning women serving in combat roles. Importantly, the association between combat exposure and several health variables were similar for males and females, such that there was a significant association between increased combat exposures and increased reporting of somatic symptoms, increased sick call visits, taking longer to fall asleep, and getting less than six hours of sleep per night. These results are consistent with available literature. In their study of gender

differences in combat-related stressors, Vogt and colleagues (2011) reported comparable levels of resilience for male and female Veterans of OIE/OEF.

The key take away from the analyses related to health is that males and females did not differ on overall health, functional impairment, missed work days, use of medication, meeting criteria for major depressive disorder, or difficulty falling asleep, despite increased reporting of symptoms and sick call visits. Further, effects of combat exposures on these health-related outcomes were not different for males and females.

4.2 Social Support

Regarding social support, females and males had similar rates of NCO, Officer, Organization, and Emotional support, but differed for rates of morale, cohesion, and marital quality. Females reported lower rates of marital quality, unit morale, and unit cohesion than males.

4.2.1 Marital Quality and Family Supportive Behaviours

Marital quality may be seen as a stressor by itself, and/or it may reflect the level of social support available from a spouse. For the purposes of this study, it was treated as a support variable for which females reported lower marital quality than males. Before matching, females also reported significantly lower marital quality and were more likely to be separated or divorced. These findings have been reported from other studies with majority male participants. Deployments have been linked to increased risk of divorce (Negrusa, Negrusa, & Hosl, 2014). In addition, military deployments have been reported as the greatest stress of military service (Rosen & Durand, 2000). Spouses under stress have a reduced capacity to stay connected, resulting in decreased marital satisfaction (Karney & Neff, 2013). Karney and Trail (2017) reported on the association between deployment and marital satisfaction; in this sample less than 8% of the Service members were female, but the results were significant nonetheless. Of particular interest, couples in which the Service member was a female had significantly lower marital satisfaction when considering other demographic (e.g., age), marital (e.g., children), and deployment (e.g., frequency, combat trauma exposure, and PTSD symptoms) factors. Our data are consistent with these findings and suggest an important area for intervention for female Service members. Increased support for females as it relates to family relationships may be beneficial.

Leaders may provide this support by using domain specific leadership for family issues. The theory of domain specific leadership and its associated literature suggests that when specific job-related problems or stressors are addressed by a leader, the negative effects on the individual should be decreased (Thomas & Ganster, 1995; Gunia, Sipos, LoPresti, Adler, 2015). In a recent extension of this theory Hammer and colleagues defined a set of four behaviours that leaders can do to mitigate effects of work related stress on their employees. The family supportive supervisory behaviours (FSSB) include: emotional support, role modelling, instrumental support, and creative work-family management (Hammer et al., 2009, 2011). Supervisory behaviours such as these are all within a military leader's capabilities to intervene. Training for leaders in FSSB may be beneficial to improving the experience of female Service members. For example, when supervisors model good balance between work and non-work life and demonstrate working strategies, subordinates may be better able to incorporate those strategies into their work-life balance and feel more supported by their supervisors. For role modelling to be effective it needs to be reinforced through written and oral communication within the organization (Kirby & Krone, 2002). The FSSB framework highlights ways that leaders can be used to go beyond formal policies and provide support to female Service members.

4.2.2 Cohesion and Reducing Prejudice

Females also reported lower unit morale and cohesion in our sample which is consistent with Kanesarajah and colleagues (2016) reports on data collected from Australian military personnel in which females recalled lower unit cohesion during their past deployments. Unit cohesion can be defined as the experiences among

Soldiers which bonds them together such that their will and commitment to each other, their unit, and their mission is sustained, regardless of stress experienced (Manning, 1994; Meyer, 1982). The concept has also been described as “social support among unit members (McAndrew et al., 2017, p. 2).” Further, unit cohesion can be seen as a shared sense of group efficacy, where members feel trust and confidence in the unit (Brailey et al., 2007). Most of the unit cohesion literature suggests that unit cohesion is protective against stress and a source of resilience (Bliese, 2006), linked to better self-reported health (Mulligan et al., 2010), better mental health (McAndrew et al., 2017), and enhanced wellbeing and readiness (Oliver et al., 1999). Given these factors, it is important to ensure females feel a sense of unit cohesion.

Several scholars have suggested that unit cohesion is a modifiable situational factor which can be monitored to identify areas contributing to decreases in cohesion (e.g., lack of trust and support among group members) that may be targeted with specific interventions to improve cohesion and thereby improving wellbeing, performance, and readiness (McAndrew et al., 2017; Kanesarajah et al., 2016; Brailey et al., 2007). Further, the literature suggests that performance is related to cohesion, such that units with higher cohesion perform better than units with lower cohesion. In particular, during peacekeeping operations, unit cohesion has been linked to mission success (Maugen, & Litz, 2006) and increased morale (Britt et al., 2007). Recent reports from the RAND corporation on female integration into combat units cite assessments from the mid-1990s, when gender policies were changed, to highlight that the integration of women had no major effect on readiness, cohesion, or morale of the unit (Schaefer et al., 2015). In fact, unit success has been demonstrated to increase cohesion of mix-gender groups when group-based tasks highlight participation from all members, and improved performance focuses on interpersonal communication and coordination versus a specified outcome (Beal et al., 2003). When all group members contribute to successful performance and women are not just included, but allowed to thrive within the group, then cohesion is higher in that organization (Mullen & Copper, 1994).

Leaders can facilitate cohesion for female Service members by enacting some principles of optimal group contact. Optimal group contact or equal status contact is a social psychological model used to reduce prejudice among group members and ensure better integration of minority members into the group (Allport, 1954). Using this model, leaders may be able to increase feelings of cohesion for females. Specifically, leaders should work to ensure their unit’s culture is: free of competition; one in which females are viewed as important by male members; establishing equal status for everyone; setting non-bias and non-prejudicial norms sanctioned by highest levels of the institution; and free from anxiety and other negative emotions (for review and critique of optimal group contact see Dixon, Durrheim, & Tredoux, 2005).

Important limitations to optimal group contact must also be considered as leaders attempt to increase feelings of cohesion for females. For instance, attitudes towards individual females may favourably change as she interacts with males, but she may be viewed as the exception and therefore bias perceptions about integrating females in general may remain unchanged (Rothbart & John, 1985). Further, interpersonal interactions may reduce some prejudice for individuals, but does not ensure enduring changes in perceptions of females or relations to them at the collective level (Forbes, 2004). Therefore, efforts may be most successful when focused to increase collective resistance to prejudice versus reducing individual biases (Reicher, 1986). The leader of the unit plays an important role in establishing a culture that is resistant to prejudice.

One question remaining from our analyses is why females report decreased moral and cohesion, but similar levels of support from organization and leadership? Differentiating vertical cohesion from horizontal cohesion may help to explain why females report low unit cohesion and morale, but do not differ regarding support from their leadership or the organization. Vertical cohesion describes the relationship between subordinates and their leadership. More specifically, the extent to which the individual believes their leader cares about them and how much trust and confidence they have in the leader (Segal & Bourge, 2002; Furukawa et al., 1987; Bartone and Kirkland, 1991). Whereas horizontal cohesion reflects cohesion among an individual and their peers (for a review on Siebold et al.’s model of military group cohesion see the RAND report on integrating women into Special Forces, Szayna et al., 2015). Responses to survey questions about

cohesion may reflect individuals' feelings about horizontal cohesion or factors related to how female Soldiers are treated by their peers. It is beyond the scope of this report to identify these horizontal factors of cohesion, but other reports may be important to consider. Street, Vogt, & Dutra's (2009) summary of the available literature on interpersonal stressors (e.g., gender harassment) experienced by female veterans, suggests that combat stressors may be exacerbated by these interpersonal stressors. Gender harassment describes behaviours that are hostile, or degrading based on biological sex but are not sexually-based. Lipari and colleagues (2008) report that more than half of females in the military experience gender harassment each year. This experience may contribute to decreases in moral and cohesion for females.

4.2.3 Social Support as a Moderator

The assessment to determine how social support changes the relationship between combat exposure and health showed preliminarily that males with increased combat exposures, who reported poor NCO support, also reported greater rates of functional impairment. For females the pattern appears similar, but not significant. These initial analyses suggest that leaders can play a role in mitigating the effects of stress on health by facilitating a social supportive culture.

4.2.4 Summary of Social Support and the Role of the Leader

Culture matters in establishing the level of cohesion in the group and cohesion is important for health and performance. As previously described, the leader of the group plays a vital role in establishing the culture of the group. Our findings highlight the importance of the leader in providing family support as well as creating a culture that insist on equal and fair treatment of female Service members.

4.3 Limitations

This study is one of the only studies examining data collected from female Service members while in a deployed environment. Although the data are unique, there were limitations for this study. The variables used to represent stress (not including combat exposure) were not validated ways of accessing stress and social support and can be considered proxy variables at best. This limitation may be why no differences in non-combat exposure stress were found between males and females. While the social support variables were specifically related to support gained from leadership (NCO and Officer), they did not directly assess support from peers, friends, or family. Future investigation of social support for female Service members should use valid measures of social support.

Nonetheless, this study contributes to the small number of studies dedicated to understanding the experience of deployed female Service members and the first to date to focus on females and report on data collected during deployment to OIF/OEF. One of the strengths of this study is the large sample size, and especially the large number of females which allowed for the comparisons made and the sophisticated models that were tested. The structured data reduction approach and the matching of males and females to decrease variance of demographic variables is another strength of this study. This study was focused on physical health outcomes for female service members, it is important to examine how deployment may affect psychological health as well for similarities and differences between males and females. Future use of this data set will explore psychological health outcomes further.

4.4 Conclusion

Leader actions are important for successful integration of women into combat specialties and primarily male units. Defining, understanding, and then fostering social support is important for both males and females to ensure readiness to conduct the military mission by reducing the effects of stress on health. More research focused on the experience of females in the military is needed, especially as it relates to stress, combat, and

social support. Building a base of empirical evidence is the best way to inform policy and practice and develop and train leaders to ensure the successful integration of women into combat roles.

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