McMaster University | HEALTH FORUM

Rapid Evidence Profile

Exploring female-dominant conditions among military personnel and Veterans in each of the 'Five Eyes' countries

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Context

- As the number of females in the military continues to rise, identifying female-dominant conditions (including both sex-specific conditions and conditions that carry greater risk based on female sex) can support future planning for health services and resources during and following active service.
- This report uses the terms sex and female to refer to biological characteristics assigned at birth, while the terms gender and woman are used to refers to social identities.
- This rapid evidence profile focuses on identifying conditions that individuals who are assigned female at birth are disproportionately affected by.
- While this report is focused on risk based on sex rather than gender, intersectional analysis to consider implications based on gender should be considered for future research.

Box 1: Evidence and other types of information

+ Global evidence drawn upon

Evidence syntheses selected based on relevance, quality and recency of search

+ Forms of domestic evidence used (= Canadian)

Data analytics

Qualitative insights

+ Other types of information used

Jurisdictional scan of five countries: Australia, Canada (all provinces and territories), New Zealand, United Kingdom, United States

*** Additional notable features**

Prepared in three business days using an 'all hands on deck' approach

Questions

- Which conditions are female military personnel and female Veterans disproportionately affected by?
- What centres and programs specific to female-dominant conditions are available in Canadian provinces and territories and at the national level for military personnel and Veterans in each of the 'Five Eyes' countries?

High-level summary of key findings

- We identified 32 highly relevant evidence documents, including 13 evidence syntheses and 19 single studies.
- The evidence documents focused predominantly on mental health and related conditions and female-dominant health risks, with relatively less on other health risks or conditions listed in the framework below.
- Relatively few evidence documents included intersectional analyses to examine how the incidence or prevalence of diseases differs by ethnicity or context (e.g., geography).
- Conditions for which female military personnel or Veterans were found to be disproportionately affected compared to the general female population include:
  - gastrointestinal disorders including bowel disorders and ulcers

    - cardiovascular disease
    - chronic pain
    - pre-term birth
    - preeclampsia
    - gestational diabetes
    - perinatal depression
    - vaginitis
    - urinary tract infection
    - urinary incontinence
    - pelvic organ prolapse.
- Conditions for which female military personnel or Veterans were found to be disproportionately affected compared to male military personnel or Veterans include:
    - musculoskeletal conditions including stress fractures, general injuries and rhematic arthritis
    - comorbid mental health conditions
    - post-traumatic stress disorder
    - depressive and other mood disorders
    - eating disorders (and distorted eating patterns).
- Though not a condition, military sexual trauma (including both sexual harassment and sexual assault) was found to disproportionately affect female military personnel and Veterans, and was found to cause illness and disability via physical and psychological injury
- Centres and programs focused on providing female sex-specific services were identified in all Canadian provinces and in two of three territories (Northwest Territories and Yukon).
- Centres or programs for female Veterans were identified in Australia, Canada and the U.S.
- We did not find any mention of sex-specific centres or programs in New Zealand or the U.K., though the Office for Veterans' Affairs in the U.K. is in the process of developing a Women Veterans' Strategy to explore the specific needs of women Veterans including their mental and physical health

Box 2: Approach and supporting materials

At the beginning of each rapid evidence profile and throughout its development, we engage a subject matter expert, who help us to scope the question and ensure relevant context is taken into account in the summary of the evidence.

We identified evidence addressing the question by searching Health Systems Evidence, Social Systems Evidence and PubMed, as well as hand searching the Forces In Mind Trust Research Centre. All searches were conducted on 29 January 2024. The search strategies used are included in Appendix 1. In contrast to synthesis methods that provide an in-depth understanding of the evidence, this profile focuses on providing an overview and key insights from relevant documents.

We searched for full evidence syntheses (or synthesis-derived products such as overviews of evidence syntheses) and protocols for evidence syntheses.

We appraised the methodological quality of evidence syntheses that were deemed to be highly relevant using AMSTAR. AMSTAR rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. The AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to evidence syntheses pertaining to delivery, financial or governance arrangements within health systems or to broader social systems.

A separate appendix document includes:
1) methodological details (Appendix 1)
2) summary of key findings from highly relevant evidence documents organized by condition (Appendix 2)
3) details about each identified evidence synthesis (Appendix 3)
4) details about each identified single study (Appendix 4)
5) details from the jurisdictional scan from Canadian provinces and territories (Appendix 5)
6) details from the jurisdictional scan from 'Five Eyes' countries (Appendix 6)
7) documents that were excluded in the final stages of review (Appendix 7).

This rapid evidence profile was prepared in the equivalent of three days of a 'full-court press' by all involved staff.

Framework to organize what we looked for

- Health risk or condition
    - Communicable diseases
    - Non-communicable diseases
        - Gastrointestinal disorders
        - Neurological conditions and diseases

- Pregnancy and obstetric related conditions
  - Fertility and infertility
  - Unintended pregnancies
  - Terminations and miscarriages
- Maternal health and related conditions
  - Parent-child bonding
- Other reproductive and gynecological conditions
  - Menstrual health and hygiene
  - Perimenopause, menopause and post-menopause
  - Urological conditions and diseases
- Musculoskeletal conditions
  - Arthritis
  - Bone conditions
  - Rheumatic conditions
- Mental health and related conditions
  - Disordered eating and body image
  - Non-suicidal self-injury
  - Social isolation and loneliness
- Medically unexplained symptoms (MUS)

- Other female-dominant health risks
  - Intimate or domestic partner violence
  - Military sexual trauma

What we found

We identified 39 evidence documents that addressed the questions above. Of these, we identified 32 as being highly relevant, including 13 evidence syntheses and 19 single studies (including 16 from Canada, two from the U.S. and one from the U.K.).

Coverage by and gaps in existing evidence syntheses

Based on the framework above, the evidence documents focused predominantly on mental health and related conditions and female-dominant health risks, with relatively less focus on non-communicable diseases, pregnancy and obstetric-related conditions, maternal health and related conditions, other reproductive and gynecological conditions, and musculoskeletal conditions. We did not identify any evidence pertaining to communicable diseases or medically unexplained symptoms. Though these findings are consistent with an evidence map from 2016 produced by Veterans Affairs in the U.S., our search for single studies was limited to those produced in Canada in the last 10 years and so may not be comprehensive.

Apart from sex, relatively few evidence documents included sub-population analyses to examine how the incidence or prevalence of disease differs by ethnicity or context (e.g., geography). The evidence documents include comparisons to both rates of conditions in the general female population as well as in male military personnel and Veterans, where relevant. Though we have done our best to reduce the conflation of sex and gender, there are many instances in the literature where the terms 'female' and 'woman' are used interchangeably. We have kept the term 'woman' where we were unable to determine that a sex-specific analysis had been undertaken.

What do existing evidence syntheses and highly relevant single studies tell us about the conditions by which female military personnel are disproportionately affected?

For non-communicable diseases, one recent low-quality evidence synthesis found higher rates of gastrointestinal disorders, cardiovascular disease and chronic pain among recently deployed females compared to civilian women.(1)

Similarly, two recent single studies of female Canadian Veterans found higher rates of migraines, gastrointestinal disorders (bowel disorders and ulcers) and asthma as compared to male Veterans.(2; 3)

With respect to pregnancy, obstetric conditions and maternal health, one recent low-quality evidence synthesis reported that female Veterans had an increased risk of pre-term birth, preeclampsia, and gestational diabetes compared to civilian females.(4) One recent low-quality evidence synthesis and one recent single study found a higher prevalence of perinatal depression among females in the military compared to the general female population, with deployment being identified as a significant risk factor.(5; 6)

Other reproductive and gynecological conditions that were identified as being particularly prevalent among military personnel and Veterans include elevated rates of vaginitis and urinary tract infection due to poor vaginal hygiene while on deployments as well as urinary incontinence and pelvic organ prolapse, which were particularly prevalent among those with physically demanding roles.(1; 7) Though not a condition, one recent low-quality evidence synthesis identified increasing rates of long-acting reversable contraceptive among active-duty women, which may have implications for future reproductive and gynecological health. (8)

One recent medium-quality evidence synthesis found female serving military members are at an increased risk of musculoskeletal injuries, stress fractures and general injuries compared to men.(9) Similarly, three studies of Canadian Armed Forces members and Canadian Veterans found higher rates of musculoskeletal problems, back problems and rhematic arthritis among females compared to males.(3; 10) Canadian women Veterans were also found in an older single study to be more likely to report moderate to extreme pain interference with work from chronic pain than men, even though men had higher overall rates of consistent and recurrent chronic pain.(11)

Much of the identified literature focused on mental health and related conditions. For mental health conditions in general, one recent single study and one older single study of Canadian Armed Forces members reported that females were more likely to experience comorbid mental health conditions and to experience moderate-level mental health conditions compared to their male counterparts.(10; 12) Similarly, two older single studies found female Veterans have higher rates of mental health conditions in general as well as of mood and anxiety disorders.(2; 13)

Two recent low-quality evidence syntheses and four recent single studies found female military personnel and Veterans are more likely to develop post-traumatic stress disorder (PTSD) compared to male military personnel and Veterans.(8; 10; 14-17) One recent single study also found that female military personnel and Veterans were more likely to experience persistent symptoms of PTSD than their male counterparts. Similarly, one recent low-quality evidence synthesis and a recent single study found females have higher rates of major depression, with particularly high rates reported for those on current deployment and those working in Joint Personnel Support Units.(8; 18)

Other female-dominant health risks include eating disorders,(19-21) insomnia and other sleep disturbances,(22) and military sexual trauma.(23-26) However, one recent low-quality evidence synthesis notes that these risks and many of the conditions listed may be interrelated. The evidence synthesis describes that military sexual trauma in particular has a number of adverse consequences including both mental and physical health conditions, and is associated with the onset of PTSD and depression, chronic illnesses (including increased risk of diabetes mellitus, hypertension, obesity and cardiovascular risk factors), and reproductive health challenges including sexual dysfunction disorder, sexually transmitted infections, infertility and perinatal depression.(24)

Centres and programs specific to female-dominant conditions in Canadian provinces and territories and at the national level for military personnel and Veterans in each of the 'Five Eyes' countries

Centres and programs specific to female-dominant conditions were identified in all Canadian provinces and in two of three territories (Northwest Territories and Yukon). In all provinces this includes hospitals with dedicated services for pregnancy and obstetric related conditions, maternal health and related conditions as well as other reproductive and gynecological conditions. All provinces also have hospital and community-based screening for select female-dominant cancers such as breast and cervical cancer. In two provinces, Ontario and Nova Scotia, female-specific mental health programs were identified. Most provinces also have programs and centres specific to

Indigenous and racialized women's health, many of which provide extensive community-based health services for female-dominant conditions.

Centres or programs for female Veterans were identified in Australia, Canada and the U.S. We did not find any mention of specific centres or programs in New Zealand. In the U.K., while we did not find any specific centres or programs for female Veterans, the Office for Veterans' Affairs is in the process of developing a Women Veterans' Strategy to explore the specific needs of women Veterans including mental and physical health. This initiative began in the spring of 2023 and will be updated in 2024. The strategy program includes dedicated funds to develop clinical supports for women who suffered from sexual trauma in the military. In addition, the U.K. Office for Veterans' Affairs provides funding to the Centre for Military Women's Research to conduct research exploring the physical healthcare needs to improve care pathways for female Veterans.

In Australia, though there are relatively few specific health programs and centres specific for female Veteran's funded by the Department of Veterans' Affairs, many general programs include services specific to female-dominant conditions. In addition, Female Veterans & Veterans' Families Policy Forum provides a platform for female veterans and veterans' families to generate ideas to solve issues facing their communities, co-design products and services, and build networks across represented cohorts. Outside of the Department of Veterans' Affairs, Women Veterans Australia is a not-for-profit charity that provides women Veterans support and services such as community and connection, referral services and resources, and mentoring and development.

In Canada, Veteran and Family Well-Being Fund provides grants to organizations who may support women Veterans. For example, two funded organizations include Serene View Ranch to provide multidisciplinary and personalized trauma treatment for women Veterans and the Women Warriors Healing Garden, which provides mental health support. In addition, the Quebec Veterans Foundation offers a Women Veterans Program, funded by Veterans Affairs Canada and private organizations that provide services and supports to reduce isolation and suicide in female Veterans. As of 2023, Veterans Affairs Canada hosted the third Women and 2SLGBTQI+ Veteran Engagement forum to understand the experiences of women and 2SLGBTQI+ Veterans, but no health plan was identified.

The United States has the most extensive programming for female Veterans health, provided by the Center for Women Veterans. Services provided by the Center include wellness checks, routine screenings, reproductive health services, management of long-term conditions, pain management, mental health services, military sexual trauma, fertility treatment, sensory aids and specialized services. In addition, the Centre for Women Veterans has a Women's Health Transition Training program that educates women Veterans on health care services, eligibility criteria, social engagement opportunities, and navigating the Veterans affairs system.

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