**Military spouses with deployed partners are at greater risk of poor perinatal mental health: A scoping review.**

**ABSTRACT**

*Background:* Poor mental health in the perinatal period is associated with a number of adverse outcomes not only for the individual but the wider family. The unique circumstances in which military spouses/partners live may leave them particularly vulnerable to developing perinatal mental health (PMH) problems.

*Methods:* A scoping review was carried out to review the literature pertaining to PMH in military spouses/partners using the methodology outlined by Arksey and O’Malley (2005). Databases searched included EBSCO, Gale Cengage Academic OneFile, ProQuest and SAGE.

*Results:* Thirteen papers fulfilled the inclusion criteria, all from the US, which looked a PMH or well-being in military spouses. There was a strong focus on spousal deployment as a risk factor for depressive symptoms and psychological stress during the perinatal period. Other risk factors included a lack of social/emotional support, and increased family-related stressors. Interventions for pregnant military spouses included those that help them develop internal coping strategies and external social support.

*Conclusions:* US literature suggests that military spouses are particularly at risk of PMH problems during deployment of their serving partner, and highlights the protective nature of social support during this time. Further consideration needs to be made to apply the findings to UK military spouses/partners due to differences in the structure and nature of the UK and US military and healthcare models. Further UK research is needed, which would provide military and healthcare providers with an understanding of the needs of this population allowing effective planning and strategies to be commissioned and implemented.

**KEYWORDS:** Military, Armed Forces, perinatal, mental health, spouses, partners, midwifery.

**KEY MESSAGES:**

* All papers that fulfilled the inclusion criteria for this review originated from the United States.
* Deployment of the serving partner during the perinatal period is a significant risk factor for depression and psychological stress in US military spouses.
* The protective nature of military-specific social and emotional support against perinatal mental health problems in US military spouses was highlighted in the literature.
* More UK research is needed for a better understanding of the perinatal needs of the military population in the UK context.

**INTRODUCTION**

The Maternal Mental Health Alliance (MMHA) reports that 10-20% of women will develop mental illness during the perinatal period (conception to one year post-partum[1])[2]. Women are more at risk of developing poor mental health in the early post-partum period than any other time of their life[3]. It is widely accepted that mental health in pregnancy can be exacerbated by a number of biological, psychological, sociological and biopsychosocial factors (see Table 1).

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| --- |
| Powerful predictors |
| * History of Psychopathology * Antenatal psychological disturbances- anxiety, depression, or dysphoric mood * Poor marital relationships/marital discord * Low levels of social support * Stressful life events * Socio-economic disadvantages/poverty * Lone parenting * Teenage parenthood * Early emotional trauma/childhood abuse * Unwanted pregnancy * Lack of affective emotional support |
| Less powerful but significant predictors |
| * Low social status * Educational attainment * Personality type and attributional style * Employment status * Familial history of mental illness |

**Table 1.** Risk Factors for developing poor mental health in the perinatal period. Adapted from O’Hara and Swain[4].

Pre-existing mental health disorders may return or be exacerbated by pregnancy and childbirth due to the personal, physical, emotional and social demands of pregnancy and caring for a new born[5, 6]. The 2017 ‘Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries Across the UK’ (MBRRACE)[7] report showed, that between 2013-15, 14% of maternal deaths up to 1 year were attributed to poor maternal mental health (the leading cause). Poor perinatal mental health (PMH) is associated with a number of adverse outcomes not only for the individual but the wider family[8]. Indeed, postnatal depression is linked with paternal depression and risk of poor birth and childhood outcomes[9-14].

The relatively unique circumstances in which military families live may leave them particularly vulnerable to developing PMH problems. Frequent moves to new areas are common across the UK Armed Forces, with little geographical choice of posting, resulting in moves away from friends and family[15]. Military spouses/partners are likely to experience low social support, stressful life events and lone parenting[16]. The sense of associated isolation is further exacerbated by overseas postings with additional cultural and language barriers[17]. In addition to isolation from support networks, military spouses/partners must renegotiate and redefine their roles and routines during partner absence, changing and potentially destabilising the family dynamic[18, 19]. Furthermore, military spouses/partners often experience fear and anxiety about the safety of their serving partner during deployment, which is linked to increased depression[16, 20].

Considering the stressors associated with being a military family, it might be expected that military spouses/partners would be more vulnerable to mental health problems than their civilian counterparts. However, this comparison is lacking in the literature. Research has shown that military spouses have lower overall well-being than matched civilian controls[21], and these findings are supported by recent research on military spousal employment[22]. Deployment is associated with increased risk of a mental health problems in military spouses, including depression, anxiety, sleep disorders, and adjustment disorders, and this risk of diagnosis increases with length of deployment[23, 24].

The impact of the military lifestyle on marriages, families and children is well described in US literature[18, 25, 26], however research in the UK is lacking[27]. Furthermore, there is limited research on the experience and psychological well-being of military spouses/partners during the perinatal period. Considering the vulnerability to mental health problems for women in the perinatal period and military spouses during deployment, the following question arises: Are UK military spouses/partners particularly at risk of developing PMH problems? In an attempt to answer this question, the aim of this paper is to review the international literature pertaining to PMH in military spouses/partners, using a scoping framework[28].

**METHODOLOGY**

A scoping review of the literature around PMH in military spouses/partners was conducted as outlined by Arksey and O’Malley[28]. A scoping review was chosen as this technique is designed to ‘map’ the available literature in a broad or emerging field of interest. The methodology provided by Arksey and O’Malley provides a comprehensive five-stage framework detailed below.

The first stage of a scoping review is to identify a research question broad enough to capture relevant literature, and includes the population, topic and outcomes of interest. For this review we chose to ask: Are UK military spouses/partners particularly at risk of developing PMH problems? In stage two, appropriate search terms and databases were identified. Search terms included “Army/Navy/Marines/Royal Air Force/Military wife” OR “Army/Navy/Marines/Royal Air Force/Military spouse”, OR “Army/Navy/Marines/Royal Air Force/Military partner” “Mental Health” OR “Postnatal Depression” OR “Post-partum depression”, “perinatal/antenatal/postnatal/post-partum” OR “Pregnan’”. Initial searches using a number of databases (EBSCO, Gale Cengage Academic OneFile, ProQuest and SAGE) yielded 856 papers.

Study selection involved a number of stages which are shown in Figure 1. Following duplicate removal and exclusion of all papers other than peer-reviewed journals, 611 papers remained. The titles and abstracts of the remaining papers were then reviewed for relevance using the inclusion criteria shown in Table 2, with 31 papers identified for full text review. A narrative search and backwards/forwards citation searches were carried out independently by two of the authors and identified 11 additional papers which were relevant to the topic. Two of the authors then independently reviewed the remaining full texts for inclusion. Thirteen papers were included in the final literature review that met the inclusion criteria, all originating from the US.

Stage four of the scoping review involves charting the relevant data from the identified papers to enable extraction and synthesis of findings. The following information was extracted and charted: full journal reference, location of research participants, study aim or objective, methodology type, outcome measures and results/main findings. Finally, a thematic analysis of the charted data was conducted to identify the main themes and gaps in the available literature. This was based on assessing the main risk and protective factors and mental health outcomes investigated in the available research. We present the charted data (see Table 3) and thematic analysis of the research papers in the results section below.

**[insert Figure 1]**

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| --- |
| Inclusion Criteria: |
| Study investigating the mental health or psychological wellbeing of military spouses/partners during the perinatal period. |
| 1. Paper written in English |
| 1. Paper published in the past 15 years between 2002-2018 |
| 1. Qualitative, quantitative or mixed methods studies. |
| 1. Published in peer reviewed journals. |

**Table 2.** Inclusion criteria for the literature search.

**Table 3.** Extracted data from the thirteen papers included in the scoping review.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Full Journal Reference** | **Location** | **Study**  **Population** | **Intervention**  **(if any)** | **Aims of the study** | **Methodology Type** | **Outcome Measures** | **Main Results** |
| Schachman, K. A., Lee, R. K., & Lederma, R. P. (2004). Baby boot camp: facilitating maternal role adaptation among military wives. Nursing Research, 53(2), 107-115. | US | 91 primagravid wives married to active duty military members stationed at an Air Force base in U.S Midwest. | Four week ‘Baby Boot Camp’ (BBC) intervention compared to traditional childbirth education (CBE). BBC group received all CBE content plus an additional hour focused on identification, development, and use of the internal and external resources unique to military wives. | To test the effects of the BBC intervention on prenatal  and postpartum maternal role adaptation among military  wives. | Randomised control trial | The Prenatal Self-Evaluation Questionnaire,  Personal Resource Questionnaire, and Resilience Scale were administered at baseline (32 to 37 weeks gestation),  immediately after the intervention, and at 6 weeks postpartum. | As compared with the military  wives who attended traditional CBE, the BBC participants showed significantly greater prenatal and postpartum adaptation.  BBC participants showed an increase in external and internal resources immediately after the intervention.  However, these differences in resources were not sustained at 6 weeks postpartum. |
| Haas, D. M., Pazdernik, L. A., & Olsen, C. H. (2005). A cross-sectional survey of the relationship between partner deployment and stress in pregnancy during wartime. Women's Health Issues, 15(2), 48-54. | US | 279 pregnant active duty military women (n=49) and civilian dependents (n=230) receiving obstetric care from the Naval Hospital Camp Lejeune. | N/A | To determine if having a partner deployed during wartime increased the stress levels in pregnant women and altered their attitudes toward pregnancy. | Quantitative; Cross sectional survey. | Self-reported stress level, attitudes towards pregnancy and deployment, blood pressure. | Women with deployed partners  more often reported significantly higher stress levels and a severe impact of the deployment on their stress, had a lower systolic blood pressure, and more often reported changed eating habits those whose partners were not deployed.  Partner deployment, having more than one child at home, and being active-duty were associated with  reporting higher stress levels. |
| Haas, D. M., & Pazdernik, L. A. (2006). A cross-sectional survey of stressors for postpartum women during wartime in a military medical facility. Military medicine, 171(10), 1020-1023. | US | 95 postpartum active duty members and military dependents receiving care from the US Naval Hospital Camp Lejeune. | N/A | To determine whether having a partner deployed during wartime increased the stress levels in pregnant women and altered the attitudes toward pregnancy or changed birth  outcomes. | Quantitative; Cross sectional survey. | Self-reported stress level and stressors, eating habits, and birth outcomes. | Women with deployed partners gave birth to larger babies.  Women with partners deployed more often reported changed eating habits.  Those with a deployed partner more often reported that media coverage impacted their stress level. |
| Haas, D. M., & Pazdernik, L. A. (2007). Partner deployment and stress in pregnant women. The Journal of Reproductive Medicine, 52(10), 901-906. | US | 463 pregnant active duty members and military dependents receiving care from the US Naval Hospital Camp Lejeune. | N/A | To determine whether having a partner deployed during wartime increased the stress levels in pregnant women and to determine the predictors of reporting high stress. | Quantitative; Cross sectional survey. | Self-reported stress level, impact of deployment on pregnancy, and attitudes towards pregnancy, blood pressure. | Women with deployed partners more often reported higher stress levels than those whose partners were not deployed.  Having a partner deployed, being active duty, advanced gestational age, and having more than one child at home all predicted higher stress levels. Having a support person present was protective against stress. |
| Robrecht, D. T., Millegan, J., Leventis, L. L., Crescitelli, J., & McLay, R. N. (2008). Spousal military deployment as a risk factor for postpartum depression. Journal of Reproductive Medicine, 53(11), 860-864. | US | 415 spouses of active duty service members who received obstetric care from the US Naval Medical Center, San Diego. | N/A | To compare postnatal depression scores in women whose spouses had deployed and women whose spouses had not deployed during their pregnancy. | Quantitative; Retrospective cohort study. | Edinburgh Postpartum Depression Scale (score of 12 or higher considered a positive screen) at any time during pregnancy. | EPDS scores were significantly higher in women whose partner had deployed during pregnancy compared to those who had not deployed.  Partner deployment during pregnancy was an independent predictor of EPDS score. |
| Weis, K. L., Lederman, R. P., Lilly, A. E., & Schaffer, J. (2008). The relationship of military imposed marital separations on maternal acceptance of pregnancy. Research in Nursing & Health, 31(3), 196-207. | US | 503 primigravida or multigravida active duty women and military dependents receiving obstetric care from four US military treatment facilities. | N/A | To examine the effect of military deployment and perceived community support on women’s acceptance of pregnancy at each trimester. | Quantitative; Longitudinal repeated measures design. | Acceptance of pregnancy measures by the Prenatal Self-Evaluation Questionnaire; Community support measured by the Social Support Index. | Pregnant military spouses with deployed husbands had higher conflict for accepting pregnancy than spouses without deployed husbands.  Community support had a significant positive effect on  Pregnancy acceptance. |
| Smith, D. C., Munroe, M. L., Foglia, L. M., Nielsen, P. E., & Deering, S. H. (2010). Effects of deployment on depression screening scores in pregnancy at an army military treatment facility. Obstetrics & Gynecology, 116(3), 679-684. | US | 3956 active duty service members, spouses or dependents of active duty service members who received obstetric care from Madigan Army Medical Centre between 2007 and 2009. | N/A | To determine whether there is a relationship between positive screening for depression during and after pregnancy, and the  deployment status of the spouse. | Quantitative; Retrospective cohort study. | Edinburgh Postpartum Depression Scale (score of 14 or higher considered a positive screen) at the initial obstetric visit, at 28 weeks of gestation, and at 6 weeks postpartum. | The risk of a positive screen for PND was more than doubled compared with the control group (no deployment planned) if the spouse was deployed during the 28–32 week visit or the postpartum period. |
| Spooner, S., Rastle, M., & Elmore, K. (2012). Maternal depression screening during prenatal and postpartum care at a Navy and Marine Corps military treatment facility. Military medicine, 177(10). | US | 3882 women with active-duty husbands receiving obstetric care from the US Naval Hospital Camp Pendleton, California. | N/A | To determine whether there is a relationship between positive screening for depression and the deployment status of the spouse. | Quantitative; Cross sectional survey. | Edinburgh Postpartum Depression Scale (score of 14 or higher considered a positive screen) at the initial obstetric care visit, 28- to 32-week gestational visit, and the 6-week postpartum visit. | Depression scores were significantly higher at the initial obstetric visit  among women who reported their husband as currently deployed, and scores were significantly higher at the postpartum visit among women who reported their husband as currently deployed or planning to deploy. |
| Weis, K. L., & Ryan, T. W. (2012). Mentors offering maternal support: a support intervention for military mothers. Journal of Obstetric, Gynecologic, & Neonatal Nursing, 41(2), 303-314. | US | 65 military wives in their first trimester of pregnancy recruited from two US Air Force bases in Florida. | The intervention group received the Mentor Offering Maternal Support (MOMS) program, eight sessions designed to facilitate coping and social support, with unlimited support from a mentor. The control group received the standard prenatal plan of care for military pregnant women. | To evaluate the effectiveness of the Mentors Offering Maternal Support (MOMS) program to promote  maternal fetal attachment, maternal adaptation to pregnancy, self-esteem, and perceived community support in military wives. | Randomised control trial | Five study variables were measured including prenatal maternal adaptation, maternal/fetal attachment, self-esteem, perceived community support,  and program satisfaction. | No statistically significant differences were found between the two groups for any of the outcome variables.  In both groups, women having the highest reported level of contact with their husbands had significantly lower anxiety related to concerns over their marital relationships, and had significantly higher self-esteem. |
| Schachman, K. A., & Lindsey, L. (2013). A resilience perspective of postpartum depressive symptomatology in military wives. Journal of Obstetric, Gynecologic, & Neonatal Nursing, 42(2), 157-167. | US | 71 women married to active-duty US service members recruited from a military immunisation clinic, who had given birth in the last 3 months. | N/A | To estimate the prevalence of postpartum depressive symptoms in a sample of military wives, and to provide a comparative descriptive analysis of demographic, risk and protective factors. | Quantitative; Comparative descriptive study. | The Postpartum Depression Screening Scale (PDSS; Scores of 14 or higher considered a positive screen); Family Index of Regenerativity and Adaptation-Military (FIRA-M) to assess risk and protective factors; The Self-Reliance Index to measure internal strengths and resources; The Social Support Index to measure degree of perceived support. | More than one half of the participants scored above the cutoff point for elevated depressive symptoms suggestive of PPD.  Military wives with depressive  symptoms had greater family changes and strains, lower self-reliance, and lower social support than those without depressive symptoms. |
| Levine, J. A., Bukowinski, A. T., Sevick, C. J., Mehlhaff, K. M., & Conlin, A. M. S. (2015). Postpartum depression and timing of spousal military deployment relative to pregnancy and delivery. Archives of gynecology and obstetrics, 292(3), 549-558. | US | 161,454 wives of active duty US military service members who gave birth between 2004 and 2009. | N/A | To determine the relationship  between deployment of the service member and postpartum depression diagnosis among US military wives, accounting for the  timing of deployment with respect to pregnancy and  delivery. | Quantitative; Retrospective cohort study. | Evidence of postpartum depression diagnosis from electronic medical records. | Significant association between postpartum depression and deployment only when husband deployed during pregnancy and returned after childbirth.  Wives whose husbands deployed were also more likely to have suffered from antepartum depression and anxiety. |
| Tarney, C. M., Berry-Caban, C., Jain, R. B., Kelly, M., Sewell, M. F., & Wilson, K. L. (2015). Association of spouse deployment on pregnancy outcomes in a US military population. Obstetrics & Gynecology, 126(3), 569-574. | US | 397 primagravid women who delivered at Womack Army Medical Centre, North Carolina. All women were either active duty service members, spouses or dependents of active duty service members. | N/A | To evaluate the association of spousal deployment during the antenatal period on maternal  and neonatal outcomes. | Quantitative; Retrospective cohort study. | Postpartum depression (defined as a score of 14 or higher on the Edinburgh Postnatal Depression Scale or ICD diagnosis).  Maternal characteristics, obstetric outcomes and neonatal outcomes. | Spouse deployment was associated with increased risk of preterm  delivery and postpartum depression when compared with women in the  non deployed group. |
| Weis, K. L., Lederman, R. P., Walker, K. C., & Chan, W. (2017). Mentors Offering Maternal Support Reduces Prenatal, Pregnancy-Specific Anxiety in a Sample of Military Women. Journal of Obstetric, Gynecologic & Neonatal Nursing, 46(5), 669-685. | US | 246 pregnant US Active Duty Service members (n = 97) and wives of US Service members (n = 149) in their first trimester. | The intervention group received the Mentor Offering Maternal Support (MOMS) program, eight sessions designed to facilitate coping and social support, with unlimited support from a mentor. The control group received the standard prenatal plan of care for military pregnant women. | To evaluate the effectiveness of the Mentors Offering Maternal Support (MOMS) program to promote self-esteem and resilience, and reduce pregnancy-related anxiety and depression. | Randomised control trial. | Assessments of pregnancy-specific anxiety, self-esteem, depression, and resilience. | Women in the intervention group experienced a more significant decrease in anxiety related to preparation for labour and identification with the motherhood role.  No significant differences were found in depression, self-esteem and resilience.  Women whose husbands were not deployed experienced less anxiety in relation to identification with the motherhood role. |

**RESULTS**

Thirteen articles were identified that fulfilled the inclusion criteria. All papers focussed on military spouses (although the inclusion criteria allowed for unmarried partners), and originated from the US. Four papers included spouses from all US military service branches (Marine Corps, Navy, Coast Guard, Army and Air Force), 2 focused on US Army spouses, 4 on US Navy and Marine spouses, and 3 on US Air Force spouses only. Four broad themes were identified from the literature: Deployment-related increases in perinatal depression, deployment-related increases in perinatal stress, other risk or protective factors from PMH problems, and support interventions for military spouses. All papers used quantitative research methodologies.

**Deployment-related increases in perinatal depression**

Four of the identified papers used the Edinburgh Post Natal Depression Scale (EPDS) to investigate the relationship between spousal deployment and PND incidence. Robrecht et al[29] found that positive screening for PND (which they defined as EPDS 12 or above[30]) was 3-times higher in US military spouses whose partners were deployed versus not deployed. Furthermore, deployment was an independent predictor of raised EPDS score, even when accounting for feelings of isolation, history of depression and history of deployment.

The remaining three papers reporting EPDS scores used a cut off of 14 or above as a positive screen, and as such reported lower overall percentages of PND. Tarney et al[31] reported that US Army spouses whose partners were deployed during their entire pregnancy were at a higher risk of developing PND compared to women whose partners were not deployed (16.4% Vs 6.1%). Furthermore, they were more likely to report pre-term delivery (21.4 vs 8.9%), for which anxiety and stress can be a risk factor[32]. Smith et al[33] recorded EPDS at the initial obstetric visit, 28-32 weeks of gestation, and 6-8 weeks postpartum. The women were then compared by deployment status (‘currently deployed’ and ‘returning from deployment’ were compared to ‘no deployment planned’). At the initial obstetric visit, only spouses whose partners were *returning from deployment* were significantly more likely to positively screen for PND (14% vs. 6%). Both deployment groups had significantly more positive screens at 28-32 weeks, and the currently deployed group had significantly more positive screens in the postpartum period (16.2% vs. 8.2%). Using the same methodology, Spooner et al[34] found a significantly higher proportion of positive EPDS screens at the initial obstetric visit and 6 weeks postpartum in women whose spouses (US Navy and Marine Corps) were currently deployed compared to non-deployed. Additionally, women whose partners were planning to deploy were also at a significantly higher risk of positively screening for PND at 6 weeks postpartum (6.9% vs. 3.5%).

Similarly, but using electronic personnel and medical records as opposed to self-report, Levine et al[35] found that US military spouses whose partners had deployed at any time from estimated conception to 6 months postpartum were significantly more likely to have postpartum depression than those who were not deployed (17.6 vs. 15.7%). They were also significantly more likely to suffer from antepartum depression and/or anxiety (15 vs. 13.4%).

Overall these studies suggest that pregnant US military spouses report more depressive symptoms at all stages of both the deployment cycle and pregnancy.

**Deployment-related increases in perinatal stress**

Three papers by Haas and colleagues[36-38] investigated whether spousal deployment impacted on psychological stress during pregnancy in military spouses (US Naval and Marine Corps). Haas, Pazdernik and Olsen[38] found that pregnant women with deployed partners were twice as likely to self-report high or severe levels of stress compared to women with non-deployed partners. Haas and Pazdernik[37] in contrast, reported no significant difference in stress levels in those with deployed partners. However, they did find increased pregnancy weight gain and higher birth weights in those who reported higher stress levels. It should be noted that these studies also included a small number of active-duty women with civilian spouses.

Weis et al[39] investigated the effect of spousal deployment on US military wives’ acceptance of pregnancy measured by the Prenatal Self-Evaluation Questionnaire[40]. Acceptance of pregnancy, or lack thereof, is associated with feelings of anxiety, stress and conflict about pregnancy and motherhood. The authors found that deployment of the serving partner during the first trimester significantly decreased acceptance of pregnancy.

**Other risk and protective factors for perinatal mental health problems**

Schachman and Lindsey[41] used the Postpartum Depression Screening scale (PDSS) to investigate positive screening for PND in US military spouses who had given birth in the previous 3 months. Scoring positively on the PDSS was significantly associated with: being married for a shorter duration, residing on the military base for a shorter period, increased family changes and strains (i.e. emotional problems of a family member, financial debt, family conflict over continued service), lower self-reliance and lower social support. Similarly, Weis et al[39] found that in addition to deployment, increased acceptance of pregnancy in US military spouses was linked to women’s perceived emotional and community support during all trimesters.

Haas and colleagues[37, 38] found that in addition to deployment, having more than one child at home and being on active-duty themselves increased the likelihood of higher stress levels and thus increased risk of poorer PMH. Furthermore, Haas & Pazdernik[36] found that having at least one support person at home reduced the levels of stress reported in US military spouses during the perinatal period.

**Support interventions for military spouses**

Three papers discussed intervention strategies to improve PMH in US military spouses. The first was aimed at improving acceptance of pregnancy and adaptation to parenthood[42]. The intervention, referred to as ‘Baby Boot Camp’, focused on the identification, development and use of internal (i.e. coping strategies) and external resources (i.e. support network). Adaptation to parenthood improved as a result compared with traditional childbirth education. Participants were more aware of and likely to access resources, and had better birth outcomes than the control group. However, acceptance of pregnancy (referred to above in Weis et al[39]) did not differ between groups. The final two interventions identified involved the Mentor Offering Maternal Support (MOMS) program for US military spouses[43, 44]. These peer mentoring sessions utilised support from military spouses who had experience of pregnancy in the military environment, and aimed to reduce pregnancy-based anxiety. Weis & Ryan[43] found no difference in outcomes between women who attended these groups and prenatal care as usual, suggesting that the intervention per se made little/no difference. However, in a larger sample (including both US military spouses and active-duty women), Weis et al[44] found a reduction in prenatal anxiety in those who attended the MOMs groups compared to normal prenatal care.

**DISCUSSION**

This review set out to scope the literature pertaining to PMH in military spouses/partners. Thirteen papers were identified, all originating from the US, which specifically focussed on the mental health and/or psychological wellbeing of military spouses during the perinatal period. In particular, no research was identified from the UK, which limits the applicability of these findings to UK military spouses/partners.

There was a particular focus on spousal deployment as a risk factor for depressive symptoms and psychological stress during the perinatal period[29, 31, 33-39]. Other risk factors linked to decreased PMH in the related to a lack of social and emotional support, and increased stressors such as family strains, having more than one child at home, and being on active duty themselves[36-39, 41]. Additionally, three publications explored interventions for pregnant US military spouses to develop internal coping strategies and external social support[42-44].

Low levels of social and/or emotional support were identified as risk factors for PMH problems by three of the identified papers[37, 39, 41], reflecting predictors of PMH problems reported in the general population[3, 4, 45]. These factors could all be exacerbated by military life, and as such may represent a unique vulnerability of military spouses to PMH problems. However, we are unable to deduce from the identified research whether these unique military risk factors translate into an increased risk of PMH problems, as no civilian comparison groups were included.

The majority of papers in this review identified spousal deployment during the perinatal period as a significant risk factor for perinatal depression and increased psychological stress[29, 31, 33-39]. Deployment of the serving spouse is associated with social isolation, increased anxiety and stress, and thus is a risk factor for depression[45, 46]. This is further exacerbated by the stress of lone parenting for the duration of the deployment, renegotiation of identity upon return of deployed partner and the potential for adverse birth outcomes, such as preterm birth[47]. Indeed, feeling unsupported by one’s partner, and being a single parent is associated with depression during pregnancy in the civilian population[48]. Spousal deployment is a risk factor unique to only a handful of occupations including the military and as such may represent a specific vulnerability to PMH problems in military populations.

The support interventions identified in this review also emphasise the importance of military-specific social/emotional support for spouses in the perinatal period, particularly during deployment[42-44]. The ‘Baby Boot Camp’ intervention was reported to be successful in decreasing anxiety surrounding pregnancy and increasing the sense of social support[42]. The MOMS peer-mentoring intervention[44] was also shown to reduce perinatal anxiety in military spouses.

**Implications for practice**

Whilst a paucity of research was found in this area, particularly in the UK context, there are some practical implications. Firstly, the evidence suggests that social support is an important protective factor for military spouses during the perinatal period. This may be particularly important for reducing anxiety during deployment of the serving spouse[42, 43]. Secondly, support tailored to the needs of military spouses rather than generic perinatal support may be advantageous[42-44].

*Implications for practice in the UK?*

As the identified literature was exclusively from the US, consideration of the UK setting is needed. There are a number of differences in the structure and nature of the US and UK militaries making comparison difficult. Deployment is identified as a significant risk factor for PMH problems, however longer deployment lengths in the US may put US military spouses at higher risk.

Additionally, the nature of obstetric health services is significantly different for military families in the US. The US military offers health care to soldiers and their families as part of their contract, under ‘TRICARE’ often at a Military Treatment Facility (MTF)[49]. As such, US military spouses are likely to receive specialist care from service providers who have an understanding of their specific needs.

Unlike the US, UK military midwives do not exist and women receive their obstetric care through the NHS. In some instances midwifery care is provided by an NHS Midwife near a military base with a good understanding of military culture. However, this is frequently not the case and there is no military-specific training provided to nurses or midwives in the UK to address this knowledge gap. As a result, whilst midwives may have a good understanding of PMH problems in general, they may not understand, or be vigilant to any military-specific needs.

The Armed Forces Covenant[50] is explicit about Armed Forces communities not being disadvantaged in receiving health care. This means that pressures, such as frequent moves, should not affect the care that families receive from the NHS, including position on waiting lists, access to dental care and fertility treatment. Whilst the Covenant is well enforced over all, it is lacking in obstetric care. Due to the lack of research in this area in the UK there are limited guidelines in place to adequately safeguard military spouses and consequently care provision may be inadequate.

**Implications for research**

In light of the paucity of research identified, investigation is required regarding the nature and extent of PMH problems in UK military spouses. There are a number of differences between the US and UK military structures and healthcare systems that make comparison difficult as suggested.

Secondly, there was limited discussion in the identified papers of other military-specific factors (for example, frequent relocation) and how these may affect women during pregnancy. Investigating these would be advantageous in understanding the perinatal health needs of military families. Furthermore, none of the papers identified included a civilian control group, as such we were unable to make any conclusive statements regarding whether being a military spouse/partner represents a particular vulnerability to PMH problems relative to a matched civilian population.

Finally, much of the research discussed psychological stress and depression, however failed to acknowledge the wider range of mental health disorders that can be associated with pregnancy. These disorders include anxiety disorders such as OCD, PTSD, psychosis and adjustment disorders[51]. In order to gain a fuller understanding, future research may benefit from widening the investigation to include these disorders.

**Conclusion**

US literature suggests that military spouses are particularly at risk of PMH problems during deployment, and highlights the protective nature of social support during this time. Further consideration needs to be made to apply the findings to UK military spouses due to differences in the structure and nature of the UK and US military and health care models. To fully understand the perinatal health needs of UK military spouses, research into their individual stressors, risks and needs is essential. This would provide military and healthcare providers alike with a detailed understanding of the needs of this population, allowing effective planning and strategies to be commissioned and implemented.

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