

## The impact of deployment to Iraq or Afghanistan on partners and wives of military personnel

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### Abstract

Deployment has well documented psychological consequences for military personnel. To fully understand the human cost of war, the psychosocial impact of separation and homecoming of military personnel on their families must also be considered. Recent arduous conflicts in Iraq and Afghanistan make understanding the impact of war on spouses topical and pertinent. Widespread psychological morbidity and social dysfunction have been reported in spouses of military personnel who have been deployed to combat zones such as Vietnam, with difficulties most acute for spouses of military personnel with post-traumatic stress disorder (PTSD). A review of the literature published between 2001 and 2010 assessing the impact of deployments to Iraq and Afghanistan on spouses of military personnel was conducted. A total of 14 US-based studies were identified which examined psychological morbidity, help seeking, marital dysfunction and stress in spouses. Longer deployments, deployment extensions and PTSD in military personnel were found to be associated with psychological problems for the spouse. Methodological differences in the studies limit direct comparisons. Recommendations for future research are outlined. The needs of spouses of military personnel remain an important issue with implications for service provision and occupational capability of both partners.

### Introduction

More than two million US military personnel have been deployed to Iraq and Afghanistan since 2001 (Manos *et al.*, 2010). While the health and well-being of military personnel has received much attention (e.g. Fear *et al.*, 2010; Hoge *et al.*, 2004; Hosek *et al.*, 2006), less is known about the impact of deployment on military families, especially spouses who have been described as the 'overlooked casualties of war' (RNRMCF, 2009). However, previous work has shown that deployment has psychosocial consequences for the spouses of military personnel (Levy & Sidel, 2009) and past research has shown increased levels of anxiety, stress, depression, marital maladjustment and an increase in inter-partner violence (Angrist & Johnson 2000; Jensen *et al.*, 1996; Jordan *et al.*, 1992; Riggs *et al.*, 1998; Rosen *et al.*, 1993, 1995). Spouses of those who have deployed for longer periods or who return with post-traumatic stress disorder (PTSD) (Manguno-Mire *et al.*, 2007) may be particularly at risk. The aim of

this review is to evaluate the literature on the health and well-being of spouses of military personnel who have deployed to the recent conflicts in Iraq and Afghanistan.

### Method

Throughout this article, we use 'military personnel' to refer to enlisted members of all ranks and all service branches, and spouses to refer to their married or unmarried cohabiting partners.

Articles were retrieved by performing a literature search of Google Scholar, PsycINFO, MEDLINE, PubMed and Web of Science from 2001 to 2010. Searches included the key words: ('military' or 'armed forces' or 'soldier\*' or 'army' or 'combat') and ('Iraq' or 'Afghanistan' or 'Telic' or 'Herrick' or 'Enduring Freedom' or 'Iraqi Freedom' or 'deployment\*') and ('partners' or 'wives' or 'spouses'). Hand-searching was then conducted by scanning the bibliographies of selected papers for other relevant articles.

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### Inclusion criteria

Papers were included if they were based on quantitative studies of civilian female spouses of male military personnel who had served or were serving in Iraq or Afghanistan. Only peer-reviewed studies which were reported in English were included. As the aim of this review was to assess the impact on spouses directly, studies which assessed outcomes by asking only military personnel themselves were excluded. Another aim of the review was to compare research findings on the nature and extent of the impact of deployment directly, which led to the exclusion of qualitative studies. Although female military personnel do deploy, these represent a small minority of the military population, and a decision was made to exclude studies based on the partners of female military personnel.

A total of 26 studies were identified from the searches, of which 14 were included in the current review (Table I). The excluded studies included ten which questioned only the service person themselves (Fonseca *et al.*, 2006; Gerwitz *et al.*, 2010; McLeland *et al.*, 2008; Meis *et al.*, 2010a, 2010b; Renshaw *et al.*, 2009; Sayers *et al.*, 2009; Teten *et al.*, 2009, 2010; Forgey & Badger, 2006) and two qualitative studies (Lapp *et al.*, 2010; Goff *et al.*, 2006).

## Results and discussion

The studies were grouped into three main themes according to the main outcomes measured: studies of the prevalence of psychiatric disorders and help seeking in spouses, studies which assessed aspects of marital health, and those looking at perceived stress. A summary is provided in Table I, key results are summarized in Table II and then discussed in further detail.

### *Prevalence of psychiatric disorders and help seeking in spouses*

Mansfield *et al.* (2010) examined outpatient attendance, and reported that spouses of deployed military personnel had significantly increased rates of psychiatric diagnoses compared to spouses of those who had not deployed. Increased prevalence rates were reported for depression, anxiety disorders, sleep disorders, acute stress reaction and adjustment disorders. A total of 39.3 excess cases per 1000 of depression were reported in the spouses of the group deployed for longer than 11 months and nearly 30% higher rates of service use are seen in this group.

The prevalence of major depression in spouses in primary care is almost 20% (Eaton *et al.*, 2008). The authors draw parallels with the similar rates of depression reported in a study of military personnel

(Hoge *et al.*, 2004). As a large proportion (78%) of military personnel were deployed at the time of data collection, the findings of Eaton *et al.* (2008) may not hold true for times beyond deployment. The cross-sectional nature of the data prohibits conclusions being drawn about the temporal association between deployment and poor mental health.

As well as deployment itself, extensions to deployment may have a negative effect on mental health of spouses. SteelFisher *et al.* (2008) reported increased feelings of loneliness, anxiety and depression in those who had experienced separations longer than anticipated. The importance of deployment length is known for the health and well-being of military personnel (Rona *et al.*, 2007; Buckman *et al.*, 2010), but also appears to be of importance to spouses.

A further risk factor for mental health problems in spouses may be the absence of military partners during critical periods such as pregnancy. Deployment during pregnancy correlates with an almost three-fold increased risk of postpartum depression in partners (Robrecht *et al.*, 2008).

There may be a disparity between those in need of help and those seeking help. For instance, Warner *et al.* (2009), examined depression, stress and help-seeking behaviour in a pre-deployment sample. They reported that 88.5% of spouses from family readiness groups (FRG), US Army sponsored groups supporting military families through deployment, reported being willing to seek help. However, another study showed a smaller proportion (68%) actually seek help for mental health concerns in primary care (Eaton *et al.*, 2008). Multiple reasons for this disparity have been suggested. For example, Eaton *et al.* (2008) reported that spouses have difficulty getting time off work (41.3%), or getting an appointment (26%) or find the cost of assessment and treatment prohibitive (26%). Stigma of mental health treatment in military personnel is well documented (Hoge *et al.*, 2004; Greene-Shortridge *et al.*, 2007) and it may also affect the behaviour of spouses. For example, 20% of the Eaton *et al.* (2008) sample stated that seeking help for mental health problems would be embarrassing and a further fifth regarded it as being 'weak'. Another reason these populations may be reluctant to seek help is the fear of negative impact on the career of their military partner (Warner *et al.*, 2009), and thus although intention to seek help is high pre-deployment, this may not translate into help-seeking post-deployment.

### *Marital health*

Research on the effect of deployment on marital health is conflicting and the interaction between deployment, combat exposure, and homecoming and marital health is complex.

Table I. Summary of included studies (n = 14).

Authors	Allen et al.	Burton et al.	Eaton et al.	Goff et al.	Haas et al.	Haas et al.	Haas & Pazdernik et al.	Hamilton et al.	Mansfield et al.	Renshaw et al.	Robrecht et al.	SteelFisher et al.	Warner et al.	Weis et al.
Date of publication	2010	2009	2008	2007	2005	2006	2007	2009	2010	2008	2008	2008	2009	2008
N	434 couples	130	940	45 couples	279	95	463	45 couples	250000	49 couples	415	798	295	421
Data collection period	2007	Data not recorded	2003	2004-2005	2003	2003	2005	2004-2005	2003-2006	2006	2006	2004	Data not recorded	2002-2003
Response rate	Data not recorded	Data not recorded	51%	80%	93%	Data not recorded	88%	80%	N/a because existing database used	Data not recorded	N/a because existing database used	56%	34%	51%
Study type	Cross sectional	Cross sectional	Cross sectional	Cross sectional	Cross sectional	Cross sectional	Cross sectional	Cross sectional	Analysis of records	Cross sectional	Analysis of records	Cross sectional	Cross sectional	Longitudinal
Service personnel included	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No
Population Sample	Unit/base	Family readiness group & primary care	Family readiness group & primary care	Unit/ base	Hospital camp; Pre-natal	Hospital camp; Pre-natal	Hospital camp; Pre-natal	Unit/ base	mental health outpatients	Unit/base	Hospital camp; Post-partum	Unit/ base	Family readiness group	Hospital camp; Pre-natal
Engagement Type	Active duty	Data not recorded	Active duty	Data not recorded	Active duty	Active duty	Active duty	Active duty	Active duty	National Guard	Active duty	Active duty	Data not recorded	Active duty
Service arm	Army	Army	Tri-service	Army	Majority USMC	Majority USMC	Majority USMC	Army	Army	Army	USMC/ Navy	Army	Army	Tri-service
Deployment status	<1 year Post non-deployed	Current versus non-deployed	All currently deployed	All post-deployment	Current versus non-deployed	Current versus non-deployed	Current versus non-deployed	All post-deployment	Post-versus non-deployed	<3 months post-deployment	during pregnancy versus non-deployed	All post-deployment	All pre-deployment	Post-versus non-deployed
Outcome measures	Psychological	Spouse: PHQ	Spouse: PHQ	Couple: 1. TSC 2. PPTSDS-R	Spouse: 1. PHQ 2. Diagnosis recorded	Couple: 1. TSC 2. PPTSDS-R	Spouse: Diagnosis recorded	Spouse: 1. PTSDC-C 2. Depression Scale	Spouse: 1. PTSDC-C 2. Depression Scale	Spouse: 1. Perceived negative impact, daily life difficulties and perceptions of Army during deployment 2. SSI 3. Location of support network	Spouse: EPDS	Spouse: 1. Perceived negative impact, daily life difficulties and perceptions of Army during deployment 2. SSI 3. Location of support network	Spouse: PHQ	Spouse: PHQ

Marital health scales	Couple: 1. KMSS 2. CS 3. PB 4. PAI 5. Dedication 6. Satisfaction with sacrifice 7. CDSS	Asked to rate 'family problem' as mild/moderate/severe	Couple: DAS	Spouse: Measure of stress	Spouse: Measure of stress	Spouse: Measure of stress	Couple: DAS	Spouse: Measure of stress	Couple: DAS	Spouse: Measure of stress	Spouse: PSS	Spouse: 1. PSEQ 2. SSI
Stress	No	Asked to rate 'stress' at mild/moderate/severe	No	No	No	No	No	No	No	No	No	No
Combat exposure	No	No	Couple: TEQ	No	No	No	Couple: TEQ	No	No	No	No	No

N, number of participants; Deployment status: post, post-deployment; Outcome measures: CES, Centre for epidemiological studies; PTSD Checklist-Civilian; PHQ, Patient Health Questionnaire; TSC, Trauma Symptom Checklist; PPTSDS-R, Purdue PTSD Scale Revised; PTSDC-M, PTSD Checklist-Military; EPDS, Edinburgh Postnatal Depression Scale; SSI, Social Support Index; KMSS, Kansas Marital Satisfaction Scale; CS, Confidence Scale; PB, Positive Bonding; PAI, Parenting Alliance Inventory; CDSS, Communication Danger Signs Scale; DAS, Dyadic Adjustment Scale; RAS, Relationship Assessment Scale; PSS, Perceived Stress Scale; PSEQ, Prenatal Self Evaluation Questionnaire; TEQ, Traumatic Events Questionnaire; SP, Spousal Perception; CES, Combat Exposure Scale.

Allen *et al.* (2010) reported that levels of marital satisfaction are not affected by deployment alone; yet other surveys of recently deployed military personnel show that deployment does negatively affect marital satisfaction (McLeland *et al.*, 2008). However, the comparison group in this study (McLeland *et al.*, 2008) consisted of a small sample of reserve military personnel and civilians rather than equivalent non-deployed military personnel. As well as deployment itself, the unexpected extension of deployments may carry an increased risk to marital relationships. A greater number of spouses (14%) who had experienced extensions reported a negative impact of deployment on their relationship (SteelFisher *et al.*, 2008).

In contemporaneous cohorts, the risk of marital problems in those exposed to significant combat during deployment appears to be significantly lower than that reported in some long-term Vietnam studies, where 70% of spouses of military personnel with PTSD experienced relationship problems and psychological morbidity (Manguno-Mire *et al.*, 2007; Riggs *et al.*, 1998). The impact of combat exposure was not associated with marital problems in the small National Guard study (Renshaw *et al.*, 2008), or other studies (Goff *et al.*, 2007; Hamilton *et al.*, 2009). Data from National Guard troops may not be representative for various reasons: differences in amount of training time and experience, lacking the support of a military community or the post-deployment activities, and being inserted into preformed full-time units. Conversely, these samples may not necessarily represent groups at the highest risk of psychological morbidity because in addition to differences in the characteristics of their role, they contain disproportionately high numbers of better educated, married and white personnel (Renshaw *et al.*, 2008, 2009), factors associated with lower rates of PTSD after exposure to trauma (Brewin *et al.*, 2000).

Whereas the effects of deployment or combat exposure alone on marital health may be unclear, military personnel who return with PTSD are at significantly with greater risk of poor marital health, mediated in the main by disrupted reintegration of military personnel into family life (e.g. disruption of communication, bonding and parenting) (Allen *et al.*, 2010). Trauma symptoms, such as dissociation, anxiety, sexual and sleep problems in military personnel are significantly associated with reduced spouse-reported relationship satisfaction, although trauma exposure, overall PTSD scores and other subscales (such as depression in military personnel) were not (Goff *et al.*, 2007). However, Renshaw *et al.* (2008) found that the spouse's perception of symptoms and level of combat exposure of military personnel were key in mediating spouse's psychological and overall

Table II. Summary of results and limitations of included studies.

Reference	Results	Limitations
Allen <i>et al.</i> , 2010	Deployment within the preceding year was not associated with differences in any aspect of relationship functioning. Current PTSD symptoms in military personnel were associated with lower rates of marital satisfaction, decreased confidence in and dedication to the relationship, reduced intimacy and effective parenting. After these were controlled for, PTSD symptoms in military personnel no longer predicted poor marital satisfaction reported by spouses.	1. Couples were from a marriage education workshop possibly representing those with particular desire to salvage marriage or couples who had significant problems. 2. The location and type of deployment is unknown.
Burton <i>et al.</i> , 2009	Significantly increased scores were reported on Perceived Stress Scale (PSS) and Patient Health Questionnaire (PHQ) ( $14 \pm 4$ ) in spouses of deployed versus non-deployed military personnel ( $4 \pm 3$ ). Both PHQ and PSS scores were significantly correlated. The most common statements were 'feeling stressed' and 'feeling tired' in the qualitative analysis.	1. Convenience sample from military support groups on 2 bases (FRG). 2. Does not establish a causal link between stress and higher PHQ score. 3. Length of deployment, previous deployments, or home characteristics, such as support or having other children at home, are not controlled for.
Eaton <i>et al.</i> , 2008	17% of spouses experienced emotional, alcohol or family problems, 7% met the criteria for major depression and 7% for generalized anxiety disorder. 68% of spouses screening positive for a mental health problem had sought help. 41% had sought help from mental health services, 19% from a primary care physician, and 8% from pastoral care, e.g. chaplain.	1. 51% response rate. 2. The primary care convenience sample may have a higher prevalence of mental health problems than a general population sample.
Goff <i>et al.</i> , 2007	Mean scores of PTSD and trauma symptoms such as anxiety, dissociation, sexual problems and sleep were comparable in military personnel and spouses. Increased depression and PTSD in military personnel predicted their poor relationship satisfaction. More trauma symptoms in military personnel had a negative impact on relationship satisfaction reported by spouses. Having two or more children at home, perceiving a greater impact of deployment, being the spouse of active-duty military personnel, having been in a relationship for a shorter period, and having a higher systolic blood pressure were associated with higher reported stress levels in spouses during pregnancy.	1. Participants were recruited by advertisement and remunerated. 2. The military personnel were mainly from Iraq deployments, and either young and healthy or older officers. 3. Small sample. 4. Non-diagnostic tools used.
Haas <i>et al.</i> , 2005	More trauma symptoms in military personnel had a negative impact on relationship satisfaction reported by spouses. Having two or more children at home, perceiving a greater impact of deployment, being the spouse of active-duty military personnel, having been in a relationship for a shorter period, and having a higher systolic blood pressure were associated with higher reported stress levels in spouses during pregnancy.	1. Clinical population. 2. Non-validated measures used. 3. Other children (a potential stressor) are not controlled for. 4. High casualty rate at this base (28 dead and 158 wounded by the end of the study) but optimistic media coverage in period may have influenced stress levels.
Haas <i>et al.</i> , 2006	A significant increase in birth weights was seen in the children of deployed military personnel. Spouses reporting higher stress did not have higher birth weight babies. Stress was not found to be correlated with deployment. Spouses of deployed military personnel reported higher stress levels than those of non-deployed counterparts (40% v 24%). The following factors were associated with higher stress reporting: spouse being active duty, being closer to term in pregnancy, having more than one child at home, exposure to media coverage of the war. A supporting person was protective.	1. A non-validated measure of stress was used. 2. The results were not linked to objective neonatal measurements of infant birth weight.
Haas & Pazdernik, 2007	Spouses of deployed military personnel reported higher stress levels than those of non-deployed counterparts (40% v 24%). The following factors were associated with higher stress reporting: spouse being active duty, being closer to term in pregnancy, having more than one child at home, exposure to media coverage of the war. A supporting person was protective.	1. Only 16% of the sample was deployed to a combat zone. 2. Confounders such as psychological morbidity in military personnel were not investigated.
Hamilton <i>et al.</i> , 2009	Examined the impact of a history of trauma and trauma symptoms such as anxiety, dissociation, sexual problems and sleep in spouses on relationship satisfaction. More severe trauma symptoms in the spouse but not trauma history significantly predicted lower relationship satisfaction reported by military personnel and spouses. Particularly significant in determining poorer relationship satisfaction were spousal re-experiencing and arousal PTSD symptoms but not avoidance symptoms.	1. Older soldiers with mean age of $31 \pm 7$ years. 2. The sample was small and taken from one geographical area. 3. All participants had some trauma history so no comparison was possible with spouses without a history of trauma. 4. Specific spousal trauma not documented.

Mansfield <i>et al.</i> , 2010	When military personnel were deployed for 1-11 months, spouses received 41 excess ICD-9 diagnoses per 1000. Deployment of more than 11 months was associated with 61 excess cases per 1000. Rates of mental health service use were 27% higher for spouses in the group who were deployed for longer.	<ol style="list-style-type: none"> <li>1. No deployment data available so not possible to assess temporal relationship between deployment and diagnosis.</li> <li>2. No data about physical health of spouses.</li> <li>3. No data about mental or physical health of military personnel.</li> <li>4. Analysing records is dependent on accurate and complete coding of disorders.</li> </ol>
Renshaw <i>et al.</i> , 2008	Spouses of recently returned military personnel exhibited nearly double the rate of depression reported in general population samples elsewhere. Spouse symptoms are worse when there is a mismatch between their perception of the severity of symptoms of military personnel and what the military personnel report. High levels of PTSD symptoms reported by military personnel did not correlate with lower spouse-reported marital satisfaction unless spouses thought military personnel had experienced low levels of combat. Overall marital satisfaction rates in this sample were equivalent to non-military community samples.	<ol style="list-style-type: none"> <li>1. Mean age of military personnel is greater than most combat samples (<math>34 \pm 9</math> years).</li> <li>2. This national guard sample may not be representative.</li> <li>3. These results obtained soon after return from deployment may not represent long term perceptions of spouses.</li> </ol>
Robrecht <i>et al.</i> , 2008	Spouses of deployed military personnel were more likely to have postpartum depression (odds ratio = 3). The deployment of military personnel during pregnancy was an independent predictor of higher Edinburgh Postnatal Depression Scores (EDPS).	<ol style="list-style-type: none"> <li>1. Length of deployment was not examined.</li> <li>2. EDPS, although a good screening tool, does not provide a postpartum depression diagnosis.</li> </ol>
SteelFisher <i>et al.</i> , 2008	Feelings of loneliness (78%), anxiety (52%) and depression (43%) were widespread in spouses of military personnel post-deployment. Nearly 20% of the sample reported problems with their overall health and an impact on their jobs. Those whose spouse's deployed for longer had significantly higher rates of feelings of loneliness, anxiety, depression.	<ol style="list-style-type: none"> <li>1. 20-30% of sample deployed to a conflict other than Iraq or Afghanistan.</li> <li>2. Deployment extensions were spouse-reported and not verified.</li> <li>3. Reasons for extension (and so possible selection bias) were unexplored.</li> <li>4. Clinical measures were not used to assess the rates of anxiety and depression.</li> </ol>
Warner <i>et al.</i> , 2009	Before deployment, 33% of spouses reported they had received mental health treatment, 44% met the criteria for depression, and their Perceived Stress Score (PSS) was reported to be significantly higher than general population mean scores. 86% of spouses would seek help if they thought it necessary or were encouraged to do so by family or friends but nearly one third expressed concern about the effect this would have on their spouse's career. The non-depressed group endorsed fewer perceived barriers to care than the depressed group.	<ol style="list-style-type: none"> <li>1. Pre-deployment sample.</li> <li>2. 33% response rate, with nothing known of the non-responders.</li> <li>3. Only Family Readiness Group (FRG) samples were used.</li> </ol>
Weis <i>et al.</i> , 2008	Deployment of military personnel in the first trimester significantly increased spousal feelings of anxiety and conflict regarding the pregnancy in each trimester Spouses who had more support available, especially on-base rather than off-base, felt more comfortable with being pregnant.	This sample may not be representative of the military population as only 20% were deployed and these personnel were primarily from a training unit and may not have been deployed to combat operations.

marital health. Spouses were more likely to report having symptoms when they perceived their military partner to have PTSD symptoms which the military partner did not themselves acknowledge (Renshaw *et al.*, 2008). Also, high levels of PTSD symptoms reported by military personnel did not correlate with lower spousal-reported marital satisfaction unless spouses perceived military personnel to have experienced low levels of combat, perhaps because spouses could identify no understandable cause for their partner's PTSD.

One consequence of marital dysfunction, divorce, has not been discussed here. Research in this area is sparse and contradictory (Karney & Crown, 2007). However, there is no evidence that marriage dissolution rates are associated with deployment in an examination of over half a million US personnel records (Karney & Crown, 2007).

#### *Stress: pre-deployment, during deployment and in pregnancy*

Perceived stress scores before deployment are elevated compared to an established general population mean value (Warner *et al.*, 2009). However, one third of this sample of spouses reported receiving mental health treatment, nearly half meet depression criteria and 70% of the sample have children at home, all of which may increase stress and therefore be confounding factors (Rosen, 1995; Haas *et al.*, 2005). Furthermore, the low response rate (33%) and exclusively FRG sample, which tend to be underutilized by the most psychologically at-risk spouses (Rosen & Moghadam, 1989), impair the generalizability of these findings.

Stress has been shown to be almost twice as high in spouses of deployed military personnel when compared to a non-deployed group (Burton *et al.*, 2009). Perceived stress is also significantly correlated with somatisation symptoms but this is not evidence of lasting psychological morbidity in spouses of deploying military personnel.

Certain factors about the spouses themselves, such as being pregnant during the deployment of their military partner, positively correlate with higher levels of stress, according to self-report (Haas & Pazdernik, 2007). This finding was not replicated in another study by the same team (Haas *et al.*, 2006). In fact, in one study only 27% of participants rated the impact of deployment as moderate or significant (Haas *et al.*, 2007). Already having children at home was another greater predictor of increased stress than deployment itself in all three pregnancy studies and pre-deployment (Haas *et al.*, 2005; Haas & Pazdernik, 2006, 2007; Warner *et al.*, 2009). A further possible risk factor for stress in pregnancy may be the representation of the conflict in the media which has been

reported as increasing stress in spouses in some but not all studies (Haas *et al.*, 2006, 2007). As well as a potential cause of stress in the pregnant spouse, deployment may influence the way in which the pregnancy is viewed by the spouse. In fact, feelings of anxiety and conflict regarding the pregnancy and impending birth in each trimester were significantly increased if military personnel had deployed in the first trimester (Weis *et al.*, 2008).

Stress will affect spouses of military personnel before, during and after deployment in different ways. The use of non-validated outcome measures makes conclusions difficult and a further limitation, applicable to most of the studies reviewed, is the use of cross-sectional survey techniques. Also in the studies described, participants are usually drawn from defined groups, i.e. presenting for antenatal screening, or on only one military base.

#### **Limitations and recommendations for future research**

The picture provided by the existing research is incomplete, conflicting and suggests the need for further research. Often deployment data are not collected, such as duration (expected and actual), number of past deployments, type (combat or support role) and exposure to trauma making temporal and causal associations difficult to make. Most of the studies examined deal with military personnel from the Army or Marines, who typically have higher rates of combat exposure, limiting their generalizability. Choice of the outcome measures used has also limited the utility of the studies to date, as they have typically used brief screening instruments rather than validated clinical measures to estimate prevalence. Although excluded from this review, a number of studies attempt to assess family functioning by asking only military personnel themselves and not their spouses. The chance of reporter bias in such studies is high and multi-informant data (e.g. from child, mother, father, and teacher) is preferable to assess family functioning. The effect of media coverage, having multiple children at home and the length and number of deployments of military personnel are all variables which warrant further study.

Future research should aim to sample all service branches, collecting objective data on deployment characteristics and using validated clinical instruments for assessment of mental health in military personnel and their spouses. Also important would be the assessment of marital satisfaction using well validated measures, alcohol use and misuse, and inter-partner violence. To achieve sufficient power, studies would need to be large and ideally longitudinal (conducting assessment before, during, and immediately post-deployment and again longer term).

## Conclusion

The reviewed research suggests that military spouses face challenges during periods of deployment and that some groups are particularly at risk of mental health problems. Specific factors identified by the research are the length of deployments of military personnel (i.e. longer deployments and deployment extensions are associated with increased risk of psychiatric morbidity), the mental health of returning military personnel, especially those suffering from PTSD, and the circumstances of the spouses themselves during periods of deployment, such as pregnancy, and having other children to care for, both of which increase the risk of stress and depression. In view of the ongoing military operations, addressing the effects of deployment on spouses is important. The mental well-being of spouses impacts not only on the individuals themselves, but also on their military partners and the wider family.

**Declaration of interest:** H. Thomas de Burgh is employed by the UK Armed Forces. The views expressed in this article are those of the authors and do not represent the official position of any UK government organization.

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