



## Post-9/11 service members: Associations between gender, marital status, and psychiatric aeromedical evacuations from combat zones

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### ABSTRACT

Psychiatric aeromedical evacuations are one of the leading causes of medical related evacuations of US military personnel from combat. Currently, no studies have examined gender and marital status of individuals who were evacuated from combat for a psychiatric diagnosis. Psychiatric aeromedical evacuation data from 5,957 United States military personnel deployed to Iraq or Afghanistan between 2001 and 2013 were analyzed using chi-square tests of independence, odds ratios (OR), and standardized residuals. Analyses showed that female service members were evacuated at higher rates (178 per 100,000) than males (115 per 100,000). When compared to nonmarried females, married females did not present with increased risk of psychiatric aeromedical evacuation on any diagnosis. Married males, however, were more likely to be evacuated than married females for PTSD (OR = 1.98) and TBI (OR = 1.14). Likewise, married males, compared to nonmarried males, were more likely to be evacuated for PTSD (OR = 1.66) and anxiety (OR = 1.38). Although deployments can be extremely stressful experiences for some military service members, they may be especially so among unmarried females and married males. This study provides a unique contribution to enhancing the understanding of risk factors related to psychiatric aeromedical evacuation for deployed service members.

### ARTICLE HISTORY

Received 30 October 2020  
Accepted 16 May 2021

### KEYWORDS

Role Strain Theory; PTSD; gender differences; psychiatric aeromedical evacuation; deployed military service members; marital status

**What is the public significance of this article?**—In recent years, female service members have been permitted to serve in combat arms positions in the US military. At present, little is known about how this may impact combat effectiveness. The present study found that relative to males, female service members were psychiatrically aeromedically evacuated at higher rates, but that finding only held for non-married females. In fact, married males presented with the greatest overall risk of psychiatric aeromedical evacuation from combat for trauma-related disorders.

Deployments can be extremely stressful experiences for military service members and their families, with levels of stress varying based on social support and family responsibilities, such as the presence of a supportive family member (DeVoe & Ross, 2012; Moore et al., 2020; Vogt et al., 2011). Before deploying, the anticipation of deployment can cause significant

distress in service members (Bolton et al., 2001). For example, many service members are required to conduct pre-deployment training with their unit, while also preparing their families, finances, and personal documents (e.g., a will or power of attorney).

When deployed, service members must then also manage the challenges associated with family separation and balance concern for the family back home with the added combat and operational stressors unique to the combat zone (e.g., planning and executing missions, leading and being responsible to unit members, sleep loss, exposure to blasts or incoming fire, and witnessing death; King et al., 2006; Peterson et al., 2018, 2018; Polusny et al., 2011, 2014; Vasterling et al., 2010). Family separation has been reported by service members in previous studies as a major concern and stressor during deployment and found to be related to mental health problems during deployment for both the service

member and their families (Mental Health Advisory Team; MHAT-V, 2008; Mulligan et al., 2012; Vasterling et al., 2010; Vogt et al., 2011). Upon completion of deployment, prior research has found that service members with dependents experience stress and must reacclimate to the changes within their home and renegotiate previously held roles related to parenting and household responsibilities (DeVoe & Ross, 2012; Vaughn-Coaxum et al., 2015). When considered in isolation, each of these stressors may contribute to an individual's stress. When examined together, the cumulative impact of these stressors on a deployed military service member may become overwhelming, leading to psychiatric distress requiring evacuation from theater.

### **Role strain**

It is not uncommon for military couples to experience high levels of strain during deployments (Balderrama-Durbin et al., 2017), such as trying to balance family responsibilities while remaining involved with their military duties. Evidence indicates that relational strain experienced during deployments may have a greater impact on female service members than males (Skopp et al., 2011). This relationship can be viewed within the framework of Role Strain Theory, which postulates the strain of competing responsibilities at numerous levels increases an individual's stress and in turn how well they function (Goode, 1960). Further, Role Strain Theory posits that as strain builds while trying to fulfill multiple roles, individuals will inevitably fail to meet all obligations (Goode, 1960). Role Strain Theory has been considered in a variety of populations and has consistently been shown to provide context for individuals functioning in unique environments (Conway et al., 2011; Edwards, 2014; Goode, 1960). As such, evaluating deployment-related stressors through the lens of Role Strain Theory may provide unique insights into the broader risk factors that impact or contribute to psychiatric diagnoses in deployed military personnel necessitating evacuation out of the theater of operations.

In the context of military service, Role Strain Theory could be considered such that as a service member's responsibilities increase throughout a deployment, so too will their perceived levels of stress, thus reducing their ability to function. In consideration of this, it is no surprise that when compared to non-deployed service members, those who have deployed commonly present with increased risk of a variety of behavioral health concerns including anxiety, adjustment disorder, and posttraumatic stress disorder (PTSD; McCaslin et al., 2018; Vasterling et al., 2010).

### **Gender, family roles, and deployment stressors**

There is a growing body of conflicting evidence on how military stressors differentially impact male and female combat veterans (Burkman & Maguen, 2018; Edwards, 2014; Fox et al., 2016; Jacobson et al., 2015; Koo et al., 2016; Polusny et al., 2014; Smith et al., 2016; Vogt, 2014). For instance, when compared to males, previously deployed females are more likely to report functional impairment (Wang et al., 2015), were approximately 2.5 higher risk of displaying postdeployment PTSD symptomatology than male service members (Skopp et al., 2011), and experienced reduced levels of perceived social support, which is known to be a protective factor against trauma-related distress (Frayne et al., 2006; Street et al., 2009). Despite this, other more recent studies have found males and females develop PTSD at approximately equivalent rates after experiencing combat (Jacobson et al., 2015; Vogt et al., 2011). Conversely, the most recent Medical Surveillance Monthly Report data indicate that mental health disorders were the number one cause for aeromedical evacuation in 2019, with females being disproportionately impacted (MSMR, 2020). When examining psychiatric concerns, males were primarily aeromedically evacuated for "reaction to severe stress and adjustment disorders, whereas females were aeromedically evacuated for anxiety and depressive disorders."

Previous research has shown that service members who have been evacuated out of a combat theater for psychiatric reasons are almost four times as likely (53%) to have been subsequently separated from active duty as compared with other active duty service members (14%; Peterson et al., 2018). However, the potential differential military career impact of a psychiatric aeromedical evacuation from a combat theater for male and female service members has not been evaluated.

Although there is an abundance of literature establishing the protective role of family and social support networks against deployment-related stress, there is also evidence that the stressors related to managing expectations surrounding family life, while deployed may create additional stress for some service members (DeVoe & Ross, 2012; Gradus et al., 2015; Smith et al., 2016; Vaughn-Coaxum et al., 2015). For example, studies of deployed single parents have shown they experienced high rates of concern for family disruptions during deployment (Nilsson et al., 2015), as well as low levels of social support both during and after deployment, higher posttraumatic stress symptom severity following deployment, and reduced quality of family functioning following deployment (Vaughn-Coaxum et al., 2015). Similarly, published studies of partnered parents have

shown that an at-home spouse's behavioral health symptoms during deployment increase the strain on the deployed service member both while deployed and upon redeploying from the combat zone (Caska & Renshaw, 2011; Miller et al., 2018); and that married, deployed service members report higher levels of stress than their non-married counterparts (Newby et al., 2005).

This finding is not unique to the service member alone. In fact, a recent survey of over 45,000 spouses of active duty military personnel identified the most common problems they experienced during deployment were loneliness (36%), being a single parent (28%), dealing with issues alone (25%), and maintaining an emotional connection with their deployed spouse (23%; Dorvil, 2017). Dorvil also found that fewer than 20% of spouses were satisfied with support from the military during their last deployment and noted that perceived stress and problems among spouses during deployment had increased in recent years. Finally, greater than one-third of the surveyed spouses favored their spouse leaving military service. This opinion was especially prevalent among spouses who were dissatisfied with military life, as they were nine times more likely to favor their spouse leaving the military than spouses who were not dissatisfied with the military (Dorvil, 2017). A perceived lack of spousal support from a spouse back home may contribute to role strain.

The unique blend of homelife and deployment-related stressors impact a service member's behavioral health and ability to adjust to the deployed environment. Many service members manage well during deployment; however, some suffer from debilitating psychiatric distress necessitating evacuation from theater. Recent evidence indicates that issues such as depression (29.6%), adjustment disorder (17.6%), and PTSD (9.7%) to be among the most common causes of psychiatric aeromedical evacuation out of combat operations among deployed military personnel (Peterson et al., 2018). Aside from reporting count data, no studies have examined gender or marital status of individuals who were psychiatrically aeromedically evacuated from a combat theater. Therefore, the primary goal of this analysis was to address this gap in the research by evaluating gender and marital status associated with psychiatric aeromedical evacuation. An exploratory aim was to examine how gender and relationship differences related to the eventual separation from the military following a psychiatric aeromedical evacuation. When considered from a Role Strain Theory perspective, we hypothesized that married service members would be more likely to be evacuated from theater for a psychiatric diagnosis as compared with unmarried service members and that female

service members would be at increased risk for psychiatric aeromedical evacuation. Finally, we hypothesized that married female service members would be at increased risk for aeromedical evacuation related to anxiety and PTSD.

## Method

### Study design

This was a retrospective analysis of United States (US) military service members deployed to Iraq or Afghanistan between 2001 and 2013 who were aeromedically evacuated from theater for a psychiatric diagnosis. Data were provided by the U.S. Transportation Command Regulating and Command and Control Evacuation System (TRACES) and the Defense Manpower Data Center (DMDC) in 2015. The nature of the available data allowed for analysis of demographic, clinical, and military attrition information. A complete description of the procedures used to build the database is published elsewhere (Peterson et al., 2018). The study was approved by the Institutional Review Boards at the University of Texas Health Science Center at San Antonio and Wright-Patterson Air Force Base, Ohio.

### Demographics and military service characteristics

Demographic and military service information available in TRACES and the DMDC included variables such as race, gender, marital status, and education as well as military specific information, such as service branch (e.g., Army, Air Force, Marine Corps, or Navy), military pay grade, occupation classification (e.g., combat arms, combat support, and combat service support), and combat theater evacuated from (see Table 1). Psychiatric diagnoses as entered into TRACES and the DMDC were based on the International Classification of Diseases, 9th revision (ICD-9) codes. Career impacts of psychiatric aeromedical evacuation were examined using Interservice Separation Code (ISC). ISCs were first sorted into two categories that indicated if a service member had separated from the service or been retained following psychiatric aeromedical evacuation and then further split between service members who had *voluntarily* and *involuntarily* separated.

### Data analysis

Prior to addressing the aims of this study, count (%) descriptive statistics were completed to describe the

**Table 1.** Sample demographics across all aeromedical evacuation diagnoses ( $N = 5,957$ ).

Demographic Characteristics <sup>a</sup>	All Diagnoses $N = 5,957$ $IR = 121.9$	PTSD $n = 682$ $IR = 13.9$	Anxiety $n = 401$ $IR = 8.2$	Depressive Disorder $n = 2,081$ $IR = 42.6$	TBI $n = 47$ $IR = 0.9$	Serious Mental Illness $n = 910$ $IR = 18.6$	Personality Disorder $n = 296$ $IR = 6.0$	ASD $n = 203$ $IR = 4.1$	SUD $n = 99$ $IR = 2.0$	Adjustment $n = 1,238$ $IR = 25.3$
Gender ( $X^2$ )	47.84***	21.29***	0.18 ( <i>ns</i> )	7.63**	8.49***	0.39 ( <i>ns</i> )	3.95*	.94 ( <i>ns</i> )	.00 ( <i>ns</i> )	1.95 ( <i>ns</i> )
Male	5051	619	343	1728	47	780	239	177	84	1034
Female	906	63	58	353	–	130	57	26	15	204
Marital Status ( $X^2$ )	0.43 ( <i>ns</i> )	38.22***	5.95*	0.44 ( <i>ns</i> )	0.74 ( <i>ns</i> )	37.08***	21.08***	0.11 ( <i>ns</i> )	1.46 ( <i>ns</i> )	0.58 ( <i>ns</i> )
Married	3306	454	246	1167	29	421	126	115	49	699
Not Married	2651	228	155	914	18	489	170	88	50	539
Male Marital Status ( $X^2$ )	–	35.75***	7.86**	0.99 ( <i>ns</i> )	0.39 ( <i>ns</i> )	36.76***	20.37***	0.07 ( <i>ns</i> )	2.45 ( <i>ns</i> )	0.21 ( <i>ns</i> )
Married Male	2889	423	221	1005	29	366	103	103	41	598
Not Married Male	2162	196	122	723	18	414	136	74	43	436
Female Marital Status ( $X^2$ )	–	0.60	0.21 ( <i>ns</i> )	0.04 ( <i>ns</i> )	–	0.84 ( <i>ns</i> )	0.78 ( <i>ns</i> )	0.00 ( <i>ns</i> )	0.32 ( <i>ns</i> )	0.25 ( <i>ns</i> )
Married Female	417	31	25	162	–	55	23	12	8	101
Not Married Female	489	32	33	191	–	75	34	14	7	103
Age										
≤25	3406	326	200	1192	26	537	201	326	56	749
26–30	1318	188	92	449	8	178	60	188	27	272
31–35	666	98	58	222	10	103	24	98	8	122
36–40	361	42	29	134	3	62	9	42	4	63
≥41	204	27	22	84	–	29	2	27	4	32
Race/Ethnicity										
Caucasian	3966	509	297	1367	31	537	205	136	73	811
African American	922	71	43	332	7	200	39	22	10	198
Other/Unknown	1069	102	61	382	9	173	52	45	16	229
Education										
≤ High School – Some College	5465	636	360	1882	43	828	279	189	93	1155
≥ Bachelor's Degree	420	46	41	174	3	71	17	11	6	83
Branch										
Army	4569	586	295	1531	39	709	234	169	80	926
Marine Corps	585	63	41	231	8	75	33	13	8	113
Air Force	452	16	40	200	–	59	11	12	5	109
Navy	351	17	25	119	–	67	18	9	6	90
Pay Grade										
E-1 to E-4	3943	351	243	1354	24	652	245	127	70	874
E-5 to E-9	1676	301	124	58	20	203	44	66	26	312
WO-1 to CW-5	38	3	4	17	–	6	–	–	–	8
O-1 to O-3	177	14	17	76	–	29	1	7	3	30
O-4 to O-6	95	13	13	37	–	15	3	1	–	13
Operation										
Iraqi Freedom	2834	292	192	1016	23	510	180	107	43	471
Enduring Freedom	1871	269	124	606	21	221	60	77	38	455
Unknown	1251	121	85	459	3	179	56	19	18	312

Due to missing demographic data some cells may not equal 100%. “–” indicates no identified cases in a given cell or a valid comparison sample is unavailable to calculate known density. Military pay grades referenced above may be interpreted as follows: E-1 to E-4 represent junior enlisted service members; E-5 to E-9 represent Noncommissioned Officers; WO-1 to CW-5 represent warrant officers; O-1 to O-3 represent junior commissioned officers; O-4 to O-6 represent senior commissioned officers. The “Not Married” group includes service members whose data indicate they are divorced, never married, or widowed. \*Indicates significant group differences at  $p < .05$ ; \*\*Indicates significant groups differences at  $p < .01$ ; \*\*\*Indicates significant groups differences at  $p < .001$ . Incidence rates (IR) are per 100,000.

Abbreviations: IR = Incidence Rate; *ns* = non-significant differences; PTSD = posttraumatic stress disorder; TBI = Traumatic Brain Injury; ASD – acute stress disorder; SUD = substance use disorder.

demographic characteristics and nature of psychiatric aeromedical evacuation categories in the sample. The primary aim was to evaluate how gender and relationship status related to psychiatric aeromedical evacuation. To address this aim, we completed three sets of analyses across variables of interest. First, two chi-square ( $\chi^2$ ) goodness-of-fit tests were calculated to determine whether gender and relationship status distributions in our sample were different from the known deployed military population (Wenger et al., 2018). Next,

a series of  $\chi^2$  tests of independence were used to evaluate the relationship between a) sex and aeromedical evacuation, b) relationship status and aeromedical evacuation, and c) gender x relationship status and aeromedical evacuation among specific psychiatric diagnoses (see Table 1). Odds ratios (OR) and adjusted standardized adjusted residuals ( $z$ ) were calculated to further describe the nature of significant relationships. Cells with  $z$ -score estimates less than  $-1.96$  or greater than  $1.96$  suggest the observed proportions significantly differed from what

would be expected by chance. Finally, to address the exploratory aim, we evaluated the increased risk of military separation among military service members aeromedically evacuated for any psychiatric reason by gender, marital status, and gender x marital status using a  $\chi^2$  test of independence. Military separation was first analyzed as separated vs. not separated. We further evaluated the nature of military separation and evaluated differences in service members voluntarily vs. involuntarily separated. All analyses were conducted using SPSS version 26.

## Results

### Demographic and military characteristics

More than half of the subjects (58.0%) were less than 26 years old. The majority were Caucasian (72.8%), male (84.4%), and married (54.9%). Based on the standards to enter military service, most subjects had a minimum of a high school degree, and many had completed some college education; however, only 8.3% had earned a bachelor's degree or higher. Most of the service members served in the Army (77.1%) in the enlisted ranks of E-1 to E-9 (94.7%). Half served in combat service support occupations, such as quartermaster, ordnance, transportation, finance, chaplain, or legal. The remaining half served equally in combat arms (e.g., infantry, armor, field artillery, air defense artillery, special forces & combat aviation) or combat support occupations (e.g., chemical corps, engineer, military intelligence, military police including security forces, signal corps). [Table 1](#) provides a detailed summary of demographic and military service characteristics for the total and specified subsamples.

### Incidence of aeromedical evacuations from 2001 to 2013

During the study period (2001–2013), it is estimated that there were approximately 4,885,000 unique individuals deployed from all three components (Regular, Reserve, and National Guard) of the US Army, Air Force, Marine Corps, and Navy (Wenger et al., 2018). In terms of gender, approximately 89.6% (4,376,960/4,885,000) of those who deployed were males and 10.4% (508,040/4,885,000) were females. According to the TRACES database, 5,051 males and 906 females received a psychiatric aeromedical between 2001 and 2013 evacuation (see [Table 1](#) for disorders examined). Therefore, the likelihood of an aeromedical psychiatric evacuation is estimated that about 0.11% for males (5,051/4,376,960) and 0.17% for females (906/508,040). This represents an

estimated incidence rate of 115 per 100,000 for males and 178 per 100,000 for females. Incidence rates for each examined disorder are in [Table 1](#).

### Aeromedical evacuations by gender

When examining all causes of psychiatric aeromedical evacuation (see [Table 1](#)), females ( $n = 906$ ) were significantly more likely to receive a psychiatric aeromedical evacuation than males ( $n = 5051$ ;  $\chi^2(1, N = 5,957) = 47.84$ ,  $p < .001$ ), with females presenting with approximately 46% higher rates of psychiatric aeromedical evacuations than expected. When examining individual disorders, males were more likely than females to be evacuated for PTSD ( $OR = 1.86$ ;  $\chi^2(1, N = 5,957) = 21.29$ ,  $p < .001$ ) and traumatic brain injury (TBI;  $OR = 1.18$ ;  $\chi^2(1, N = 5,957) = 8.49$ ,  $p < .001$ ). Conversely, female service members were at increased risk for depressive disorders ( $OR = 1.22$ ;  $\chi^2(1, N = 5,957) = 7.63$ ,  $p = .006$ ). There were no observed gender differences in psychiatric aeromedical evacuations for diagnoses related to adjustment disorder, anxiety, acute stress disorder, personality disorders, substance use disorder, or serious mental illness ( $p > .05$ ).

### Aeromedical evacuations by marital status

When examining all causes of psychiatric aeromedical evacuation (see [Table 1](#)), there were no statistically significant differences between married ( $n = 3306$ ) and non-married service members ( $n = 2651$ ;  $\chi^2(1, N = 5,957) = 0.43$ ,  $p = .835$ ). When examining only married service members, males were at increased risk for PTSD ( $OR = 1.98$ ;  $\chi^2(1, N = 3,306) = 15.98$ ,  $p < .001$ ) and TBI ( $OR = 1.14$ ;  $\chi^2(1, N = 3,306) = 4.22$ ,  $p = .040$ ). There were no statistically significant differences between married females and males across the other seven psychiatric conditions (see [Table 1](#);  $p > .05$ ). When examining individual disorders in the total sample, married service members were more likely than non-married service members to be evacuated for PTSD ( $OR = 1.69$ ;  $\chi^2(1, N = 5,957) = 38.22$ ,  $p < .001$ ) and anxiety ( $OR = 1.29$ ;  $\chi^2(1, N = 5,957) = 5.95$ ,  $p = .008$ ). Conversely, non-married service members were more likely to be evacuated for personality disorder ( $OR = 1.72$ ;  $\chi^2(1, N = 5,957) = 21.08$ ,  $p < .001$ ) and serious mental illness ( $OR = 1.55$ ;  $\chi^2(1, N = 5,957) = 37.08$ ,  $p < .001$ ). Nonsignificant differences between married and non-married service members were observed for depressive disorders, TBI, acute stress disorder, adjustment disorders, or substance use disorder ( $p > .05$ ).

## **Aeromedical evacuations by gender and marital status**

### **Marital status in males**

Among the disorders of interest, married males ( $n = 2,889$ ) accounted for 48.4% of all psychiatric aeromedical evacuations; nonmarried males accounted for 36.3% ( $n = 2,162$ ; see [Table 1](#)). Married males were more likely to be evacuated than non-married males for PTSD ( $OR = 1.66$ ;  $\chi^2(1, N = 5,051) = 35.75, p < .001$ ) and anxiety ( $OR = 1.38$ ;  $\chi^2(1, N = 5,051) = 7.86, p = .003$ ). Conversely, non-married males were more likely to be psychiatrically aeromedically evacuated for personality disorder ( $OR = 1.81$ ;  $\chi^2(1, N = 5,051) = 20.37, p < .001$ ) and serious mental illness ( $OR = 1.63$ ;  $\chi^2(1, N = 5,051) = 39.76, p < .001$ ). Regardless of marital status, males did not differ in psychiatric aeromedical evacuations due to depressive disorder, acute stress disorder, adjustment disorder, TBI, or substance use disorder ( $p > .05$ ).

### **Marital status in females**

Among the disorders of interest, married females ( $n = 417$ ) accounted for 7.0% of all psychiatric aeromedical evacuations; nonmarried females accounted for 8.2% ( $n = 489$ ; see [Table 1](#)). Similar to married and non-married males, there were no statistically significant differences between married and non-married females across any of the nine psychiatric conditions (see [Table 1](#);  $p > .05$ ).

### **Career impacts and military separation**

Just over half (53%) of the service members who were aeromedically evacuated from theater for any psychiatric reason between 2001 and 2013 were separated from the military by 2015. Results indicated that neither marital status ( $\chi^2(1, N = 5,957) = .176, p = .675$ ) nor gender ( $\chi^2(1, N = 5,957) = .391, p = .735$ ) influenced separation.

## **Discussion**

This analysis evaluated data from U.S. service members who were aeromedically evacuated from Iraq or Afghanistan between October 2001 and October 2013 for psychiatric concerns related to depressive disorders, PTSD, anxiety, adjustment disorders, and acute stress reactions. The current literature is clear that deployments are stressful and that stressors experienced on deployments impact individuals differently (Jacobson et al., 2015; Taal et al., 2014; Vogt et al., 2011). What was unclear before this study, however, was how stress experienced during deployment impacts psychiatric

aeromedical evacuation. This study sheds light on this and provides evidence for how a psychiatric aeromedical evacuation impacts a service member's career. The present study also expands on previous findings by Skopp et al. (2011) and reports on the differential impacts of deployment stressors on married and nonmarried service members, as well as males and females. We considered these factors through the lens of Role Strain theory which posits that strain builds when an individual attempts to fulfill multiple roles (e.g., being a spouse and a deployed service member), they will inevitably fail to meet all obligations (Goode, 1960).

We hypothesized that married service members would experience higher rates of psychiatric aeromedical evacuations than non-married service members. We found partial support for this, concerning PTSD and anxiety. Although there were no differences in anxiety between males and females, males were at increased risk for aeromedical evacuation due to PTSD. Interestingly, some literature shows that females experience reduced well-being and greater levels of interpersonal stress that negatively impacts their health during (Edwards, 2014; McNulty, 2005; Street et al., 2013; Vogt et al., 2005) and after deployment (Skopp et al., 2011); whereas other literature indicates that female service members may be as resilient to combat-related stress as males (Jacobson et al., 2015; Vogt et al., 2011; Woodhead et al., 2012). Contrary to our hypothesis, married female service members were not at increased risk of psychiatric aeromedical evacuation for PTSD.

Based on the present analyses, we would put forth that although females were at increased risk for psychiatric aeromedical evacuation overall, married female service members appear to be at reduced risk for psychiatric aeromedical evacuation out of theater related to PTSD and anxiety diagnoses and thus are potentially more resilient to combat stressors than their married male counterparts. This is not to minimize the findings that married military personnel are at greater risk for anxiety but suggests that females compared to married males might have been less able to cope with stress while deployed.

This may also be partially explained by considering the relationship between stressors and traditional gender roles or by examining healthcare seeking behaviors in the contemporary operating environment. In the post 9–11 conflicts, female service members have been more likely to serve in roles on larger forward deployed bases, thereby providing increased access to behavioral healthcare services. Additionally, female service members are more likely to experience and report sexual assault and harassment (Street et al., 2007; Zinzow et al., 2007) which may contribute to increased risk for evacuation and psychiatric illness. Although they do not report on

this directly, Judkins and Bradley (2017) reported that deployed females sought care at a rate nearly three times what would have been expected given the percentage of female service members deployed over the course of this study. Similarly, McNulty (2005) found deployed, female sailors were more likely to have a history of seeking counseling services as well as being willing to seek counseling services than were male sailors. Also, of interest, the finding that non-married females were at significantly increased risk for aeromedical evacuation due to depressive disorders indicates that family may provide psychological protection for female service members. Despite this, we do not discount previous literature which has shown that post-deployment, females who experienced decreases in perceived intimate relationships during deployment were at significantly increased odds for PTSD symptomology (Skopp et al., 2011). Both considerations point toward potential avenues for future intervention development with consideration toward far forward care and implementation by Combat Operational Stress Control centers and partnered/dyadic interventions delivered by unit chaplains upon redeployment.

The finding related to the impact of psychiatric aeromedical evacuation on military careers contributes unique information on previous reports showing that many military service members who sought help did not experience a negative impact on their career (Christensen & Yaffe, 2012; Rowan & Campise, 2006). In the present sample, service members who were psychiatrically aeromedically evacuated from theater were just as likely to separate as not and neither gender nor marital status were related to separation. Although we can only speculate, it seems that military leaders and behavioral health providers in the contemporary operating environment are affording these service members time to seek behavioral healthcare services, rather than simply discharging them.

Despite the novelty of this study, its limitations warrant discussion. First, we were interested in the impacts of Role Strain but were only able to compare data from married to nonmarried service members. We did not have any data about the quality of the marriage or supportive partnered relationships outside of marriage. Additionally, no data were available about the number, age, or living situation of children, for whom service members may be responsible. Based on the demographics of deployed service members, nearly 56% of active duty service members are married, and 45% have children (Department of Defense, 2016; Wenger et al., 2018). Our approach to considering Role Strain and its impact on aeromedical evacuations was driven by the current literature and assumes that deployed, married

service members were under additional stress based on the combination of their home and military service responsibilities than those not married.

Another consideration is that when examining large datasets there is always the potential for coding errors, misdiagnoses, and missing data (Mooney et al., 2015). For example, a diagnosis of adjustment disorder is ill-defined in the *Diagnostic and Statistical Manual of Mental Disorders* and is often used as a default diagnosis when the clinical picture is unclear. These errors may be especially amplified as the high operational tempo of aeromedical evacuation often requires medical providers to quickly document diagnoses on large numbers of patients resulting in incomplete coding and/or coding errors. As such, we would note that despite each of these diagnoses being made by a medical provider and the data being drawn from DoD validated datasets, that errors in diagnosis may still exist. Similarly, only data from individuals who had been psychiatrically aeromedically evacuated were available for analysis. As such, a cross-section of the deployed force is naturally excluded from the present analyses. When considering recommendations for the future, we would encourage interested researchers to re-evaluate these present findings in service members deployed in support of more recent conflicts to determine the protective nature of relationships now that females are more actively serving in combat roles. Finally, the nature of our data and the analyses implemented limited controlling for covariate variables. Future studies should further examine the interrelations between the effects reported herein life experiences, sociodemographic (i.e., age), or military unique (i.e., combat exposure) factors to ensure that the present findings are indeed uniquely related to gender and marital status.

## Conclusions

This study provides a unique contribution to enhancing the understanding of risk factors related to psychiatric aeromedical evacuation for deployed service members. The present data shows that female service members are at the greatest risk for psychiatric aeromedical evacuation but that deployed married males present with a significantly higher incidence of psychiatric aeromedical evacuation for PTSD than married females and that neither gender nor marital status is related to a separation from the service following a psychiatric aeromedical evacuation from a combat zone. Considering females were not permitted to actively serve in combat arms positions until after the conclusion of this study, future research is needed to validate these findings in more recent samples.

## Acknowledgments

The authors would like to thank Julie Collins and Joel Williams for their assistance in the completion of this manuscript.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

Funding for this work was made possible by the U.S. Department of Defense through the Air Force Medical Support Agency (AFMSA) contract FA8650-13-2-6408 executed by the 711th Human Performance Wing.

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## Data availability statement

The data that support the findings of this study are available from the corresponding author (BAM) upon reasonable request.

## Disclaimer

The views expressed herein are solely those of the authors and do not reflect an endorsement by or the official policy or position of the U.S. Air Force, the Department of Defense, the Department of Veterans Affairs, or the U.S. Government.

## Previous presentation

This manuscript was previously presented at the 34th annual meeting of the International Society for Traumatic Stress Studies, Washington, DC.

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