

JMVH

Volume 34 Number 3

July 2026

Journal of Military and Veterans' Health



- Relations Between Physical and Emotional Health and Psychological Stress in Trauma-Exposed Veterans with Emotional Disorders
- Self-Compassion and More: A Newer Psycho-Spiritual Framework in Support of Veterans
- The Influence of Psychosocial Health on Military Performance: Fit for Service?

The Journal of the Australasian Military Medicine Association





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STATEMENT OF OBJECTIVES

The Australasian Military Medicine Association is an independent, professional scientific organisation of health professionals with the objectives of:

- Promoting the study of military medicine
- Bringing together those with an interest in military medicine
- Disseminating knowledge of military medicine
- Publishing and distributing a journal in military medicine
- Promoting research in military medicine

Membership of the Association is open to doctors, dentists, nurses, pharmacists, paramedics and anyone with a professional interest in any of the disciplines of military medicine. The Association is totally independent of the Australian Defence Force.

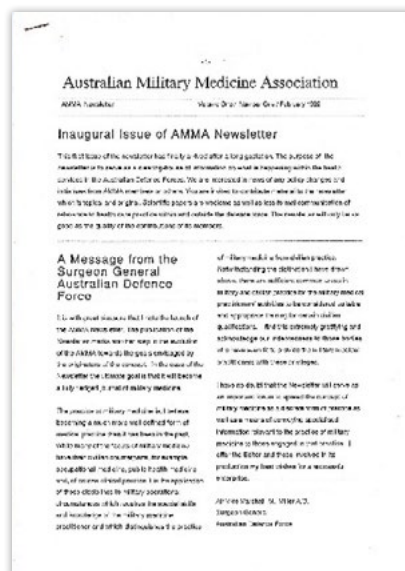
JMVH is published by the
Australasian Military Medicine Association
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Editorial

Thirty-four years ago, the initial issue of the Journal of Military and Veterans' Health (JMVH) (then Australian Military Medicine (AMM)) was published in February 1992. SQNLDR James Ross was the inaugural President and the first article published, fittingly on "Should Defence Force Personnel receive Influenza Vaccine?", also came from James Ross. By 1993, CMDR Russ Schedlich was the inaugural Editor, and the Journal rapidly progressed to publishing three issues per year. When I took over the Editorial role from CMDR Schedlich in December 1999 (Volume 8, Issue 3), I outlined a vision for the still relatively new Journal.

"What is my vision? My vision is to publish the journal at least 4 times a year, to increase the size of the journal and to tap into that deep wellspring of military medicine knowledge in our community. I believe that this journal should and can become one of the premiere military medicine journals in our field."

So how have we done? In 1999, AMM was publishing three issues a year and published 12 papers. By 2025, JMVH had moved to 4 issues per year, a dedicated editing system (ScholarOne), and 26 peer-reviewed papers per year. These papers are now all available online, including back to our first issues. Increasing numbers of them are also available



by podcast - <https://jmvh.org/podcasts/>. The period wasn't without its challenges – in 1999, the Australian Defence Force (ADF) established the Journal of the ADF Health Service (ADF Health), which ran in competition with JMVH until 2011. The good outcome is that AMMA has managed to preserve all the copies of ADF Health for people's open access – 1999 to 2007 are already online (<https://jmvh.org/adf-health-journal-1999/#>), with 2008-2011 expected to follow shortly. As JMVH updates its website, searching for these articles will also become easier.

Our third issue of 2026 contains 8 articles on diverse topics spanning tropical medicine, transition out of the military, mental health, and fitness for service. We continue to attract an increasing number and range of articles, including from overseas, as demonstrated by several of the articles in this issue. Other military and veterans' health articles, however, are always very welcome, and we would encourage all our readers to consider writing on their areas of military or veterans' health interest. We would particularly welcome papers being developed in preparation for the Sydney 2026 conference, but welcome any articles across the broader spectrum of military health.

Dr Andy Robertson, CSC, PSM
Commodore, RAN
Editor-in-Chief

Catalogue of Research Investigating the Health of Australian Defence Force Personnel, 2002-2023

N Kinsman, H Kelsall, D Tomic, S Green, A Collie, S McDonald, Z Jenkins, E Wessel, J Saboisky, K Walker-Bone

Abstract

Background: The Australian Department of Defence commissioned a scoping review and catalogue of research investigating the health of Australian Defence Force (ADF) members, published between 2002 and 2023.

Material and methods: MEDLINE, Embase, PsycINFO, Cochrane Central Register of Controlled Trials and Web of Science databases were searched in April 2023 for peer-reviewed studies published since 2002. Eligibility criteria included studies that involved ADF personnel (serving or transitioning at the time of the study intervention), health and wellbeing outcomes (other than malaria), and English-language publications. Data were extracted using a template developed by the authors, and risk of bias was assessed using the JBI Institute critical appraisal tools. Studies were categorised according to the eight strategic health priorities identified by the Australian Department of Defence.

Results: The database searches identified 171 peer-reviewed studies. Most were either cohort (n=71; 41%) or cross-sectional (n=45; 26%) in design. Fourteen (8%) studies were randomised trials. The health research areas most frequently addressed were mental health (n=78; 47%), musculoskeletal (n=46; 27%), and occupational and environmental exposure (n=23; 13%). The Department of Defence or Department of Veterans' Affairs funded 74% of studies. A further 60 reports (provided by the Department or retrieved through grey literature) were included in the evidence catalogue and reflected the same common research areas.

Conclusion: The evidence synthesis catalogue provides an overview of the range of research investigating the health of ADF personnel since 2002. Cataloguing past health research has provided insights into the importance of aligning research focus with ADF priorities. It provides an opportunity to consider strategies to ensure that future health research aligns closely with ADF priorities.

Keywords: military health, Australian Defence Force, musculoskeletal, mental health, occupational health

Introduction

The Australian Defence Force (ADF) is one of the largest employers in Australia; in 2021/2022, there were 58 342 permanent ADF members and approximately 21 500 Reserve members in a diverse range of job roles.¹ The ADF exists to defend Australia and its national interests and to be an advocate for stability, security and sovereignty in the Indo-Pacific region. As with all armed forces, the ADF recruits 'healthy workers'^{2,3} capable of being trained to be part of Australia's response to the spectrum of conflict, which includes the use of credible force when required, peacekeeping, humanitarian and disaster relief, and domestic operations. In August 2023, the ADF Health Strategy⁴ was released to ensure that the

Defence health system continues to deliver world-class healthcare while evolving to meet the needs of the future force. Within the ADF Health Strategy, a key enabler is described as a 'unified, targeted and timely approach to research with feedback mechanisms to Defence planning processes'.⁵ The Defence Health Research Framework (2021-2025) also highlights the aim to 'build and strengthen pathways for translating research findings into policy and practice'.⁵ The World Health Organization (WHO) defines knowledge translation as the 'synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health'.⁶

To progress the ADF Health Strategy, the Department of Defence commissioned the Monash Centre for Occupational and Environmental Health to conduct a scoping review and synthesis of health research findings from 2002 to 2023, and to catalogue the research according to the eight health research priority themes. These priority areas were developed in 2022, following an examination of available evidence, stakeholder input and available data on the health of the force, and included: 1) Measuring and monitoring the health of the force; 2) Health of the future warfighter; 3) Musculoskeletal injuries; 4) Occupational and environmental health; 5) Mental health and wellbeing; 6) Health system performance and efficiency; 7) Gender and health; and 8) Infectious disease. The aim was to catalogue all research investigating the health of ADF members (excluding malaria research, as the Australian Defence Force Malaria and Infectious Disease Institute oversees malaria research) conducted and published over the previous 20 years, along with a risk-of-bias assessment. This activity would support the implementation of the ADF Health Research Framework 2021–2025.

Method

The protocol for this study was developed by the authors in consultation with the Department of Defence and informed by the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis—Scoping Reviews) guidelines.⁷ Since this study is primarily a scoping review of publications relating to a single country (with synthesis of a subset of studies), the project does not meet the criteria for a systematic review required for registration in PROSPERO. However, three related specific topic reviews were registered in International Platform of Registered Systematic Review and meta-analysis Protocols (INPLASY) (registration numbers INPLASY202420076 (Post-traumatic stress disorder in Australian Defence Personnel 2002–23: A systematic review of incidence, prevalence, risk factors and treatment); INPLASY202420077 (Gender and health in ADF personnel 2002–2023: A systematic review and synthesis); and INPLASY202420078 (Affective disorders including depression in ADF personnel 2002–2023: A systematic review of incidence, prevalence and risk factors)).

Eligibility criteria

The eligibility criteria for the studies were devised using the PICO framework.⁸ Studies were included if they met the following criteria: 1) participants were current serving Permanent and Reserve ADF members or ADF members in transition (transferring

from the ADF to civilian life), and 2) the study measured outcomes that were focused on health or wellbeing. All study design types were included. Studies of former serving ADF members, families and children of serving ADF members, and non-Australian military personnel were out of scope for this review. Additionally, studies were not included if they related to malaria, if data about current serving ADF members were not presented separately from former serving ADF members, or if they were opinion pieces, narrative reviews or commentaries.

Search methods

The search was developed by an information specialist (SM), with input from subject matter experts. Searches combined subject headings and free-text terms related to the military and military health with the subject heading and text word Australia (Table S1, supplementary material).

The search was conducted on 24 April 2023 and was limited to studies published after 1 January 2002. Five electronic databases were searched: Web of Science Core Collection, Medline, Embase, PsycINFO and the Cochrane Central Register of Controlled Trials. The ProQuest Military Database was initially included; however, only a few studies identified in this database were health-related and were subsequently duplicated in Medline. Consequently, ProQuest Military Database was removed from the search. Bibliographies of included studies were checked to identify any additional relevant studies.

The Department of Defence provided internal publicly available research reports that investigated or reported on health outcomes. In addition, a search of grey literature for additional research reports and theses was conducted on the websites of known related research institutions.

Study selection

Retrieved records were imported into EndNote, de-duplicated and then added to Covidence software. Approximately 20% of records were independently screened at the title/abstract level by two reviewers (HK, KWB) to establish reviewer consistency, using a pre-established strategy developed by the screening team. Conflicts were resolved by consensus. The remaining records were screened by one reviewer (HK). Three reviewers screened potential studies at the full-text level (HK, KWB, NK). Any discrepancies were resolved through discussion.

Table S1. Database search strategies for the ADF Catalogue 2002–2023**MEDLINE**

Ovid MEDLINE ALL 1946 to 21 April 2023

#	Search statement	Results
1	(Military Personnel/ or Military Health/ or exp Naval Medicine/ or Military Family/ or Psychology, Military/ or Military Psychiatry/ or (Military Medicine/ not historical article. pt.)) and (exp Australia/ or Australia*. ti,ab,kf.)	666
2	((defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or servicewomen or servicemen or regiment* or squadron* or battalion* or coastguard* or coast guard*) adj20 Australia*).ti,ab,kf.	901
3	(defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or servicewomen or servicemen or regiment* or squadron* or battalion* or coastguard* or coast guard*).ti,ab,kf. and (Australian Defence Force or (department of defence adj3 Australia*)).in.	95
4	or/1-3	1241
5	limit 4 to yr="2002 -Current"	847

Embase

Ovid Embase Classic + Embase 1947 to 21 April 2023

#	Search statement	Results
1	(exp Military Personnel/ or Military Health/ or Military Health Service/ or exp Military Family/ or (Military Medicine/ not History/)) and (exp Australia/ or australia*.ti,ab,kf.)	238
2	((defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or regiment* or squadron* or battalion* or coastguard* or coast guard*) adj20 Australia*).ti,ab,kf.	1139
3	(defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or regiment* or squadron* or battalion* or coastguard* or coast guard*). ti,ab,kf. and (Australian Defence Force or (department of defence adj3 Australia*)). in.	146
4	or/1-3	1307
5	exp Animal/ not exp Human/	5954285
6	4 not 5	1235
7	limit 4 to yr="2002 -Current"	946

CENTRAL

Cochrane Central Register of Controlled Trials (Cochrane Library, Issue 3, 2023)

#	Search statement	Results
1	(Military Personnel/ or Military Health/ or exp Naval Medicine/ or Military Family/ or Psychology, Military/ or Military Psychiatry/ or Military Medicine/) and (exp Australia/ or Australia*.af.)	51
2	((defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or regiment* or squadron* or battalion* or coastguard* or coast guard*) adj20 Australia*).af.	146
3	or/1-2	153
4	limit 3 to yr="2002 -Current"	131

PsycINFO

Ovid APA PsycINFO 1806 to Week 3 April 2023

#	Search statement	Results
1	(exp Military Personnel/ or Military Psychiatry/ or Military Psychology/ or Military Families/) and Australia*.mp.	384
2	((defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or regiment* or squadron* or battalion* or coastguard* or coast guard*) adj5 Australia*).mp.	576
3	(defence or defense or military* or army or armies or armed or combat or soldier* or troop* or infantry or air force or RAAF or fighter pilot* or navy or naval or sailor* or submariner* or active dut* or service personnel or regiment* or squadron* or battalion* or coastguard* or coast guard*). mp. and (Australian Defence Force or (department of defence adj3 Australia*)).in.	34
4	or/1-3	702
5	limit 4 to yr="2002 -Current"	510

Web of Science Core Collection

24 April 2023

AB=((Australian defence or Australian defense or Australian military or Australian armed or Australian army or Australian soldier* or Australian troop* or Australian air force or Australian navy or Australian naval or Australian sailor* or Australian submariner* or Australian combat))

Limited to WoS categories: Medicine General Internal; Public Environmental Occupational Health; Psychiatry; Rehabilitation

PY 2002-2022 = 649

Outcome measures

Eligible outcome measures were any health or wellbeing-related outcomes, except for studies that investigated/reported only malaria, studies that focused only on aspects of performance (e.g., fitness levels) and studies that included only validation of health-related metrics. Studies on malaria were excluded, as the Australian Defence Force Malaria and Infectious Disease Institute oversees malaria health research.

Risk of bias

Risk of bias was assessed for each included study. The following JBI critical appraisal tools were used: Checklist for Analytical Cross-Sectional Studies, Checklist for Case Control studies, Checklist for Case Reports, Checklist for Cohort Studies, Checklist for Diagnostic Test Accuracy Studies, Checklist for Prevalence Studies, Checklist for Quasi-Experimental Appraisal Tool, Checklist for Systematic Review and Research Syntheses, and Checklist for Randomised Control Trials (RCTs) (<https://jbi.global/critical-appraisal-tools>).

An overall risk-of-bias rating (low, moderate or high) was assigned to each study. Consistent with best-practice guidelines,⁹ the judgement was based on weighting the assessment of critical domains, rather than a checklist or scoring framework. Consequently, some studies with an overall rating of high risk of bias may have had only one high-risk critical domain, while others may have had multiple unclear critical domains. Determining whether a domain was critical depended on the study's context. Consequently, the designation of 'critical' to a domain varied between studies. For RCTs, the domain of 'blinding of participants' was assessed; however, since blinding participants is invariably difficult to achieve in occupational intervention studies, non-blinding was not considered a critical domain in deriving an overall rating for these studies. An 'unclear' assessment was made for domains that could not be fully assessed due to incomplete information in the publication.

Each study was independently assessed by two authors who were not co-authors of that publication, with any disagreements resolved through discussion. A third author arbitrated if consensus could not be reached.

Data extraction

The authors devised a data extraction form. Three authors independently extracted data from five studies to assess the consistency and applicability of the form. Slight adjustments were then made to the form, with the final categories being: study

type, participant details, intervention/exposure, comparator, outcome, health domain, inclusion and exclusion criteria and findings. A single author extracted data for each of the remaining studies. A senior member of the research team (KWB) conducted a second data extraction of 5% of the studies to verify accuracy. Data were entered into an Excel spreadsheet, with a separate column for each data variable. The data extraction table for the reports included an additional column detailing related studies derived from each report.

Development of the evidence catalogue

For each study, information was extracted to define which specific health outcomes had been evaluated and reported, so that each study could be catalogued into the most applicable health research priority area. An additional category, 'other health outcome', was created for studies that did not meet the criteria for any of the eight specified priority health research areas. Some studies included multiple health outcomes; these studies were catalogued under a maximum of three health research priority areas for ease of use.

Results

Study selection

A total of 3083 records were retrieved through the database search (Figure 1). After removal of 1201 duplicates, 1882 records were screened at the title/abstract level, of which 1522 were excluded. After full-text screening, 195 studies were excluded and 165 studies were included. A further six studies were included after a search of the bibliographies of included studies (Figure 1). A small number of the included studies (n=5) focused on former serving ADF members who were serving at the time of exposure (deployment)—Defence deemed these studies to have a particularly valuable contribution to the health research evidence catalogue. This resulted in a total of 171 studies for inclusion (Table S2, supplementary material).

Reasons for exclusion of studies included: non-primary data study (n=91), non-health outcome (n=57), former serving ADF members (n=21), data not presented separately for current serving ADF members (n=11), non-ADF military personnel (n=9), malaria outcome (n=4), and systematic review that only analysed studies that were already included in the search (n=2).

In addition to the studies identified through database searching, a further 60 reports and theses were included in the catalogue. The Department of Defence provided 33 reports, and one of the authors

Table S2: Bibliographic details of 171 papers included in the ADF evidence catalogue 2002–2023

Study
Abouzeid M, Kelsall HL, Forbes AB, et al. Posttraumatic stress disorder and hypertension in Australian veterans of the 1991 Gulf War. <i>J Psychosom Res.</i> 2012;72(1):33-38.
Aidman E, Jackson SA, Kleitman S. Effects of sleep deprivation on executive functioning, cognitive abilities, metacognitive confidence, and decision making. <i>Appl Cogn Psychol.</i> 2019;33(2):188-200. doi: https://dx.doi.org/10.1002/acp.3463
Alele FO, Malau-Aduli BS, Malau-Aduli AEO, et al. Individual anthropometric, aerobic capacity and demographic characteristics as predictors of heat intolerance in military populations. <i>Medicina (Kaunas).</i> 2021;57(2):173.
Arthur DTJ, Khan MM, Barclay LC. Thermographic investigation of osseous stress pathology. Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Annual International Conference. 2011;2011:6250-6253.
Attia JR, D'Este C, Schofield PW, et al. on behalf of the SHOAMP Team. Mental health in F-111 maintenance workers: the study of health outcomes in aircraft maintenance personnel (SHOAMP) general health and medical study. <i>J Occup Environ Med.</i> 2006;48:682-691.
Barton CA, McGuire A, Waller M, et al. Smoking prevalence, its determinants and short-term health implications in the Australian Defence Force. <i>Mil Med.</i> 2010;175(4):267-272.
Bleier J, McFarlane A, McGuire A, et al. Risk of adverse health outcomes associated with frequency and duration of deployment with the Australian Defence Force. <i>Mil Med.</i> 2011;176(2):139-146.
Bonanno D, Murley G, Munteanu S, et al. Effectiveness of foot orthoses for the prevention of lower limb overuse injuries in naval recruits: a randomised controlled trial. <i>Br J Sports Med.</i> 2018;52(5):298-302.
Bonanno DR, Munteanu SE, Murley GS, et al. Risk factors for lower limb injuries during initial naval training: a prospective study. <i>J R Army Med Corps.</i> 2018;164(5):347-351.
Booth CK, Coad RA, Forbes-Ewan CH, et al. The physiological and psychological effects of combat ration feeding during a 12-day training exercise in the tropics. <i>Mil Med.</i> 2003;168(1):63-70.
Booth CK, Probert B, Forbes-Ewan C, et al. Australian army recruits in training display symptoms of overtraining. <i>Mil Med.</i> 2006;171(11):1059-1064.
Brown A, Gibson R, Tavener M, et al. Sexual function in F-111 maintenance workers: the study of health outcomes in aircraft maintenance personnel. <i>J Sex Med.</i> 2009;6(6):1569-1578.
Bull C, Ellwood D, Toohill J, et al. Quantifying the differences in birth outcomes and out-of-pocket costs between Australian Defence Force servicewomen and civilian women: a data linkage study. <i>Women Birth.</i> 2022;35(5):e432-e438.
Burley SD, Drain JR, Sampson JA, et al. Effect of a novel low volume, high intensity concurrent training regimen on recruit fitness and resilience. <i>J Sci Med Sport.</i> 2020;23(10):979-984.
Burne SG, Khan KM, Boudville PB, et al. Risk factors associated with exertional medial tibial pain: a 12 month prospective clinical study. <i>Br J Sports Med.</i> 2004;38(4):441-445.
Burnett AF, Naumann FL, Burton EJ. Flight-training effect on the cervical muscle strength of trainee pilots. <i>Aviat Space Environ Med.</i> 2004;75(7):611-615.
Cable GG. In-flight hypoxia incidents in military aircraft: causes and implications for training. <i>Aviat Space Environ Med.</i> 2003;74(2):169-172.
Cash R, Varker T, McHugh T, et al. Effectiveness of an anger intervention for military members with PTSD: A clinical case series. <i>Mil Med.</i> 2018;183(9-10):e286-e290.
Cohn A, Pakenham K. Efficacy of a cognitive-behavioral program to improve psychological adjustment among soldiers in recruit training. <i>Mil Med.</i> 2008;173(12):1151-1157.
Colgrave N. Special operations task group regimental aid post presentations, Tarin Kowt, Afghanistan: February - June 2010. <i>J Mil Veterans Health.</i> 2011;19(3):13-19.
Coltman CE, Steele JR, Spratford WA, et al. Are female soldiers satisfied with the fit and function of body armour? <i>Appl Ergon.</i> 2020;89:103197.
Coltman CE, Brisbane BR, Molloy RH, et al. Identifying problems that female soldiers experience with current-issue body armour. <i>Appl Ergon.</i> 2021;94:103384.
Cowlishaw S, Metcalf O, Lawrence-Wood E, et al. Gambling problems among military personnel after deployment. <i>J Psychiatr Res.</i> 2020;131:47-53.
Cowlishaw S, Metcalf O, Little J, et al. Cross-lagged analyses of anger and PTSD symptoms among veterans in treatment. <i>Psychol Trauma.</i> 2022;14(2):336-345.
Crane MF, Boga D, Karin E, et al. Strengthening resilience in military officer cadets: A group-randomized controlled trial of coping and emotion regulatory self-reflection training. <i>J Consult Clin Psychol.</i> 2019;87(2):125-140.
Crane MF, Forbes D, Lewis V, et al. The interplay between social interaction quality and wellbeing in military personnel during their initial two-years of service. <i>Mil Psychol.</i> 2022;34(5):503-515.

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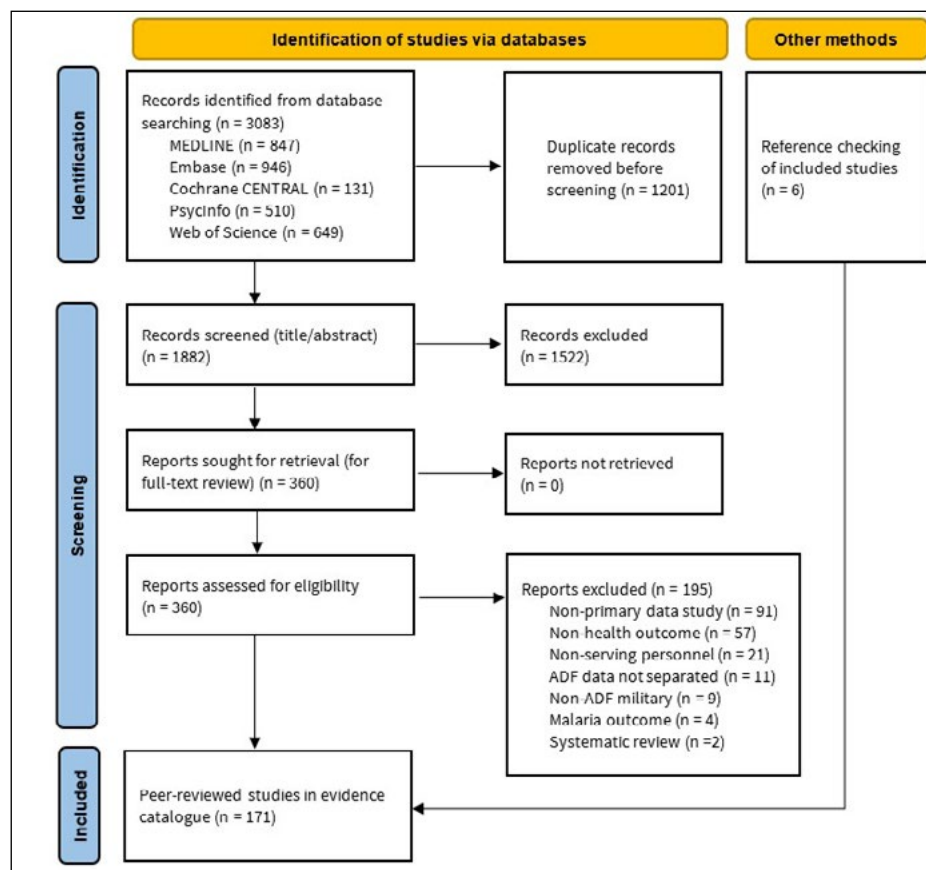
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Figure 1 - Preferred Reporting Items for Systematic Reviews and Meta-Analysis–Scoping Reviews (PRISMA–ScR), flow chart of the scoping review, 1 January 2002 to 24 April 2023.



(HK) sourced 24 reports and three PhD theses through a grey literature search.

Study characteristics

The 171 studies used the following study designs: cohort (n=71), analytical cross-sectional (n=45), prevalence (n=17), RCTs (n=14), quasi-experimental (n=9), case reports (n=4), diagnostic test accuracy (n=4), systematic review (n=3), case control (n=3), and qualitative (n=1). There were studies published in every year between 2002 and 2023, with a large number published in 2017–2023 (Table 1).

All studies were Australian-based, although there was collaboration with authors from the United States of America (USA), the United Kingdom (UK), Canada, the Netherlands and Belgium. Two of the systematic reviews reported data from the USA, UK and an unspecified international source. A large proportion (n=83, 48%) of studies received funding from the Department of Defence or Department of Veterans' Affairs. The remainder of studies were funded by charitable organisations (n=21), research councils/government scheme (n=6), internal funding (n=16), other (US Army, Australasian Military

Medicine Association) (n=2), and 44 studies did not state their funding source; some of those studies analysed data sets collected by the Department of Defence (n=7).

The 60 research reports and theses spanned the years 2003–2023, with the majority (77%) published in the most recent decade, 2012–2023 (Table 2). Australian authors and research teams authored all reports and theses.

Risk of bias assessment

Sixteen of the included studies were assessed as having a high risk of bias; these were cohort, analytical cross-sectional, case-control and systematic review studies. The critical domain in the cohort, analytical cross-sectional and case-control studies was confounding factors: studies that did not consider possible confounding factors within the analysis were considered to have a high risk of bias. In addition, one cohort study was assessed as high risk of bias due to a considerable non-random loss to follow up. The systematic review was rated as high risk of bias due to insufficient methodological detail. All of the RCTs, quasi-experimental studies,

Table 1: Peer-reviewed publications investigating the health of ADF members 2002–2023 by publication time period and top three priority health research areas n (% of total for time period)

Year of publication	Total no. of studies	No. of mental health and wellbeing studies	No. musculoskeletal studies	No. occupational and environmental studies
2002–2006	33 (19)	11 (33)	8 (24)	8 (24)
2007–2011	27 (16)	8 (30)	5 (19)	8 (30)
2012–2016	39 (23)	19 (49)	11 (28)	2 (5)
2017–2021	49 (29)	27 (55)	15 (31)	5 (10)
2022–2023	23 (13)	13 (57)	7 (30)	0 (0)
TOTAL	171	78 (47)	46 (27)	23 (13)

Note: Studies may be assigned to multiple categories (maximum of three) so percentages will not sum to 100.

Table 2: Reports and theses publications investigating the health of ADF members 2002–2023 by publication time period and top three priority health research areas (PHRA) n (% of total for time period)

Year of publication	Total studies in top 3 PHRA for time period	Mental health and wellbeing	Musculoskeletal	Occupational and environmental
2002–2006	5 (8)	2 (40)	1 (20)	3 (60)
2007–2011	9 (15)	8 (89)	0 (0)	7 (78)
2012–2016	13 (22)	10 (77)	3 (23)	11 (85)
2017–2021	26 (43)	18 (69)	1 (4)	7 (27)
2022–2023	7 (12)	6 (71)	0 (0)	1 (14)
TOTAL	60	44 (72)	5 (8)	29 (48)

Note: Studies may be assigned to multiple categories (maximum of three) so percentages will not sum to 100.

Table 3: Risk-of-bias assessment for study types in catalogue of ADF studies 2002–2023 n (%)

Type of study	Low risk of bias	Moderate risk of bias	High risk of bias	TOTAL (n=171)
Cohort	32 (45)	33 (46)	6 (9)	71
Cross-sectional analytical	26 (58)	11 (24)	8 (18)	45
Case report	4 (100)	–	–	4
Case control	–	2 (67)	1 (33)	3
Prevalence	13 (76)	4 (24)	–	17
Quasi-experimental	4 (44)	5 (56)	–	9
Qualitative	–	1 (100)	–	1
Diagnostic test accuracy	2 (50)	2 (50)	–	4
Systematic review	1 (33)	1 (33)	1 (33)	3
Randomised control trial	8 (57)	6 (43)	–	14

Table 4: Studies investigating the health of ADF members 2002–2023 by priority health research area

Health domain outcome	Number of peer-reviewed publications (n=171) (% total studies)	Reports/ theses (n=60) (% total reports/ theses)	TOTAL (n=231) (%)
1. Measuring and monitoring the health of the force	16 (9)	–	16 (7)
2. Health of the future warfighter	0 (0)	0	0
3. Musculoskeletal injuries	46 (27)	5 (8)	51 (22)
4. Occupational and environmental health	23 (13)	29 (48)	52 (23)
5. Mental health and wellbeing	78 (45)	44 (73)	122 (53)
6. Health system performance and efficiency	0 (0)	0	0
7. Gender and health	23 (13)	–	23 (10)
8. Infectious diseases	2 (1)	–	2 (1)
9. Other health outcomes	31 (18)	–	31 (13)

Note: Studies may be assigned to multiple (maximum of three) categories; therefore, percentage and count will exceed 100.

prevalence studies, qualitative studies, diagnostic test accuracy studies and case report studies were either moderate or low risk of bias. Analytical cross-sectional studies had the highest proportion of high-risk-of-bias assessments (Table 3).

Evidence catalogue development

It proved challenging to attribute any identified research studies to two of the strategic priority areas: 'health of the future war fighter' (focus on the health needs of Defence members in the future, exploring technological advances, emerging technologies and innovative models of care) and 'health system performance and efficiency'. No published studies were identified that could be catalogued under these priority areas.

There were considerably more studies involving mental health and wellbeing outcomes than any other priority area (Table 4). Most mental health and wellbeing studies (76%) were published in the last decade. Thirty-one studies contained health outcomes that could not be categorised into the predefined eight priority health areas and were categorised under 'other health outcomes'. This category included the following health outcomes: dental (n=7); neurological (n=7); respiratory (n=4); auditory (n=4); melanoma (n=1); other dermatological conditions (n=1); and general health (n=7). In total, 16 of these studies involved only one health outcome outside the strategic priority health areas (seven dental studies, three neurological studies, six general

health studies). The remaining 15 studies also included one of the predefined health area outcomes and were therefore catalogued in both.

The majority of studies focused on mental health and wellbeing (n=78, 47%), followed by musculoskeletal disorders (n=46, 27%) and occupational and environmental exposures (n=23, 13%). No studies on traumatic brain injury-related research were identified. When examining the 126 studies funded by the Department of Defence and the Department of Veterans' Affairs, the distribution across priority health research areas was similar to the overall totals.

Consistent with the published literature, the reports and theses also showed that the majority (72%) focused on mental health and wellbeing outcomes (Table 2). Occupational and environmental health-related outcomes were included in approximately 48% of reports and theses, and musculoskeletal outcomes were included in 8%.

Discussion

This scoping review resulted in the development of an extensive evidence catalogue of health research involving ADF members over 20 years. One hundred and seventy-one peer-reviewed journal articles and 60 reports/theses were identified, appraised and catalogued according to the ADF health research priorities.

Most health research involving ADF members over the previous 20 years has focused on mental health and wellbeing (53%), with the next most common health area being musculoskeletal injuries (22%). Over the period 2002–2011, there was a more even distribution of studies across domains, including: mental health and wellbeing (32%); musculoskeletal disorders (22%); and occupational and environmental health (27%). However, over the period 2012–2022, there was an increased emphasis on mental health and wellbeing research (53%) and a decrease in research investigating musculoskeletal (30%) or occupational and environmental health (6%) outcomes. This may reflect recent greater recognition of the impact of military service on mental health and wellbeing outcomes, not only by Defence and the Department of Veterans' Affairs, but also by researchers and the wider community. Notably, women have been eligible to serve in non-combat roles in the ADF since the 1970s, but have only been eligible to apply for all roles since 2014. There were more studies from 2014 onwards investigating gender and health outcomes; of the 23 studies included in this category, only five were published before 2014.

There has been a sustained focus on research into musculoskeletal injuries and disorders among ADF members throughout the past 20 years. This would seem appropriate, since musculoskeletal disorders are the second most common reason for workers' compensation claims within the ADF.¹⁰ Similarly, musculoskeletal injuries and disorders also make up the majority of compensation claims within the Australian civilian workforce.¹¹ However, notably, of the 46 musculoskeletal disorder studies, 19 related to musculoskeletal disorders that developed during periods of mandatory basic training. There are practical benefits to undertaking research during basic training, and it is desirable to identify strategies to prevent these injuries, which might detriment recruitment. However, the relative lack of studies among current serving ADF members beyond basic training may be an important gap to address, as the majority of musculoskeletal injuries resulting in workers' compensation claims are likely to occur post-training.

Evidence has demonstrated that poor mental health and wellbeing can be associated with musculoskeletal injuries and disorders and chronic pain.^{12–14} However, very few studies ($n=3$) of ADF members took a holistic approach to exploring the incidence of musculoskeletal disorders; almost half of the studies focused on physical health outcomes in basic military training^{15–17} without collecting concurrent outcomes on mental health and wellbeing. It seems that this is consistent with

contemporaneous studies involving overseas military forces, such as the US military, which have also considered only physical factors in the aetiology and prevention of musculoskeletal injuries, rather than adopting a biopsychosocial approach to health.^{18–21} There are additional challenges in the military workforce due to the nature of the work and working conditions with unpredictable and often changeable environments in which they operate. This may at least partly explain the small number of studies that investigated prevention strategies. The limited investigation into the prevention of musculoskeletal disorders and injuries across the life span indicates a future priority area for health research.²²

Most studies included in the evidence catalogue were based on research commissioned and/or funded by the Department of Defence or the Department of Veterans' Affairs. Studies that were not funded by the Department of Defence or the Department of Veterans' Affairs had Department of Defence Veterans' Affairs HREC approval to include ADF personnel participants. No matter who commissioned the studies, the outcomes focused predominately on mental health and wellbeing.

While mental health and wellbeing-related studies were particularly prevalent, mental health conditions only accounted for a relatively small number of compensation claims in 2021/2022,¹⁰ and an even smaller proportion of work, health and safety incidents (1% in 2012/2014 in the Army).¹⁵ The highest number of claims for military compensation relate to hearing loss,¹⁰ yet only four studies considered this health outcome.^{23–26} The search strategy did not actively exclude trauma or traumatic brain injury. However, no articles relating to research on trauma or traumatic brain injury research and current serving ADF personnel were retrieved. Several studies have reported the prevalence of post-traumatic stress disorder (PTSD) in cohorts of current serving ADF members, with findings ranging from 2% to 11% prevalence,^{27–32} but there was heterogeneity in the diagnostic criteria utilised. A 2010 report about the mental health of ADF personnel found the 12-month prevalence of mental health disorders (22%, 95%CI 18.9–25.3%) was similar to that of the general Australian population (20.7%, 95%CI 18.9–25.3%), but that lifetime prevalence rates were higher in ADF members (54.1% vs 49.3%).²⁹ Furthermore, the estimated prevalence for affective disorder in ADF members was higher over both the previous 12 months (9.5% vs 5.9%) and lifetime (20.8% vs 14.0%), compared to the general Australian population.³³ Suicide rates within current serving ADF members are lower than the general Australian population and stable over the last 20 years. However, suicide rates

for former serving ADF members were estimated to be 26% higher among men and 107% higher among women compared to the general population.³⁴ The relatively low previous 12-month prevalence of mental health disorders and overall suicide rate among current serving ADF members may be at least partly attributed to the 'healthy-worker effect'.³⁵

Overall, a substantial body of research investigating health outcomes has been undertaken among ADF members over the past 20 years. The research has informed an evidence base for health policy and practice, in Australia and overseas, and has developed military and veteran health research capability within Australia. It is anticipated that the new ADF Health Strategy⁴ and an evidence catalogue will inform an approach to a) address knowledge gaps in health research relating to strategic priority areas; b) target future health research to areas that will help improve capability and economic benefits for the ADF; and, c) improve health outcomes for ADF personnel, their families and the Defence community.

This study has several strengths. It was a comprehensive, systematic search of the published literature across the five relevant electronic databases and handsearching, with a focus on a well-defined population. The search followed rigorous methodology consistent with best-practice standards, and bias risk was assessed using valid tools. Unfortunately, due to the heterogeneity of study designs and outcome measures, it was not possible to undertake any meta-analysis. Studies that examined the health outcomes of former serving ADF members and the consideration of the translation of research findings into policy and practice were outside the scope of this review. However, an evidence catalogue for ex-serving members could be beneficial.

Conclusion

An evidence synthesis catalogue of health research involving ADF members over the past 20 years has been developed. Since 2002, there has been a considerable number of research studies investigating the health of ADF members, the majority

of which focused on mental health and wellbeing or musculoskeletal outcomes. Cataloguing past health research has provided insights into the importance of aligning research focus with ADF priorities. It provides an opportunity to consider strategies to ensure that future health research aligns closely with ADF priorities.

Declarations

Any views expressed in this review are those of the authors, not the Department of Defence.

Ethics approval

Not applicable

Consent for publication

All co-authors have reviewed the final version of the manuscript and expressed their consent for publication.

Availability of data

All data generated or analysed during this study are included in this published article.

Competing interests

The Department of Defence employs ZJ, EW and JS. No other competing interests are declared.

Funding

The Commonwealth of Australia (represented by the Defence Science and Technology Group) supported this research through a Defence Science Partnerships agreement (Ref: ID11922).

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Relations Between Physical and Emotional Health and Psychological Stress in Trauma-Exposed Veterans with Emotional Disorders

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Abstract

Background: Exposure to potentially traumatic events (PTEs) is common, especially in veterans. There are psychological sequelae to PTE exposure, including stress and anxiety pathology, depressive symptoms, and PTSD. Identifying veterans at risk for elevated psychological distress following PTEs, as well as distress correlates, is critical to improving mental health screening efforts and minimising downstream adverse outcomes. Two correlates, emotional and physical wellbeing, are typically examined in isolation. Understanding unique and/or synergistic relations between emotional wellbeing, physical wellbeing, and distress in veterans, and how relations vary across distress outcomes (i.e., depressive symptoms, anxiety, stress), would facilitate an understanding of the unique contribution of these correlates in trauma-exposed veterans.

Method: Four-hundred and ninety veterans participating in randomised controlled trials of cognitive-behavioural interventions in a United States Veterans Affairs Healthcare System were included. Pearson correlations, regressions and a path analysis were used to examine relationships between wellbeing domains and psychopathology, with varying sample sizes across analyses due to missing data.

Results: Higher levels of emotional wellbeing and fewer role limitations due to emotional difficulties were associated with lower stress and depressive symptoms. Results were similar for anxiety, except that physical wellbeing was also related to lower anxiety.

Conclusion: Results suggest meaningful, distinct relations between wellbeing domains across distress outcomes, which inform wellbeing/quality-of-life theory, the knowledge base on protective factors for distress outcomes in trauma-exposed samples, and screening and intervention efforts. Regarding the relationships among emotional wellbeing, physical wellbeing, and distress, emotional wellbeing may be a stronger contributor.

Keywords: veterans, depressive symptoms, anxiety, stress, wellbeing

Introduction

Experiencing potentially traumatic events (PTEs) is common, with a PTE exposure rate of 89.7% in national prevalence estimates¹ and 70.4% with international estimates.² There are numerous psychological sequelae of PTE exposure. Sequelae include, but are not limited to, problematic substance use, depressive symptoms and anxiety.³ Psychological PTE impacts are heterogeneous across populations and variables due to psychosocial factors.⁴ For example, PTSD is more common in military personnel relative to civilians following PTEs (14–16% in veterans),⁵ likely due to military service-specific variables (combat exposure).⁶ Environmental factors, such as social support, also protect against post-traumatic psychopathology development.⁷

Efforts to identify veterans at risk for elevated psychological distress following PTEs, as well as distress correlates, are critical to improving mental health screening efforts, minimising downstream adverse outcomes, and informing the knowledge base of relevant correlates and distinct relations to distress. Such efforts may help reduce the burden on health systems and providers.

One sequelae^{8,9} of PTE exposure and a potential amplifier of adverse mental health in veterans is poor physical health.¹⁰ Experience of PTEs and combat exposure places veterans at risk for physical health difficulties, examples of which include diabetes, arthritis, chronic pain, and stroke.^{11,12} Relations between physical and emotional health are both reciprocal and unidirectional, depending on the

population studied.^{13,14} There is evidence suggesting bidirectional relations between PTSD symptom severity and physical health in female veterans, wherein PTSD symptoms influence physical health outcomes and vice versa. Unidirectional relations between PTSD and physical health are evident in male veterans¹⁴ with PTSD, placing individuals at risk for adverse downstream physical health. In briefly summarising mechanisms linking physical and emotional health, most are biopsychosocial.¹⁵ For example, allostatic load may result from PTE experience.¹⁶ At a broad level, allostatic load theory suggests that prolonged stress exposure can over activate bodily systems, dysregulating the body's stress response. If a veteran experiences a combat-related trauma or prolonged trauma (or a civilian experiences a separate PTE or multiple/prolonged PTEs), prolonged hyperarousal resulting from trauma exposure may negatively impact body systems and, therefore, manifest in physical health difficulties.

Clearly, there is a strong connection between mental and physical health in veterans exposed to PTEs. While there are robust, reciprocal relations between physical health and emotional health outcomes due to PTE exposure and subsequent allostatic load in veterans, it remains unclear how emotional and physical health, as well as functional impairment resulting from emotional and physical difficulties, simultaneously and distinctly relate to changes in stress and related psychopathology in trauma-exposed veterans. Emotional and physical wellbeing are also understudied in veterans relative to disability/poor functioning. Research suggests stronger relations between psychosocial domains of emotional functioning and PTSD, relative to relations between physical health and PTSD.^{17,18} More recently, Elliott et al. showed that psychosocial domains and emotional and physical wellbeing each uniquely relate to depressive symptoms,¹⁹ suggesting that the strength of associations between emotional and physical wellbeing, psychosocial factors and mental health outcomes varies depending on the outcome. Understanding shared and distinct relations between emotional and physical wellbeing, role limitations due to these difficulties, and psychopathology in veterans, and how relations vary across distress outcomes (i.e., depressive symptoms, anxiety, stress), contributes to an understanding of unique protective factors of distress in trauma-exposed veteran samples.

Present study

The present study is a secondary analysis of cross-sectional data examining relations among emotional and physical wellbeing, role limitations

due to emotional and physical difficulties, and distress (i.e., depressive symptoms; anxiety; stress). Relations between physical health, emotional health, and psychological distress are understudied in veterans, as are emotional and physical wellbeing more broadly. A large sample of trauma-exposed veterans participating in two randomised controlled trials for emotional disorders was included. The primary aim was to examine whether associations between physical and emotional wellbeing indicators and distress were consistent across depressive symptoms, anxiety and stress.

Given the extant literature, we hypothesised that physical wellbeing and limitations due to physical difficulties would be uniquely related to depressive symptoms, anxiety and stress, even when controlling for emotional wellbeing and limitations due to emotional difficulties. Given sex- and race-based differences across mental and physical health outcomes,^{14,20} we controlled for these variables in primary analyses. Psychiatric comorbidity (receiving more than one psychiatric diagnosis) was also controlled for, given relations between comorbidity and psychopathology.²¹ Based on results obtained from primary analyses, a path model was calculated to succinctly capture relations between independent and dependent variables analysed.

Method

Participants

For the current study, 490 veterans with emotional disorders provided baseline data as part of two psychotherapy trials of Transdiagnostic Behavior Therapy (Veterans Affairs Office of Research and Development grant #110 RX002910 and CSR&D grant #I01 CX001846 [Principal Investigator: Gros]). Recruitment occurred in outpatient clinics at a large United States Southeastern Veterans Affairs Healthcare System (VAHCS). Inclusion criteria were: 1) competence to consent; 2) meeting criteria for PTSD, major depressive disorder, or panic disorder on a diagnostic interview; 3) PTE exposure as assessed by the Anxiety and Related Disorders Interview Schedule for DSM-5 (ADIS-5); and 4) aged 18–80. Exclusion criteria included: 1) psychiatric hospitalisation or suicide attempt within the last two months; 2) medical conditions interfering with the trial protocol or likely to cause hospitalisation during the study period; 3) new psychiatric medication started within the past four weeks; and 4) meeting diagnostic criteria for a bipolar disorder, personality disorder or psychotic disorder based on a chart review conducted as part of the study. For the 490 participants, the mean age was 45.51 (*SD* = 13.13).

Participants were mostly White (49.80%) or Black (41.04%) and were predominantly male (70.41%).

Procedure

The VAHCS research and development committee and the university-affiliated Institutional Review Board approved the study procedures (initial approval reference number: Pro00093517). The study occurred between October 2020 and December 2024. Participants completed an initial intake appointment to determine eligibility. Masters'-level project assessors completed initial intake assessments, with supervision from a licensed clinical psychologist and the parent study principal investigator. Informed consent was obtained.

Measures

Demographics

Participants completed a comprehensive battery of demographic items assessing age, race and gender.

Anxiety and Related Disorders Interview Schedule-5

The Anxiety and Related Disorders Interview Schedule for the Diagnostic and Statistical Manual of Mental Disorders-5th Edition (ADIS-5)²² was administered at intake to assess psychiatric disorders and determine eligibility for study participation. Psychometric properties of the ADIS-5 are excellent.²² For the primary project, independent raters scored 20% of diagnostic interviews. There was acceptable interrater agreement for diagnoses of MDD (88%), PTSD (81%), and panic disorder (92%) across assessment points. Consistent with scoring criteria,²² principal diagnoses were made using the most severe ADIS interference and distress scale scores.

Depression Anxiety Stress Scales 21-Item Version

The Depression Anxiety Stress Scales-21 (DASS-21)²³ includes 21 items and was administered as part of the baseline measure battery. There are three DASS-21 subscales: depression, anxiety and stress. The depression subscale assesses dysphoria, while the anxiety subscale assesses physiological arousal and cognitive anxiety. The stress subscale assesses tension and agitation. Items are rated on a 0–3 ('did not apply to me at all' to 'applied to me very much or most of the time') scale, with the time frame of reference of one week. The DASS-21 has strong psychometrics.²³ Internal consistency alpha was excellent (0.86–0.91) across DASS-21 subscales.

Veterans Short-Form Health Survey

The Veterans Short-Form Health Survey (V/SF-36)^{24,25} is a 36-item measure designed to assess physical and emotional health in veterans. Items are rated on Likert-type scales, grouped by subscales (e.g., physical functioning, role limitations due to physical health, emotional wellbeing, role limitations due to emotional problems) and re-scored on a 0–100 scale. Higher scores suggest higher functioning/life quality across subscales. The V/SF-36 has excellent psychometric properties. The current study used only the emotional and physical wellbeing, and role limitations due to emotional and physical difficulties scales to determine unique relations with distress. Internal consistency alphas across the four subscales were good, ranging from 0.78–0.93.

Data-analytic plan

Data cleaning

Data were screened for accuracy errors, missing data and multivariable assumptions. Full-information maximum likelihood estimation was used to impute missing data for the path analysis. Only participants with complete V/SF-36 data were used in correlations and regression analyses, as individuals were generally missing >5% of their data. Imputation was not conducted for those missing >5% of their data to avoid replacing a large percentage of participant-level data. The specific *N* for each analysis is described in detail below.

Pearson bivariate correlations

Pearson bivariate correlations were calculated to examine associations between physical health scales (V/SF-36), emotional health scales (V/SF-36), stress, depressive symptoms and anxiety scales (DASS-21), and comorbidity (ADIS-5). Comorbidity was operationalised as the number of psychiatric diagnoses identified by the ADIS-5.

Hierarchical regression

Regressions were calculated in two steps across the three DASS-21 subscales. The first step included age, dichotomised race, self-reported sex and number of psychiatric diagnoses, considering the influence of these variables.^{14,20,21} Next, we added physical wellbeing, emotional wellbeing, limitations due to physical difficulties, and limitations due to emotional difficulties in step two in each of the three models. *R*² change values and standardised coefficients were used for interpretation, along with *F* statistics.

Path analysis

Based on regression and correlation results, we modelled relations among emotional wellbeing, physical wellbeing, role limitations due to emotional difficulties, role limitations due to physical difficulties, and depressive symptoms, anxiety and stress. Fit indices used to assess model fit were root mean square error of approximation and standardised root mean square residual.²⁶⁻²⁸ Standardised coefficients were used for interpretation of path analysis parameters. Full-information maximum likelihood was used to impute missing data, unless participants lacked data for any of the variables of interest in these models. If they had no data, they were excluded from the path analysis (to avoid replacing all missing data for a participant).

Results

Pearson correlations

All Pearson correlations, including sample sizes, are presented in Table 1. Greater levels of depressive symptoms (DASS-21) were associated with worse physical wellbeing, emotional wellbeing, role limitations due to physical difficulties, and role limitations due to emotional difficulties (V/SF-36; r_s from -0.74 to -0.22, $ps < 0.001$). Results were similar for both anxiety (r_s from -0.52 to -0.34, $ps < 0.001$) and stress (r_s from -0.54 to -0.18, $ps < 0.01$) DASS-21 subscales. Individuals with more psychiatric diagnoses also reported worse physical wellbeing, emotional wellbeing, and more limitations due to both emotional and physical difficulties (r_s from -0.26 to -0.12, $ps < 0.05$).

Table 1. Bivariate Pearson Correlations

Variable		Depression	Anxiety	Stress	Physical	Emotional	Physical role	Emotional role	Dx
1. Depression	n	—							
	r	—							
	p	—							
2. Anxiety	n	334	—						
	r	0.584	—						
	p	<0.001	—						
3. Stress	n	328	325	—					
	r	0.656	0.672	—					
	p	<0.001	<0.001	—					
4. Physical	n	325	323	315	—				
	r	-0.217	-0.341	-0.177	—				
	p	<0.001	<0.001	0.002	—				
5. Emotional	n	330	328	321	322	—			
	r	-0.743	-0.521	-0.543	0.208	—			
	p	<0.001	<0.001	<0.001	<0.001	—			
6. Physical role	n	335	332	325	329	332	—		
	r	-0.380	-0.370	-0.261	0.654	0.338	—		
	p	<0.001	<0.001	<0.001	<0.001	<0.001	—		
7. Emotional role	n	335	332	325	329	332	339	—	
	r	-0.529	-0.464	-0.423	0.398	0.536	0.609	—	
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—	
8. Dx	n	340	337	330	329	334	339	339	—
	r	0.226	0.334	0.256	-0.118	-0.261	-0.146	-0.246	—
	p	<0.001	<0.001	<0.001	0.032	<0.001	0.007	<0.001	—

Note. Depression, anxiety, stress assessed with DASS-21. Dx = number of diagnoses. All other domains assessed with the V/SF-36.

Table 2. Stress regression

Model		Unstandardised	Standard error	Standardised	t	p
M ₀	(Intercept)	11.759	1.534		7.666	<0.001*
	Age	-0.049	0.021	-0.130	-2.308	0.022*
	Race	0.779	0.569	0.076	1.368	0.172
	Sex	-0.266	0.626	-0.024	-0.424	0.672
	Diagnoses	1.179	0.276	0.235	4.263	<0.001*
M ₁	(Intercept)	18.329	1.561		11.740	<0.001*
	Age	-0.023	0.019	-0.063	-1.215	0.225
	Race	0.878	0.484	0.086	1.813	0.071
	Sex	-0.422	0.530	-0.038	-0.795	0.427
	Diagnoses	0.473	0.243	0.094	1.947	0.052
	Physical	-0.007	0.011	-0.036	-0.572	0.568
	Emotional	-0.118	0.015	-0.448	-7.844	<0.001*
	P Role	7.624×10 ⁻⁴	0.012	.005	0.064	0.949
	E Role	-0.025	0.012	-0.138	-2.104	0.036*

Note. Physical, emotional, P Role, and E Role were measured from the V/SF-36 (emotional wellbeing, physical wellbeing, role limitations due to physical difficulties, role limitations due to emotional difficulties). * = $p < 0.05$.

Table 3. Depression regression

Model		Unstandardised	Standard error	Standardised	t	p
M ₀	(Intercept)	10.400	1.770		5.874	<0.001*
	Age	-0.031	0.024	-0.073	-1.289	0.198
	Race	0.868	0.649	0.074	1.338	0.182
	Sex	-0.421	0.718	-0.033	-0.586	0.558
	Diagnoses	1.160	0.313	0.204	3.700	<0.001*
M ₁	(Intercept)	20.395	1.420		14.365	<0.001*
	Age	0.012	0.017	0.027	0.668	0.505
	Race	1.155	0.436	0.099	2.649	0.008*
	Sex	-0.633	0.480	-0.050	-1.317	0.189
	Diagnoses	0.037	0.218	0.006	0.168	0.867
	Physical	0.006	0.010	0.028	0.571	0.569
	Emotional	-0.196	0.014	-0.652	-14.452	<0.001*
	P Role	-0.016	0.011	-0.087	-1.534	0.126
	E Role	-0.027	0.011	-0.131	-2.520	0.012*

Note. Physical, emotional, P Role, and E Role were measured from the V/SF-36 (emotional wellbeing, physical wellbeing, role limitations due to physical difficulties, role limitations due to emotional difficulties). * = $p < 0.05$.

Table 4. Anxiety regression

Model		Unstandardised	Standard error	Standardised	t	p
M ₀	(Intercept)	5.930	1.642		3.611	<0.001*
	Age	-0.013	0.022	-0.033	-0.596	0.552
	Race	0.791	0.602	0.071	1.314	0.190
	Sex	0.010	0.672	7.890×10 ⁻⁴	0.014	0.989
	Diagnoses	1.667	0.291	0.307	5.726	<0.001*
M ₁	(Intercept)	15.003	1.659		9.043	<0.001*
	Age	-0.007	0.020	-0.016	-0.323	0.747
	Race	0.829	0.511	0.075	1.621	0.106
	Sex	-0.146	0.568	-0.012	-0.256	0.798
	Diagnoses	0.878	0.256	0.162	3.424	<0.001*
	Physical	-0.037	0.012	-0.187	-3.059	0.002*
	Emotional	-0.102	0.016	-0.357	-6.399	<0.001*
	P Role	-0.003	0.013	-0.015	-0.218	0.828
	E Role	-0.027	0.013	-0.133	-2.062	0.040*

Note. Physical, emotional, P Role, and E Role were measured from the V/SF-36 (emotional wellbeing, physical wellbeing, role limitations due to physical difficulties, role limitations due to emotional difficulties). * = $p < 0.05$.

Hierarchical regressions

Stress

In step 1 of the hierarchical regression analyses for stress ($n = 309$), demographic variables were entered. These variables were age, dichotomised race, sex and number of psychiatric diagnoses. The first step was significant, $F(4, 304) = 6.54$, $p < 0.001$, Adjusted $R^2 = 0.07$. Adding physical and emotional wellbeing and limitations due to physical and emotional difficulties improved the overall model, $\Delta F(4, 300) = 31.19$, $p < 0.001$, $\Delta R^2 = 0.27$. After adding these four variables in step two, greater emotional wellbeing and fewer limitations due to emotional difficulties were associated with reduced stress. Full coefficients for these regression models are presented in Table 2.

Depressive symptoms

In step 1 of the hierarchical regression analyses for depressive symptoms ($n = 318$), demographic variables were entered. These variables were age, dichotomised race, sex and number of psychiatric diagnoses. The initial step was significant, $F(4, 313) = 4.41$, $p = 0.002$, Adjusted $R^2 = 0.04$. Adding physical and emotional wellbeing and limitations due to physical and emotional difficulties improved the overall model, $\Delta F(4, 309) = 97.73$, $p < 0.001$, $\Delta R^2 = 0.53$. After adding these four variables, greater emotional wellbeing and less impairment

due to emotional difficulties were associated with reduced depressive symptoms. Overall, results were consistent with the stress model. Full coefficients for depressive symptoms regression models are presented in Table 3.

Anxiety

In step 1 of the hierarchical regression analyses for anxiety ($n = 317$), demographic variables were entered. These variables were age, dichotomised race, sex and number of psychiatric diagnoses. The initial step was significant, $F(4, 312) = 8.87$, $p < 0.001$, Adjusted $R^2 = 0.09$. Adding physical and emotional wellbeing and limitations due to physical and emotional difficulties improved the overall model, $\Delta F(4, 308) = 32.40$, $p < 0.001$, $\Delta R^2 = 0.27$. After adding these four variables, greater emotional wellbeing, better physical wellbeing and fewer limitations due to emotional difficulties were associated with reduced anxiety. Results are consistent with depressive symptoms and stress, except that physical wellbeing was also a distinct correlate. The results for these regression models are presented in Table 4.

Path analysis

Based on results obtained from regression analyses, a path analysis examining relations between emotional wellbeing, physical wellbeing, role limitations due to

emotional difficulties, role limitations due to physical difficulties, depressive symptoms, anxiety and stress was modelled ($N = 344$ using full information maximum likelihood estimation for those with at least one data point). Emotional wellbeing and fewer limitations due to emotional difficulties were modelled to relate to stress and depressive symptoms. Emotional and physical wellbeing and fewer limitations due to emotional difficulties were modelled to relate to anxiety.

The model was an appropriate fit to the data (SRMR and RMSEA < 0.05). Standardised coefficients were significant ($ps < 0.01$) for emotional wellbeing (-0.46) and role problems due to emotional difficulties (-0.17) relating to stress, which was also the case for depressive symptoms when considering emotional wellbeing (-0.64) and role problems due to emotional difficulties (-0.19; $ps < 0.01$). Finally, for anxiety, emotional wellbeing (-0.39), role limitations due to emotional difficulties (-0.19), and physical wellbeing (-0.19) were significantly related to anxiety ($ps < 0.01$). Overall, results suggest that emotional wellbeing and role problems due to emotional difficulties are key, unique correlates of stress, depressive symptoms and anxiety. At the same time, physical wellbeing also distinctly relates to anxiety difficulties.

Discussion

The current study assessed unique relations between emotional wellbeing, physical wellbeing, role limitations due to emotional difficulties, role limitations due to physical difficulties, and depressive symptoms, anxiety and stress in a trauma-exposed veteran sample. Stress and physical health are robustly linked,²⁹ as are emotional and physical health in veterans.^{13,14} A comprehensive examination of physical and emotional wellbeing, and their unique relations with psychopathology when examined simultaneously, has yet to be tested. The current study suggests emotional wellbeing and role limitations due to emotional difficulties are consistently related to stress, depressive symptoms and anxiety. The pattern of results is similar for anxiety, except physical wellbeing was a unique correlate for this outcome. A path model integrating correlation and regression results was an appropriate fit and supported prior analyses. Findings highlight unique contributions of emotional wellbeing and role limitations due to emotional difficulties when these are considered variables simultaneously and, pending future studies, suggest these variables may drive distress relative to physical wellbeing and role limitations related to physical difficulties.

Results are consistent with prior studies reporting significant relations between emotional wellbeing and depressive symptoms.³⁰ V/SF-36 domains, specifically physical and emotional health, relate to the experience of stress.³¹ The current study expands these findings, suggesting that both emotional wellbeing and limitations resulting from these difficulties are important to consider when understanding correlates of psychological distress in veterans. Given the extensive research on the link between physical health and distress, it is important to incorporate a simultaneous study of emotional wellbeing domains.

Relations between emotional wellbeing and role limitations due to emotional difficulties were consistent across anxiety, and physical wellbeing was also a correlate of anxiety when considering these variables in the same model. Some DASS-21 anxiety subscale items measure physiological arousal ('I experienced trembling, e.g., in the hands'). Given connections between physical health and physiological arousal,¹⁷ it is possible that physical difficulties are indicative of higher allostatic load, which may exacerbate anxiety. Overall, the results provide unique insights into the relationship between quality-of-life indicators and stress, expanding our knowledge base in this area and providing important implications for screening and interventions in VAHCS.

Regarding potential interventions to target role limitations due to emotional difficulties, acceptance and commitment therapy (ACT)³² is a viable option. ACT considers values and valued behaviour that may be impacted by psychological distress, potentially aligning with items assessing role limitations due to emotional difficulties in the V/SF-36 (e.g., accomplishing less than one would like due to emotional difficulties). However, cognitive-behavioural interventions more broadly would be viable intervention options as they consider functional impairment. As the number of psychiatric diagnoses was consistently related to stress, depressive symptoms and anxiety in the initial step of regression models and each V/SF-36 domain in bivariate correlations, interventions may also consider comorbidity in service delivery. Example interventions designed with comorbidity in mind include the unified protocol for emotional disorders and transdiagnostic behaviour therapy, both of which have demonstrated utility in veterans.^{33,34}

Findings also have implications for mental health screening efforts with veterans, adding to the literature examining the utility of the V/SF-36 in VAHCS.²⁴ Veterans exposed to PTEs reporting worse

emotional wellbeing and limitations due to these difficulties may be more likely to endorse clinical symptoms of depression or heightened stress. Those with greater physical health difficulties are also likely to endorse higher levels of anxiety. The V/SF-36 has been established as an easy-to-administer tool²⁴ that can be used as a preliminary marker of psychopathology and distress. Incorporating the V/SF-36 into routine clinical care may enhance the value of screening for difficulties that could precipitate or co-occur with psychopathology.

There are limitations to note when interpreting these findings in the present research. Of course, as the data collected are cross-sectional, causal interpretations are not appropriate. Quasi-experimental study designs may be an appropriate next step to discern the unique effects of emotional wellbeing and role limitations due to emotional difficulties within predetermined groups. Future research may also engage in efforts to determine how these relations vary and interact across primary psychiatric diagnoses and co-occurring difficulties (e.g., substance use). Larger samples would enhance generalisability across veteran populations. As the path analysis was based on results from correlational and regression analyses, replications are necessary to test a priori path model hypotheses.

Conclusion

The current study investigated relations between emotional wellbeing, physical wellbeing, role limitations due to these difficulties, and psychological distress (i.e., depressive symptoms, stress, anxiety). Findings suggest that emotional wellbeing and limitations specific to emotional difficulties uniquely relate to elevated stress and depressive symptoms. Physical wellbeing should also be considered in veterans presenting with elevated anxiety pathology, which may be attributed to allostatic load connecting physical health to emotional health, resulting from prolonged PTE exposure. Overall, the results have implications for the knowledge base on the unique effects of wellbeing indicators on distress, as well as for screening and intervention efforts in VAHCS settings.

Conflicts of interest

None to disclose. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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Comparing Sense of Control between Veterans and Civilians using the Health and Retirement Study

E Olson, B Porter

Abstract

Background: Sense of control has been associated with age-related outcomes. Veterans may experience a reduced sense of control due to the sacrifices associated with military service—potentially contributing to increased health problems in this population.

Purpose: This study seeks to understand how military service affects the sense of control in older veterans in the United States.

Materials and methods: Veterans and civilians were compared on measures of perceived control using data from the Health and Retirement Study. Initial differences were compared using the MIDI Sense of Control scale, and items measuring perceived control over health, social life and finances were analysed using t-tests. Multiple regression was used to control for variables associated with sense of control. Service era was also examined using the same analyses to determine differences in sense of control between draft-era and all-volunteer-era veterans.

Results: Significant differences were initially found with veterans reporting fewer perceived constraints than civilians. However, controlling for covariates, this difference was no longer significant. No other significant differences were found between veterans and civilians, nor between the draft and all-volunteer eras. However, service-related disability was associated with greater perceived constraints.

Conclusions: Sense of control is unlikely to be the significant cause of increased health problems in veterans. However, as service-connected disability was associated with perceived constraints, future studies should examine how military variables can influence the sense of control in veterans.

Keywords: sense of control, veterans, Health and Retirement Study

Introduction

Older adult populations face a variety of changes that have been demonstrated to lower their sense of control over time.¹ Sense of control is defined as one's perception that personal actions will influence life outcomes. Reduced sense of control has been associated with lowered engagement in certain coping strategies that may provide a buffer against age-related declines. Alternatively, a greater sense of control has been associated with greater engagement in health-related coping strategies such as increased physical activity, greater involvement in medical decision making and better health prognoses.²⁻⁴ US Veterans are generally older than the civilian population (median ages of 62 and 38.9 years old,

respectively) and have widely cited health problems, reporting reduced engagement in certain health behaviours, and worsened health than civilians.⁵⁻⁸ Veteran status is often not observed in studies examining aging-related variables, and few studies examine sense of control in veteran populations.⁹ Given this, the relationship between military service and sense of control warrants further study. Previous studies have examined aspects of sense of control within military populations, finding that increased sense of control was associated with reduced PTSD symptom severity and course, and greater resilience.¹⁰⁻¹² However, in environments with greater external control, the internal sense of control has been reduced.¹³⁻¹⁶ Military service requires the relinquishment of certain aspects of personal and

professional life during one's military career. It is thus possible that military service may lead to a reduced sense of control compared to civilian life. However, few studies have examined differences in sense of control between military populations and civilians.

This study seeks to examine whether veteran status is associated with reduced sense of control by using the Health and Retirement Study (HRS), a national study that examines aging outcomes in the US. HRS measures sense of control through two variables: perceived obstacles in life (labelled perceived constraints), and a sense of personal competence (labelled perceived mastery). We additionally sought to examine whether military-specific variables were associated with a reduced sense of control. HRS collected data on whether veterans had a service-related disability, experienced combat and whether they were in a drafted era or volunteer era. Thus, these variables were examined in relation to sense of control in our veteran group.

Sense of control

Sense of control (also referred to in the literature as perceived control) has been studied extensively, with many theories and constructs developed to capture contributing factors to control. In Skinner's review of perceived control terms, she conceptualised the constructs of contingency and competence as the two primary themes underlying existing control theories.¹⁷ Contingency is defined as one's belief that there is a connection between one's own behaviours and an outcome. Related to contingency, competence refers to one's belief in their ability to complete specific tasks or engage in behaviours that lead to desired outcomes. Prior literature has determined that sense of control may be both a state and a trait variable, with support for its functioning as a personality trait, demonstrating some variation across the lifespan and susceptibility to various environmental factors.^{15,18-20} When examining sense of control across the life span, a curvilinear pattern demonstrates that perception of control is strongest in midlife, with lower levels in early life and later life.¹

Prior studies have demonstrated that age-related health outcomes are influenced by sense of control, with cross-sectional and longitudinal studies showing that higher levels of perceived control are associated with fewer severe health limitations, higher self-rated health, fewer chronic conditions and greater engagement in positive health-related behaviours.^{1,3} A greater sense of control was associated with increased cognitive abilities, such as improved memory recall, effective use of memory

strategies, and greater intellectual functioning.³ Sense of control can buffer against health risks. For example, individuals with low socioeconomic status who reported a higher sense of control demonstrated health outcomes similar to those of higher-income groups.³

Mental health outcomes are also associated with a sense of control in both longitudinal and cross-sectional studies. In a sample of older adults, a lower sense of control was associated with increased anxiety and depression.²¹ A higher sense of control was associated with reduced inflammation over time in response to stress and trauma exposure in individuals over the age of 50.²² A greater sense of control was associated with the use of adaptive coping skills and better psychological health with increased control over the job environment over time^{23,24}. Individuals reporting a greater perception of control additionally reported greater life satisfaction, a greater sense of hope for the future, and increased happiness.³

Sense of control in veteran populations

Veteran status may be associated with a sense of control relative to civilian populations due to the unique demands of military service. When service members join the military, they relinquish certain rights to defend their country.²⁵ Military life is one of rigid rules and regulations. Alternatively, the military may instil a sense of competence through its emphasis on training and competent performance as vital components to military readiness.²⁶

The military service era may affect sense of control, as it has been associated with a variety of outcomes, including differing rates of combat exposure. Draft-era veterans were exposed to greater mortality and combat-associated wound rates than the all-volunteer force.²⁷ Given that veterans during these eras were required to serve and experienced combat at higher rates, an examination of whether their sense of control differs between service eras is warranted. Previous studies have examined perceptions of control in military populations; however, the literature is limited. In active-duty populations, an increased sense of control was associated with positive mental health outcomes and favourable impressions of military variables, such as job satisfaction and leadership.²⁸ In veteran populations, sense of control has been associated with post-traumatic stress disorder, with lowered sense of control associated with greater symptom severity and reduced coping strategies.²⁹ Increased perceived mastery was associated with greater life satisfaction in older Australian veterans.³⁰

While these studies indicate benefits of increased sense of control in military populations, we are not aware of a prior study that has examined whether former military service is associated with differences in perceived control compared to civilians. Understanding potential differences in sense of control among veterans may help explain differences in health behaviours and provide avenues for intervention to address them.

Study aims

Given the relinquished control required by military service, we hypothesised that veterans would report higher levels of perceived constraints than civilians. However, as military training strongly emphasises personal competence, we hypothesised that veterans would have a greater sense of perceived mastery than civilians. Additionally, we hypothesised that draft-era veterans would exhibit greater perceived constraints than all-volunteer veterans, but that there would be no difference in perceived mastery.

Materials and methods

Study population

The Health and Retirement Study is a longitudinal panel survey that examines factors associated with aging populations in the US and has been collecting bi-yearly assessments since 1992. Additional information about HRS sampling methodology can be found elsewhere.³¹ Starting in 2006, sense of control data was collected in a leave-behind questionnaire. The current study included participants who completed this questionnaire at least once in the 2018, 2020 and 2022 collection cycles, and indicated whether they had prior military service ($n = 6872$). Individuals were sequentially removed who were missing main outcome data ($n = 191$), secondary outcome data ($n = 90$) or covariates ($n = 329$), yielding a final sample of 6262. None of the military members in this group had missing data on military covariates.

Measures and materials

MIDI sense of control scale

Sense of control was measured by using a subset of questions from the Midlife Development Inventory (MIDI). This scale was developed to measure personal control for the Midlife in the United States (MIDUS) national survey, which examines health and wellness factors across the life course.^{32,33} The scale defines sense of control through the constructs of perceived constraints and perceived mastery, which

map onto Skinner's constructs of contingency and competence.³³

The original MIDI Sense of Control Scale includes eight items for perceived constraints, and four items for perceived mastery. However, different items have been added and removed at different MIDUS waves. HRS collects five items on perceived constraints and five items on perceived mastery at all waves of data. Higher scores on perceived constraints reflect greater perceived obstacles, and higher scores on perceived mastery reflect greater perceived competence. In the current sample, perceived constraints and perceived mastery demonstrated high internal consistency (α 's = 0.85 and 0.90, respectively).

Health, social and financial control

Sense of control is often studied as a global trait that determines how an individual engages with the world. However, researchers have argued that examining domain-specific sources of perceived control increases predictive validity.³⁴ HRS collects domain-specific control variables relating to perceived control over health, social life and finances, thus, this study included these variables as exploratory measures to provide greater depth into sense of control across comparison groups. Participants were asked, 'How would you rate the amount of control you have over your health?', 'How would you rate the amount of control you have over your social life these days?' and, 'How would you rate the amount of control you have over your financial situation these days?' on a scale of 0–10 with 10 indicating very in control.

Military status

Military status was assessed with the question, 'Have you ever served in the active military of the United States?'. This question appears to have been asked only when participants enrolled in HRS, and so was backfilled from surveys between 2002 and 2022. Era status was determined by birth year, as HRS did not explicitly ask whether veterans volunteered or were drafted. Veterans born prior to 1956 were grouped as draft-era veterans, as the final draft was in 1975, making individuals born in 1956 the last eligible members of the draft.³⁵ Individuals born after 1956 were grouped into the all-volunteer veteran group. The draft era was coded as 1, and the all-volunteer era was coded as 0.

Covariates

Participants self-reported demographic characteristics. Sex was coded as female or male, ethnicity as Hispanic or non-Hispanic, and race as Black/African American, White/Caucasian, and

other. Participants could select multiple categories for the race variable. To account for this, we dummy coded each individual race selected by each participant.

Factors hypothesised to be associated with sense of control were included as covariates, including distress about financial strain, health problems and caregiver status. Financial strain was measured by asking participants to rate financial strain and associated distress on a 4-point Likert scale with responses including 'No, did not happen', 'Yes, but not upsetting', 'Yes, somewhat upsetting' and 'Yes, very upsetting'. Participants who indicated they both experienced financial strain and that it was upsetting were coded as experiencing financial strain. Participants rated their health as 'excellent', 'very good', 'good', 'fair', or 'poor'. Participants who rated their health as poor were coded as having health problems. Finally, participants provided how often they cared for a sick or disabled adult. Participants who cared for a sick or disabled adult at least once a week were coded as caregivers.

Military covariates thought to influence sense of control were combat experience and service-related disability. Combat experience was examined by including participants who responded 'yes' to the question 'Did you ever fire a weapon against the enemy or come under enemy fire?'. Previous research has demonstrated that military combat exposures tend to overlap in exposed service members.³⁶ Additionally, firing a weapon was one of the most common exposures for veterans in the period examined.³⁷ Military-related disability was measured by asking participants, 'Do you have a disability connected with military service?' with individuals dummy coded as endorsed vs not.

Analysis plan

Group descriptive statistics were examined using chi-square and t-tests to determine significant differences between veterans and civilians on covariates, as well as between draft-era and all-volunteer-era veterans. T-tests were also used to determine mean differences in scores on sense of control scales, identifying whether there were significant differences in perceived constraints, perceived mastery, and perceived control over health, social life and finances across veterans and civilians, and across draft-era veterans and all-volunteer-era veterans. Given the potential for violations of homogeneity of variance and unequal group size, Satterthwaite degrees of freedom were used.

Multiple regressions were used to determine

associations between military status and draft-era status with perceived constraints, perceived mastery, and perceived control over health, social life and financial situation, controlling for sex, age, race, ethnicity, caregiver status, financial status and health conditions. In the military group analysis, the additional military covariates of combat exposure and service-connected disability were included. Analyses were conducted using R version 4.2.3.³⁸

Results

After filtering for non-response on the leave-behind questionnaire and covariates, the final sample included 6262 participants, with veterans accounting for 11.6% (see Table 1). Civilians were predominantly white, female and significantly younger on average than the veteran group. Veterans were predominantly white, disproportionately male and older than civilians. Veterans additionally had significantly fewer Hispanic individuals and significantly more Black individuals.

Draft-era veterans made up 42.7% of the military sample (see Table 2). Veterans in both groups were predominantly white, male, and non-Hispanic. Demographics between the two eras were mostly not significantly different; however, the draft-era veteran group included fewer women, fewer Black individuals, more combat exposure and, of necessity, were older than the all-volunteer group.

Comparing perceived control between veterans and civilians

Initial t-tests revealed that veterans reported fewer perceived constraints than civilians ($t(958.64) = 2.09, p = 0.03$). There was no significant difference between veterans and civilians in perceived mastery ($t(934.69) = 0.13, p = 0.90$). Additionally, there were no differences between veterans and civilians on perceived control over social life ($t(947.45) = 1.02, p = 0.31$) or finances ($t(932.58) = -0.26, p = 0.80$). There was a significant difference between veterans and civilians on perceived control over health ($t(915.31) = 2.27, p = 0.02$).

Results of a multiple regression analysis indicated that military status was no longer associated with perceived constraints ($b = -0.26, p = 0.25$) when controlling for financial strain, caregiver status, health problems, sex, ethnic identify and racial identify. Complete regression results are included in Table 3. Regarding perceived mastery, multiple regression analysis indicated that military status was not significantly associated with perceived mastery ($b = 0.05, p = 0.83$), controlling for the above

Table 1. Differences between veterans and civilians on measures of control and demographics

Variable		Civilian (n = 5536)	Military/veterans (n = 726)	p
Perceived constraints	M(SD)	10.22(5.61)	9.79(5.22)	<0.04*
Perceived mastery	M(SD)	24.32(5.46)	24.29(5.35)	0.90
Perceived health control	M(SD)	7.52(2.24)	7.32(2.30)	0.02*
Perceived social control	M(SD)	7.90(2.30)	7.81(2.19)	0.31
Perceived financial control	M(SD)	7.62(2.42)	7.64(2.38)	0.80
Age	M(SD)	64.79(6.53)	67.83(7.20)	<0.001***
Ethnicity	Hispanic	16.8%	7.3%	<0.001***
	Non-Hispanic	83.2%	92.7%	
Race	Black	23.2%	31.3%	<0.001***
	Other Race	12.4%	11.0%	
	White	68.1%	63.2%	<0.01**
Gender	Female	63.1%	11.0%	<0.001***
	Male	36.9%	89.0%	

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 2. Differences between draft-era veterans and all-volunteer veterans on measures of control, demographics and military variables

Variable		All-volunteer military/ veterans (n = 416)	Draft-era military/veterans (n=310)	p
Perceived constraints	M(SD)	9.80(5.11)	9.77(5.36)	0.94
Perceived mastery	M(SD)	24.46(5.29)	24.07(5.43)	0.34
Perceived health control	M(SD)	7.31(2.32)	7.33(2.28)	0.95
Perceived social control	M(SD)	7.76(2.25)	7.88(2.10)	0.44
Perceived financial control	M(SD)	7.54(2.42)	7.78(2.32)	0.16
Age	M(SD)	62.92(4.18)	74.43(4.66)	<0.001***
Ethnicity	Hispanic	7.9%	6.5%	0.54
	Non-Hispanic	92.1%	93.5%	
Race	Black	36.1%	24.8%	0.002**
	Other Race	11.3%	10.6%	
	White	58.7%	69.4%	0.004**
Gender	Female	16.6%	3.5%	<0.001***
	Male	83.4%	96.5%	
Combat exposure		17.3%	31.6%	0.001***
Military disability		26.0%	22.6%	0.34

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Table 3. Multiple regression results comparing veterans and civilians on measures of perceived control

Variable	Perceived constraints	Perceived mastery	Perceived health control	Perceived social control	Perceived financial control
	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>
Military vs civilian	-0.26 (.25)	0.05(.83)	-0.09(.28)	-0.04(.67)	0.0003(1.00)
Financial strain	2.74(<.001)***	-1.94(<.001)***	-0.85(<.001)***	-0.66(<.001)***	-1.88(<.001)***
Caregiver status	0.68(.001)***	-0.07(.70)	-0.006(.93)	-0.18(.02)*	-0.11(.16)
Sex	0.16(.28)	-0.20(.16)	-0.20(<.001)***	-0.19(.002)**	-0.16(.009)**
Health problems	3.14(<.001)***	-3.26(<.001)***	-2.04(<.001)***	-1.20(<.001)***	-0.95(<.001)***
Hispanic	1.01(<.001)***	0.68(.001)***	0.46(<.001)***	0.18(.03)*	0.33(<.001)***
Black	-0.07(.66)	0.32(.05)*	0.34(<.001)***	0.50(<.001)***	0.31(<.001)***
Other Race	.60(.005)**	-0.24(.27)	-0.002(.98)	-0.11(.21)	-.24(.008)**

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 4. Multiple regression results comparing draft-era and all-volunteer veterans on measures of perceived control

Variable	Perceived constraints	Perceived mastery	Perceived health control	Perceived social control	Perceived financial control
	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>	<i>b(p)</i>
All-volunteer vs draft-era veterans	0.35(.35)	-0.50(.21)	-0.03(.87)	0.12(.46)	0.18(.30)
Fired weapon in combat	-0.89(.05)*	0.47(.33)	-0.03(.89)	-0.04(.82)	-0.05(.82)
Military-related disability	1.64(<.001)***	-0.73(.13)	-0.14(.49)	-0.33(.09)	0.07(.73)
Financial strain	3.33(<.001)***	-2.28(<.001)***	-1.15(<.001)***	-1.05(<.001)***	-1.92(<.001)***
Caregiver status	1.15(.03)*	-1.45(.01)*	-0.23(.34)	-0.52(.03)*	-0.87(<.001)***
Sex	-0.23(.70)	-0.77(.22)*	-0.11(.69)	-0.32(.22)	-0.08(.77)
Health problems	3.01(<.001)***	-3.29(<.001)***	-1.81(<.001)***	-1.14(<.001)***	-0.15(.003)**
Hispanic	-0.95(.21)	-0.06(.94)	0.88(.01)**	0.27(.41)	0.39(.25)
Black	-1.01(.01)*	-0.95(.03)*	0.37(.04)	0.47(.007)**	0.62(.001)**
Other race	-0.21(.74)	-0.14(.83)	0.04(.90)	0.24(.38)	0.38(.18)

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

covariates. Similarly, perceived control over health ($b = -0.09$, $p = 0.28$), social life ($b = -0.04$, $p = 0.67$) and finances ($b = 0.0003$, $p = 1.00$) were nonsignificant after controlling for the same covariates.

Comparing perceived control between the draft and all volunteer eras

T-tests revealed no significant differences between draft-era veterans and the all-volunteer veterans across perceived constraints ($t(648.14) = 0.08$, $p = 0.94$), perceived mastery ($t(656.59) = 0.96$, $p = 0.34$), perceived control over health ($t(671.44) = -0.06$, $p = 0.95$), social life ($t(689.08) = -0.78$, $p = 0.44$) and finances ($t(681.23) = -1.40$, $p = 0.16$). Multiple regression analyses were conducted controlling for firing a weapon, military disability, financial strain, caregiver status, health problems, sex, ethnic identify and racial identify. Controlling for these covariates, there was no significant association between military eras on perceived constraints ($b = 0.35$, $p = 0.35$), perceived mastery ($b = -0.50$, $p = 0.21$), perceived control over health ($b = -0.03$, $p = 0.87$), social life ($b = .12$, $p = .46$), and finances ($b = 0.18$, $p = 0.30$). Covariates were examined, finding that having a military-related disability was associated with greater perceived constraints ($b = 1.64$, $p < 0.001$), whereas combat was not significantly associated with perceived constraints ($b = -0.89$, $p = 0.05$). Complete results from these regressions are in Table 4.

Discussion

The current study examined sense of control using the HRS dataset with the constructs of perceived constraints and perceived mastery, as well as domain-specific sense of control over health, finances and social life. The current study found that older veterans and civilians differed initially, with veterans reporting fewer perceived constraints. There was a significant difference in perceived control over health between veterans and civilians, but no significant differences in perceived mastery, control over finances or social life between the two groups. After controlling for relevant demographic differences, perceived constraints and perceived control over health were no longer significant between veterans and civilians.

Draft-era and volunteer-era veterans were also compared on sense of control. There were no significant differences between draft-era and volunteer-era veterans in perceived constraints, perceived mastery, or perceived control over health, social life or finances. This finding was confirmed when controlling for relevant demographic differences and military-specific variables. However,

when examining covariates, service-related disability was associated with greater perceived constraints, while combat exposure was not associated with perceived constraints. This indicates that while there were no group differences across service eras, certain aspects of military service may impact sense of control in different ways.

Our first hypothesis proposed that the relinquished control required by military service may lead to an increase in perceived constraints was not supported. Sampling characteristics may partially explain why no differences were found. Various studies have examined attrition rates and characteristics of participants willing to engage in longitudinal studies. Particularly relevant to this study, individuals with more significant health difficulties, unemployment, less education, lower socioeconomic status and drug abuse are associated with greater attrition rates, while things like altruism and perceived study value increase participation in longitudinal studies.^{39,40} As several of these factors are likely associated with a reduced sense of control, the findings of this study may be limited to individuals with a higher sense of control. However, Veterans are at greater risk of worsened health, substance use and homelessness than the civilian population.⁴¹⁻⁴⁴ These outcomes indicate the need for further study of sense of control among difficult to reach military populations. This need is further supported by the finding that service-connected disability was associated with greater perceived constraints.

Surprisingly, combat exposure was not significantly associated with perceived constraints, given that combat exposure is associated with PTSD and a loss of perceived control.⁴⁵ HRS did not collect data on PTSD; given the role of combat exposure in developing PTSD, it was assumed that combat exposure would lead to greater perceived constraints. This may be attributed to the sampling characteristics examined previously, as individuals with significant PTSD may be less likely to engage in a longitudinal study. However, it may also reflect some strengths associated with military service, as, while not significant, the directionality of scores trended towards fewer perceived constraints with combat exposure.

Prior studies have examined the role of combat on coping strategies, with findings indicating that while combat was associated with negative outcomes such as misery and disruption to life, certain military variables mitigated these outcomes. As such, the majority of combat veterans reported developing skills such as increased competence, discipline, a greater value placed on life, and the ability to cope with

adversity.^{46,47} Our hypothesis that veterans might show greater perceived mastery than civilians due to their military training was not supported. However, recent literature has found that veterans reported that military training prepared them for aspects of active-duty life but did not help with the transition to civilian life⁴⁸. This suggests that their sense of mastery may have been domain specific rather than global, and that the measure of perceived mastery in this study may not have captured coping skills for navigating the challenges of combat. This may help explain why, while no significant differences were found between veterans and civilians, combat exposure was not significantly associated with sense of control in this sample.

These findings may reflect two additional concepts. First, it is possible that as service members leave the military environment, the control relinquished during military service is reduced, thus more closely approximating that of civilians. Second, public support and access to VA resources may serve as a protective factor against perceived constraints. Global and national studies have demonstrated that public support for veterans in the US is currently at an all-time high, with citizens more likely to rate veterans as heroes and to endorse government spending on veteran support services.^{49,50} Perception of veteran support has been associated with positive outcomes, including reduced depression, increased self-efficacy and increased life satisfaction. Thus, public support may function to serve as a buffer against perceived constraints in military populations.⁵¹

Strengths, limitations and future directions

As sense of control is a multidimensional construct, our study may have excluded some factors associated with it that may differ between civilian and veteran populations. However, prior research has demonstrated that perceived constraints and perceived mastery reflect the two primary constructs associated with sense of control—contingency and mastery—indicating that our study captures key elements of sense of control.^{17,32,33}

Generalisability to the overall veteran population may be limited, as our sample included only veterans eligible for HRS and contained limited measures of military experience. As discussed previously, the sampling characteristics of participants in longitudinal studies limit the findings of this study, as it likely did not adequately capture veterans or civilians with the poorest life outcomes, and may not have adequately captured veterans from the OIF/OEF eras due to the focus on older age groups.

Measurement of military variables in this study, such as service era and combat exposure have some limitations in scope. Regarding the service era, individuals who served in the draft era are still likely to have not been drafted, although they would have been likely to serve with drafted personnel. Differences may still exist based on the method of military accession. The measure of combat available only examines a single type of exposure that does not capture the range of potentially dramatic exposures that occur in combat. Therefore, some individuals may be incorrectly classified as not having combat exposure. However, military combat exposures tend to co-occur such that shorter measures of combat often identify the same individuals as more extensive measures.³⁶ Finally, our study was cross-sectional in design rather than longitudinal. A sense of control has been shown to decline later in life due to compounding life stressors.¹ Future studies may benefit from examining whether veteran status predicts differential rates of change in perceived control through aging.

HRS is not a veteran-specific study, and, as such, does not collect extensive data on military-specific variables, which may be necessary for a closer examination of factors affecting sense of control in this population. However, HRS has some particular strengths, including a large number of veterans and the inclusion of combat exposure and service-related disabilities. Therefore, we were able to examine some key aspects of military service related to the sense of control. Additionally, HRS is representative of the general aging population in the US, thus increasing the generalisability of findings across demographically similar individuals.

The findings of this study demonstrated that service-connected disability was associated with greater perceived constraints. As veterans report poorer health than civilians, future studies may want to examine the relationship between specific health conditions and their impact on sense of control in veteran populations. Specifically, health data from HRS have previously been studied in civilian populations, finding that increased sense of control over time was associated with a lower risk of stroke, lung disease, physical limitations, cognitive impairment and chronic pain, and participants endorsed better self-rated health⁵². Examining these conditions in relation to service-connected disability may provide further clarification on the role of sense of control in this population.

Conclusion

This study examined how military service affects the sense of control in aging populations. Results indicated that veteran status did not predict significant differences in sense of control, even after controlling for relevant demographic, health and financial variables. Additionally, service era was not associated with differences in sense of control; however, when controlling for service-related variables, service-related disability was associated with greater perceived constraints, indicating that certain military-related variables may play some role in sense of control. Given the unique factors associated with military service, understanding its nuances is particularly important among older adults, as several military-related factors have been shown to appear later in life.³⁰ Specifically, service-connected physical health conditions and both positive and negative mental health outcomes

associated with prior military service may emerge or intensify later in life.^{30,53,54} This study provides context for the role of military service in sense of control, demonstrates that veteran status does not appear to have a detrimental effect on sense of control above that of civilians, and highlights the need for further research on veteran sense of control.

Acknowledgements

We want to thank the researchers at the Health and Retirement Study for their efforts in collecting and making this data available.

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Self-Compassion and More: A Newer Psycho-Spiritual Framework in Support of Veterans

P Devenish-Meares

Abstract

Veterans are frequently exposed to chronic stress, trauma, moral injury and psychosocial risks that extend long beyond service. Traditional wellbeing interventions can overlook the spiritual and existential aspects of suffering. This study responds to a need for integrated pastoral innovations that strengthen veteran self-care and recovery by identifying psycho-spiritual mechanisms that complement self-compassion. While self-compassion is a recognised buffer for stress, evidence shows its effects are inconsistent when used alone, with chaplains frequently observing deeper needs related to meaning, identity repair and compassionate boundary-setting.

A Critical Interpretive Synthesis (CIS), supported by heuristic inquiry and bricolage, was used to integrate literature from pastoral care, positive psychology, spirituality, and workplace wellbeing within a biopsychosocial-spiritual (BPSS) framework. Findings suggest that self-compassion is enhanced when paired with humility, which is accurate, non-judgemental self-awareness and psycho-spiritual detachment, a tender, meaning-oriented 'stepping back' from rumination and self-criticism. These mechanisms appear to support healing, moral repair, emotion regulation and self-care. Chaplains can support these mechanisms through relational presence, narrative repair, ritual, reflective practices and collaboration with psychology. A conceptual pastoral framework and brief pastoral practice guide are presented to help embed inclusive spirituality, reflective practices, chaplaincy access and compassion-based initiatives into veteran support systems and organisational wellbeing frameworks.

Keywords: self-compassion, veteran stress, humility, psycho-spiritual detachment, chaplaincy

Introduction

Many military veterans and similarly, police and emergency service veterans, live with persistent stressors that do not end with discharge. Combat exposure, morally complex decisions, and the deaths of comrades are linked to long-term PTSD¹, depression, suicidality and moral injury. When purpose, hope and spiritual frameworks become sources of guilt or collapse entirely, distress often intensifies.¹ Conversely, positive spiritual coping and renewed meaning can buffer psychological strain and promote healing and recovery.

Many veterans, therefore, seek integrated psycho-spiritual care that combines mental health treatment with chaplaincy. Evidence shows high

veteran engagement with chaplains for mental health concerns, but collaboration with clinicians often remains fragmented despite clear demand.² Contemporary approaches increasingly recommend bio-psycho-social-spiritual (BPSS) models that embed chaplains within trauma and moral injury care pathways.

Veterans frequently report loss of meaning, hopelessness and identity disorientation, strongly related to PTSD symptoms, suicide risk and moral injury. These challenges are not only psychological but existential. Chaplains play a crucial role by offering relational, spiritually attuned presence, facilitating meaning-making, supporting rituals and linking veterans with appropriate services.

1 Post-traumatic stress disorder (PTSD) is a psychiatric condition that may develop following exposure to actual or threatened death, serious injury or sexual violence. It is characterised by four symptom clusters: intrusion (e.g., flashbacks, nightmares), avoidance of trauma-related stimuli, negative alterations in cognition and mood, and marked alterations in arousal and reactivity. Diagnosis requires symptom persistence beyond one month with significant functional impairment.

Context: The Biopsychosocial-Spiritual (BPSS) framework

Pastoral carers and chaplains work alongside clinical, psychological and social supports to address the full spectrum of veteran wellbeing. When individuals engage in negative self-talk or harsh inner criticism, they often experience spiritual degradation, loss of purpose and weakened hope. However, historically, many care frameworks have omitted religious or spiritual components, prompting the development of the BPSS framework to ensure spirituality and meaning-making are included.³ As Layson notes, models of moral distress such as moral injury and perceived injustice are best understood within a broader anthropological category of “moral suffering,” which the BPSS framework addresses by restoring spiritual and existential elements often neglected in organisational responses.²

Recent evidence suggests that work practices integrating psycho-spiritual and compassionate dimensions play a protective role in high-risk occupations. Martins, Palmeira and Matos demonstrate that spiritually informed practices can buffer the effects of stress. At the same time, Goff et al. found that organisational support for religion and spirituality reduced burnout even after controlling for personal religiosity and workplace support.^{5,6} These findings show that spirituality broadly defined contributes to resilience and psychological health.

Although chaplains offer confidential, relational, spiritually grounded care to those experiencing betrayal, which complements clinical services, research remains limited and sometimes methodologically fragmented.⁷ Chaplains often teach reflective practices such as mindfulness, self-kindness and perspective-taking. These practices align closely with the BPSS model because they recognise the interplay of psychological, relational and spiritual factors in recovery.

Self-compassion

Self-compassion is an important construct in veteran care, especially for individuals living with trauma-related guilt, stress, shame or moral conflict. Grounded in three components: self-kindness, common humanity and mindfulness.⁸ However, research consistently shows that self-compassion alone may not be sufficient. Its conceptualisation varies across studies, sometimes as a trait, sometimes as a skill, leading to mixed results.⁹

Research with veterans shows significant individual differences in responses to self-compassion practices,

implying that other mechanisms influence outcomes. This supports the view that self-compassion is most effective when complemented by additional psycho-spiritual resources, a key premise of this study.

Aims and research question

Scholars increasingly emphasise the need to integrate spiritual and moral domains into biopsychosocial care.¹⁰ Military chaplains are often a first, a trusted contact for members experiencing shame, guilt, negative self-talk or meaning disruption.¹¹ Emerging models show that spiritually integrated approaches to moral injury, combining chaplaincy with meaning-making, forgiveness and values repair, complement clinical treatment rather than duplicate it.¹²

The premise of this study is that self-compassion, while valuable, may be strengthened when paired with other psycho-spiritual mechanisms. The aim is to search for and synthesise such mechanisms, particularly those that support meaning-making, relational repair and emotional regulation. Findings may extend beyond military contexts to other trauma-exposed workplaces.

Research question

Noting that self-compassion fosters healing and resilience in veterans exposed to stress and moral injury, a key question is: what additional self-care choices could complement self-compassion, given the subjective and relational nature of pastoral care?

Method

The study adopts a Critical Interpretive Synthesis (CIS) approach. This is a theory-generating, interpretive method well suited to pastoral care's psycho-spiritual, relational and moral dimensions. It resists narrow quantification.¹³ CIS enables iterative searching, appraisal and synthesis across diverse literatures while acknowledging disciplinary biases. The researcher plays an active interpretive role, reflecting the intuitive, experiential nature of pastoral practice.

Spirituality in this paper is defined broadly as ‘lifestyles and practices that embody a vision of human existence and how the human spirit achieves its potential’.¹⁴ This definition aligns with contemporary chaplaincy, where pastoral care addresses identity, belonging and meaning within psychological distress.

The CIS process involved systematic searches, critical appraisal of conceptual contributions, and development of thematic constructs. Heuristic and

bricolage perspectives were incorporated to reflect the adaptive, interdisciplinary nature of psycho-spiritual care.^{15,16} Bricolage is relevant because pastoral carers routinely draw as many themes, mechanisms and disciplines as necessary in response to need.

To enhance the credibility, transparency and conceptual rigour of the synthesis, where possible, the analysis incorporated *negative case analysis*, a systematic strategy for identifying evidence that contradicts, complicates or challenges emergent interpretations. Rooted in traditions of qualitative rigour, this approach intentionally seeks studies, themes or data segments that deviate from dominant patterns, thereby testing the stability, scope and explanatory power of developing constructs. Within a Critical Interpretive Synthesis (CIS), negative case searching plays a crucial role in refining theoretical propositions by revealing potential over generalisations, exposing conceptual tensions and promoting deeper integrative thinking.¹³ Likewise, heuristic and bricolage-informed methodologies emphasise the importance of attending to disconfirming evidence as part of disciplined reflexivity, helping prevent premature closure around preferred interpretations.¹⁶

In this study, negative case analysis was applied iteratively: as themes such as self-compassion, humility or psycho-spiritual detachment consistently appeared to be supported, the review process deliberately sought empirical or conceptual counterexamples, including critiques of the Self-Compassion Scale, limitations of detachment and challenges to spirituality-based interventions. This procedure strengthened analytical depth, clarified the boundaries of applicability, and contributed to a more nuanced and trustworthy synthesis.

Literature review

This intuitive literature search focuses on veterans' self-care and pastoral-chaplaincy practices that complement self-compassion and address the inner life. It also co-opts material from related disciplines. A key starting point is Litz et al.'s foundational work on moral injury, demonstrating how morally injurious events disrupt moral identity, purpose and meaning.¹⁷ Such events often produce guilt, shame, spiritual distress and long-term psychosocial impairment. Veterans may also experience spiritual/religious struggles that paradoxically coexist with renewed faith or increased prayer as protective strategies.¹⁸

Self-compassion, which includes self-kindness, common humanity and mindful acceptance, is

recognised as psychologically and spiritually grounded, supporting recovery from stress and trauma. Originating in contemplative traditions, self-compassion counters harsh self-criticism and guilt commonly found in trauma-exposed professions.⁸ Yet self-compassion sits within a broader field of workplace spirituality and meaning.

Work-related spirituality and meaning

Evidence shows that work-related spirituality reduces affective rumination and encourages constructive problem-solving.¹⁹ Emergency nurses and paramedics who use positive spiritual coping strategies report lower occupational stress, suggesting spirituality's potential to serve as an emotional regulator in high-pressure roles.²⁰ These studies affirm the value of meaning-oriented coping, yet they did not examine self-compassion.

Compassion-based interventions

Growing attention has been given to compassion-based interventions (CBIs) as methods to reduce stress and enhance wellbeing. It was found that CBIs promoting compassion, self-compassion and mindful reflection significantly lowered stress and improved emotional wellbeing across occupational groups.⁵ Then other research demonstrated that brief workplace compassion-focused training reduced perceived stress and burnout while increasing self-compassion and work engagement.²¹

While some studies report only modest reductions in depression or variability in outcomes, CBIs generally support employees' emotional regulation and meaning-making.⁵ Organisational support and psychological safety are key moderators.²² Research also shows that loving-kindness and compassion meditation support workplace wellbeing.²³ These suggest that compassion practices can be spiritual, psychological and organisationally influenced.

Self-compassion and its limitations

Evidence shows that self-compassion buffers the adverse effects of poor psychological detachment, reducing emotional exhaustion and depressive symptoms.²⁴ Therefore, self-compassion has become an increasingly important aspect of veteran care, especially for individuals living with trauma-related guilt, shame or moral conflict. It is centred around three components: self-kindness, common humanity and mindfulness.⁸

Self-compassion helps veterans relate to their suffering with warmth rather than harsh judgement. Studies show that higher levels of self-compassion

predict fewer PTSD symptoms and support more stable recovery trajectories, even when combat exposure is high.²⁵ These findings highlight the central role of how veterans relate internally to their distress.

However, research consistently shows that self-compassion alone may not be sufficient. Its conceptualisation varies across studies, sometimes as a trait, sometimes as a skill, leading to mixed results.⁹ Some interventions show modest or no greater impact than general reflective writing, suggesting that broader psycho-spiritual or reflective processes may be responsible for improvements.²⁶ Questions have also been raised about the psychometric clarity of the Self-Compassion Scale, which may conflate self-criticism with low self-compassion.²⁷

Further, physiological research with veterans shows significant individual differences in responses to self-compassion practices, implying that other mechanisms influence outcomes. This supports the view that self-compassion is most effective when complemented by additional psycho-spiritual resources: a key premise of this study.

Self-compassion training reduces burnout, with some studies showing benefits for deeper trauma, though results vary and other factors appear influential.²⁸ Detachment itself is not always effective, especially when positive moods or meaning-oriented reflections are more appropriate.²⁹ This suggests that self-compassion and psychological detachment, while useful, are insufficient by themselves.

Role identity also shapes outcomes. Individuals with strong callings (clergy, chaplains, health professionals, military personnel) often struggle to detach from work, experiencing ongoing responsibility beyond the shift.³⁰ Even though detachment is generally beneficial, meta-analytic evidence shows that job characteristics and personal values shape its effects.³¹

Self-compassion moderates emotional exhaustion, but multidimensional approaches can offer more durable protection.²⁴ For chaplains, self-compassion relates to positive psychology and appears protective in moral injury recovery by promoting kindness and acceptance in the face of distressing events.³² It also counteracts shame and guilt in moral injury.

Longitudinal studies further show that self-compassion supports adjustment, emotional functioning and quality of life. An 8-week Mindful Self-Compassion program for morally injured veterans yielded reductions in PTSD symptoms, shame and distress, alongside increases in self-

compassion.³³ Similarly, integrating Acceptance and Commitment Therapy (ACT) with self-compassion helps strengthen psychological flexibility while ensuring self-kindness.^{8,34}

Negative case analysis: self-compassion

While self-compassion is widely associated with improved wellbeing and reduced stress in workplace settings, negative case analysis highlighted several studies that complicate this narrative. Some evidence suggests that self-compassion may not uniformly benefit all workers; in certain contexts, it can blur with self-criticism or fail to buffer stress as strongly as proposed.⁹ Other research indicates, not surprisingly, that self-kindness alone has a positive effect, suggesting that the ways the three aspects of self-compassion work as a construct need closer examination.³⁵

Research also shows that self-compassion does not necessarily improve problem-solving, nor does it consistently outperform other mechanisms such as meaning-making or reflection.^{36,37} Psychometric critiques argue that the Self-Compassion Scale may blur distinctions between self-compassion and self-criticism.^{35,38} Understanding the research immediately above enables a more nuanced understanding of self-compassion's effect and operations, or lack thereof on occasions, emphasising that its impact may vary by other factors, including individual personality factors and the presence of complementary supports, such as meaning-making or humility practices. Overall, however, evidence supports self-compassion as valuable but incomplete unless paired with other reflective, spiritual or relational mechanisms.

Other mechanisms: meaning-making, reflection, forgiveness

Meaning-making emerges as a consistent buffer for stress and moderates the relation between work stress and life meaning.³⁹ Jnaneswar and Sulphrey demonstrated that workplace spirituality, mindfulness, and self-compassion jointly predict mental wellbeing, indicating that combinations of responses, rather than single strategies, are most effective.⁴⁰ Other research similarly found that self-compassion and reflection reduce psychological distress.⁴¹ Forgiveness also reduces stress by processing anger and resentment, fostering emotional healing.⁴² Spiritual practices such as empathy, prayer and positive self-talk support forgiveness, especially among religious or spiritually oriented individuals.⁴³

Recovery skills that incorporate meaning-making, detachment, gratitude and positive rumination

show associations with lower distress.⁴⁴ Positive or constructive rumination can also have purposeful outcomes.⁴⁵

Reflection has further relevance. Mamede and Schmidt identified five elements of reflective practice: deliberate induction, deduction, synthesis, openness to reflection and meta-reasoning.⁴⁶ These processes promote thoughtful responses under stress and may reduce cognitive load in complex situations. New pastoral frameworks, therefore, need to support reflective practices, updated thinking and balanced responses to distress.⁴⁷

Converging themes

The literature suggests that the limitations of self-compassion in isolation call for additional, personal and psycho-spiritual self-care choices. Two mechanisms emerge strongly: *humility and psycho-spiritual detachment*. Both relate to accurate self-view, self-kindness, reduced harsh self-talk and sustained meaning-making. Together with self-compassion, they offer integrated pathways to coping, identity repair and reduced burnout.

Discussion

Research shows that meaning-making and inner spiritual work can support stress reduction and modest improvements in PTSD symptoms among veterans. It was demonstrated that post-deployment meaning-making, asking 'Who am I now?' and 'How do I live a good life?', influences whether moral and spiritual injuries remain sources of distress or become integrated into a coherent life narrative.⁴⁸ This meaning-making functions as an existential 'stepping back', enabling veterans to observe traumatic experiences with greater psychological spaciousness.

Structured interventions likewise reveal the significance of meaning. For example, a *Search for Meaning* group, an eight-session spiritually based program, produced statistically significant reductions in PTSD symptoms, spiritual injury, and negative religious coping among veterans, indicating that guided work on purpose and belief systems can reduce suffering and enhance emotional regulation.⁴⁹

Similarly, it was found that veterans' treatment outcomes were shaped by religiosity, spirituality and especially a sense of purpose.⁵⁰ These findings show that meaning-making acts both as a buffer and a form of psycho-spiritual grounding, helping veterans live alongside trauma without being continually

overwhelmed. Taken together, the literature suggests that psycho-spiritual detachment in veterans often works *through* meaning: establishing a stable narrative or purpose that allows trauma to be held rather than avoided.

Psycho-spiritual detachment

In the context of workplace stress, psycho-spiritual detachment—also called meaningful or spiritual detachment—is defined as a gentle, self-caring process of 'letting go' of unhelpful rumination, inner criticism and persistent stress-related emotions.⁵¹ It reflects a spiritually grounded form of non-attachment that enables individuals to step back from moral pain and evaluate experiences with compassion and perspective.

Emerging research on moral injury shows that spiritually informed practices, including confession, forgiveness rituals and spiritual surrender, can reduce guilt, shame and PTSD symptoms in military populations.^{52,53} These practices often engage the same reflective, meaning-oriented stance central to psycho-spiritual detachment.

Psychological detachment itself involves non-judgemental awareness of one's inner experience⁵¹ and aligns with mindfulness-based coping.⁸ Unlike emotional withdrawal, psycho-spiritual detachment is tender, self-protective, and relational, creating space for inner quietness, reflection and emotional integration. It complements self-compassion by reducing over-identification with distress and encouraging kinder, more balanced self-observation.

Validated measures such as the Recovery Experience Questionnaire²⁹ and detachment indices can assist assessment, though spiritual aspects often require heuristic interpretation.⁵⁴

Psycho-spiritual detachment is therefore not passive disengagement. It combines the following, which make it relevant for veterans processing moral injury, cumulative stress, and identity disruption:

- inner spaciousness
- perspective-taking
- reduced rumination
- emotional openness
- acceptance of imperfection.

These features make it highly relevant for veterans processing moral injury, cumulative stress and identity disruption.

Humility

Humility is defined as accurate self-awareness, openness and a non-dominating presence; these qualities emerge as another key complementary mechanism. Humility supports self-kindness by encouraging individuals to acknowledge limitations without shame and to extend compassion to themselves during adversity.⁵⁵

Evidence is growing that humility protects against emotional disturbance in trauma-exposed populations. Veterans with higher humility-related traits report fewer post-traumatic reactions and reduced emotional volatility.^{56,57} In the moral injury literature, humility-related processes such as forgiveness, self-forgiveness and the acknowledgment of limits are frequently presented as conditions for recovery. Veterans often describe forgiveness as 'opening a door', signalling reduced guilt and reconnection with self and community.²⁰

Humility also fosters psychological safety, essential for team cohesion, help-seeking and compassionate communication.^{58,59} However, this has not been studied much with veterans. Irrespective, others highlight that humility promotes adaptability, emotional regulation and openness to new perspectives.⁶⁰ The strongest benefits of humility are relational, expressed through altruism, empathy, forgiveness, cooperation and self-control.

Humility can be modelled and taught. Research shows that leader-expressed humility reduces stigma and encourages help-seeking.^{61,63} The Comprehensive Intellectual Humility Scale⁵⁷ provides a validated measure of this virtue.

Importantly, humility is **not** self-abasement. It is a realistic acceptance of one's strengths and limitations that supports non-judgemental self-view and reduces harsh self-criticism—making it a natural complement to self-compassion. When combined with psycho-spiritual detachment, humility helps individuals maintain boundaries, reduce rumination and approach suffering with tenderness and clarity rather than defensiveness.

The three complementary mechanisms

Across the literature, three themes appear to relate to meaningful self-care, to one another and even overlap. These are as follows and illustrated below in Figure 1:

Self-compassion: warm, mindful, non-judgemental self-awareness

Psycho-spiritual detachment: tender, meaning-oriented emotional stepping back

Humility: accurate self-view, openness and acceptance of imperfection

Figure 1: Overlapping self-care themes/choices in support of meaningful self-care



Together, they support the following and form the conceptual basis for the framework developed later in the manuscript:

- reduced self-criticism
- improved emotional regulation
- healthier boundaries
- moral and spiritual repair
- resilience in high-stress contexts.

Chaplaincy and organisational context

Chaplains play an important role in supporting self-care actions through pastoral presence, helping individuals step back meaningfully from distress and cultivate accurate, compassionate self-views. They often triage moral and emotional concerns, assist veterans in reconnecting with meaning, and foster tender detachment from trauma through spiritually informed practices such as deep listening, values clarification, ritual, lament and reflection.⁶⁴ Chaplains help restore boundaries, dignity and emotional clarity while activating referrals to clinical, psychological and peer supports when required.

This relational, spiritually attuned presence complements psychological care. Chaplains often work at the interface of ethics, identity, purpose and trauma domains central to moral injury. By helping individuals narrate, process and situate difficult experiences within broader value and belief systems,

chaplains facilitate important shifts in trust, self-compassion and moral orientation.

Organisational factors and psychosocial safety

Chaplaincy most often operates within organisational contexts, for example, Veterans Administration, which are shaped by psychosocial safety, leadership behaviours, workload demands and support structures. These factors influence both wellbeing and the effectiveness of pastoral care.⁶⁵ In this environment, chaplains frequently co-work with psychologists, peer support officers, health staff and leaders, contributing to workplace culture, moral repair and psychological safety.

Contemporary models of pastoral innovation emphasise integration with organisational wellbeing strategies, particularly those aligned with ISO 45003 psychosocial risk frameworks. Compassion-based training, reflective practices and spirituality-informed initiatives can be embedded as proactive risk controls rather than optional add-ons.^{42,66} When such supports are legitimised in policy and culture, they promote emotional regulation, purpose, connection and trust.

Arguably, compassion is not merely a personal virtue but an organisational capability.⁵ When leaders model compassion, and when workplaces normalise reflective practices and access to chaplaincy, employees experience deeper support, better recovery and improved relational climates. Spirituality, wellbeing initiatives and meaning-making become embedded in organisational life rather than peripheral.

This aligns with the BPSS framework, which views organisational, relational and individual wellbeing are interconnected. From a pastoral perspective, humility, tender detachment and self-compassion become not only personal mechanisms but cultural resources that strengthen collective resilience.

Transition to conceptual framework

Drawing on the CIS synthesis, three complementary self-care mechanisms are self-compassion, humility and psycho-spiritual detachment, emerged as central pathways to supporting veterans experiencing moral injury, trauma and chronic stress. These mechanisms work best when supported by chaplaincy practices that include narrative repair, meaning-making and spiritually grounded reflection. Together, they are also encapsulated in a conceptual framework illustrated below. It shows how these three mechanisms operate at:

- **individual** levels (inner emotional regulation, reduced self-criticism, meaning reconstruction)
- **relational** levels (trust, connection, psychological safety)
- **organisational** levels (culture, leadership, psychosocial systems).

New conceptual framework

The conceptual map integrates the complementary mechanisms with chaplaincy practices and potential outcomes, forming the foundation for the pastoral practice guide. Using the biopsychosocial-spiritual (BPSS) lens, the CIS synthesis identified three interconnected psycho-spiritual self-care mechanisms: *self-compassion*, *meaningful (psycho-spiritual) detachment* and *humility*, as particularly salient in supporting veterans experiencing moral injury, trauma and prolonged stress. These mechanisms complement each other and collectively enhance psychological safety, meaning, self-care and relational trust.

1. Self-compassion

Self-compassion provides non-judgemental, emotionally balanced awareness of suffering. It helps counteract harsh self-talk, shame and guilt—common responses to moral injury—and encourages practical self-care choices grounded in kindness and shared humanity.⁶⁷ In pastoral care contexts, self-compassion is integral to how individuals process trauma and re-engage with values.

2. Psycho-spiritual detachment

Psycho-spiritual detachment (or meaningful detachment) offers veterans a gentle, reflective ‘stepping back’ from distressing thoughts and emotions. It reduces over-identification with trauma, softens negative rumination and encourages spacious emotional processing.⁴⁸ Detachment functions as a stabilising, meaning-oriented mechanism that restores perspective, supports spiritual grounding and allows values-based reorientation.

3. Humility

Humility enables accurate self-assessment and the acceptance of human limitations, countering perfectionism and self-condemnation—factors often heightened in moral injury and trauma. Humility fosters compassion, psychological safety and relational trust.^{52,55} It supports emotional regulation, openness and willingness to seek help, making it a powerful complement to self-compassion.

Pastoral Action Concept Map

The Pastoral Action Concept Map below in Figure 2 illustrates the relationship between self-compassion, meaningful detachment and humility, even to the extent that they can overlap:

- **Self-compassion** provides warmth and non-judgemental awareness
- **Detachment** creates emotional space to observe suffering without becoming overwhelmed
- **Humility** grounds the process with realism, acceptance and relational openness
- Together, they form a **model** of spiritually grounded self-care:
- **Emotional regulation** (reducing rumination and harsh self-talk)
- **Identity and moral repair** (reframing beliefs, restoring dignity, reconnecting with values)
- **Boundaries and resilience** (establishing kinder internal dialogue, facilitating rest, reducing overload)
- **Psychosocial safety and connection** (fostering trust in teams, leaders and carers)

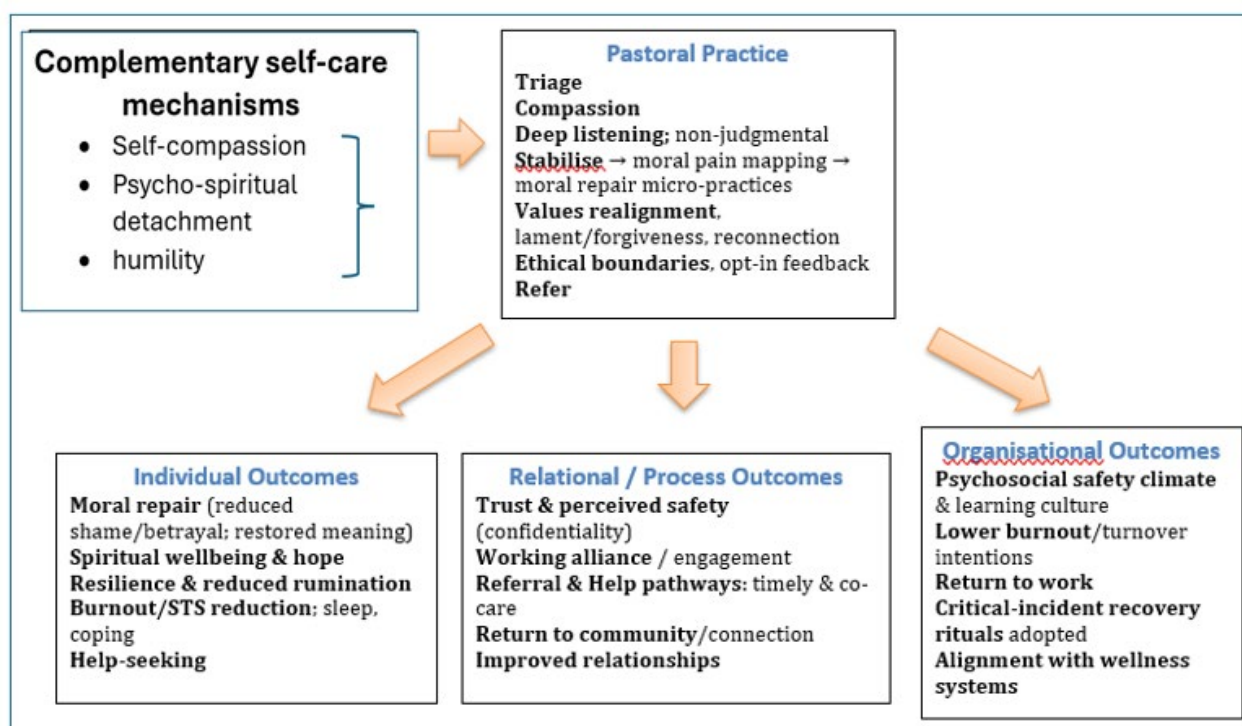
This model shows how pastoral care becomes a strategic element of veteran self-care and resilience.

They are enablers, not merely a supportive resource but a core component of veteran wellbeing systems. These enablers prepare individuals for deeper emotional processing, boundary-setting, moral repair and sustained wellbeing.

It is important to acknowledge that the *Pastoral Action Concept Map* and (brief) *Pragmatic Playbook* proposed in this paper remain theoretical in their current form. Rather than presenting a validated clinical protocol, this paper offers a conceptual framework intended to synthesise existing evidence and translate it into a coherent pathway for veteran care. As such, it is offered as a starting point for dialogue rather than a prescriptive model. The authors therefore invite practitioner feedback, from clinicians, chaplains, mental health professionals and veterans themselves, as an essential next step in refining and contextualising this framework for real-world implementation. Such feedback will be critical in identifying practical barriers, cultural considerations and setting-specific adaptations that no theoretical model can fully anticipate in advance.

Chaplains are well positioned to activate and support these processes either with or without the map, through relational presence, value reflection, narrative repair, ritual, forgiveness work and integrated referral pathways.

Figure 2: Pastoral Action Concept Map: self-care enablers, practices and outcomes



A. Self-care enablers

- Self-compassion
- Meaningful/psycho-spiritual detachment
- Humility
- Reflective practice (meta-reasoning, narrative review)
- Spiritual awareness and values alignment.

B. Pastoral practices

- Pastoral and chaplaincy practices that activate and support these enablers include:
- deep, compassionate listening
- narrative repair and reflective dialogue
- rituals of lament, forgiveness and purpose
- meaning-making conversations
- boundary support and detachment cues
- referrals to psychological or medical care when indicated
- confidential relational presence
- psycho-spiritual education (values clarification, self-kindness, tender detachment).
- Pastoral practices link the enablers to concrete behavioural and emotional shifts.

C. Individual outcomes

Examples include:

- reduced rumination
- improved emotional regulation
- enhanced meaning and identity coherence
- reduced guilt and shame
- greater self-kindness
- improved capacity to rest, detach and set boundaries
- D. Relational outcomes
- Renewed trust
- Improved communication
- Reduced stigma
- Increased help-seeking
- Reconnection with partners, colleagues or community.
- E. Organisational outcomes
- Enhanced psychosocial safety climate
- Stronger team cohesion and moral alignment
- Reduced burnout and compassion fatigue
- Improved wellbeing KPIs

- More integrated care pathways (psychology, chaplaincy, leadership).

Limitations

This synthesis is shaped by the interpretive nature of Critical Interpretive Synthesis (CIS), which involves researcher judgement and therefore carries risks of subjectivity and reflexivity bias. While such interpretive methods are appropriate for spiritual, relational and moral domains that resist reductionist measurement, the flexibility of CIS also limits replicability compared to traditional systematic reviews. The scarcity of contemporary chaplaincy research on self-compassion, humility and psycho-spiritual detachment further constrains the available evidence for integration—a limitation reflective of the field itself.

Many studies in the reviewed literature rely on cross-sectional or qualitative designs, limiting the capacity to infer causality. Heuristic and bricolage approaches enrich understanding but contribute additional subjectivity.¹⁵ Longitudinal evaluations of chaplaincy impact, particularly across deployments or entire careers, remain limited. There is also relatively little research examining how humility, detachment and self-compassion interact synergistically in workplace or military contexts.

While the findings offer promising conceptual insights, they require empirical testing to validate the proposed relationships among self-compassion, humility, psycho-spiritual detachment and chaplaincy practice.

Future research

Significant gaps exist in chaplaincy research and occupational wellbeing regarding psycho-spiritual self-care.⁶⁸ Future studies should adopt mixed-methods designs that integrate qualitative insights with quantitative indicators, using outcome tools (e.g., moral injury scales, spiritual wellbeing measures, burnout indices) alongside narrative journals, reflective interviews and chaplain logs.⁶⁹ Future research directions include:

- **longitudinal research** exploring the durability of humility, detachment and self-compassion as protective mechanisms
- **intervention trials** examining chaplain-led or co-delivered programs integrating mindfulness, compassionate reflection, forgiveness practices and meaning-making
- **organisational studies** assessing how psychosocial safety climates and leadership

humility influence chaplaincy effectiveness

- **interdisciplinary collaboration**, such as the VA's MHICS training and the integration of psychological modalities with spiritually grounded care
- **evaluation of chaplain wellbeing** examining how humility, detachment and self-compassion may reduce chaplain burnout, compassion fatigue and moral distress.^{51,67}

Greater attention to humility and psycho-spiritual detachment, a still under-researched concept, may yield new insights into how spiritual care contributes to recovery, identity repair and resilience in trauma-exposed populations.

Summary and conclusion

The study began with the premise that self-compassion, while valuable for veterans experiencing chronic stress, trauma and moral injury, may be insufficient on its own. Using a CIS enriched by heuristic and bricolage perspectives, the research integrated literature across chaplaincy, positive psychology, pastoral care, spirituality and organisational wellbeing within a biopsychosocial-spiritual (BPSS) framework.

Self-compassion remains a crucial component of emotional resilience, helping veterans respond to distress with kindness rather than harsh self-judgement.⁸ However, two additional psycho-spiritual mechanisms emerged as consistent complements:

Psycho-spiritual (meaningful) detachment

This is a tender, reflective, emotional stepping back that reduces rumination, supports perspective and enables trauma to be held rather than re-lived.^{51,55} Such meaningful detachment helps individuals create inner space to process suffering without avoidance or denial.

Humility

Humility is an accurate, accepting self-view that reduces defensiveness, supports emotional openness and facilitates forgiveness, moral repair and willingness to seek help. Humility fosters relational trust and psychosocial safety while reinforcing self-compassion.⁴⁷

Together, these three mechanisms form a spiritually

grounded, evidence-informed triad of self-care that addresses both emotional and moral-existential domains of suffering. Each mechanism reinforces the others:

- Self-compassion softens suffering
- Detachment creates space around suffering
- Humility grounds suffering in acceptance, connection and realism

Chaplains are situated to operationalise this triad through relational presence, narrative repair, ritual, reflective guidance and collaborative care pathways. Their work supports identity reconstruction, meaning-making, emotional equilibrium and connection back to community and purpose.

The conceptual 'Pastoral Action Concept Map' and accompanying *pragmatic playbook* translate these insights into practice, offering a multilayered model across individual, relational and organisational domains. This approach situates chaplaincy not merely as support, but as a core element of psychosocial safety and organisational wellbeing.

This paper shows, at least at the conceptual level, that a shift towards spiritually inclusive, compassion-based and meaning-oriented care, embedded structurally within veteran services and wellbeing systems, can significantly reduce distress, strengthen resilience and promote holistic healing for those who serve.

Biography

Rev. Professor Peter Devenish-Meares is a chaplain, director and an interdisciplinary scholar-practitioner whose decades of service span Defence, police chaplaincy, banking, community care, board leadership and higher education. He integrates pastoral care, organisational ethics, and trauma-informed practice to shape compassionate pastoral leadership, advance applied research, and strengthen governance across diverse Australian institutions. He has chaired a large housing charity and St John Ambulance (Qld)

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Appendix

Self-compassion-oriented care: Chaplaincy for stress & moral injury:

a (brief) pragmatic playbook²

1) Quick-start: what matters in your first 24–48 hours

Your posture: be present, open, humble, boundaried, trustworthy.

Your aim: stabilise, protect dignity, be kind to self and connect to supports.

Your guardrails: confidentiality (within policy), 'do no harm', informed consent, opt-in. Constantly check with other mental health professionals

Rapid contact checklist (10–15 minutes)

Respecting privacy and boundaries, make contact where they are (parade ground, station, patrol room, mess, family setting).

Micro-grounding (60–90 sec): 'Feet on the floor, slow breath in... out. Right now, you're safe with me.'

Name the moral or distress signal (guilt, shame, betrayal, moral confusion, grief, anger).

Normalise + permission: 'Many in your role feel this; you don't have to carry it alone.'

Confidentiality script (adapt locally): 'I'm here as your chaplain. Our conversation is confidential, except for immediate risk to life or mandated reporting. I don't write performance reports, nor tell your team or team leader. This space is for you.'

Triage decision: Immediate risk? If yes → activate emergency protocol; if no/unsure → continue chaplaincy care pathway while seeking help, advice and assistance.

2) Core pathway for moral injury & high moral stress

Purpose: offer a repeatable, humane sequence blending pastoral care, light-touch measurement and collaboration.

Step A - Stabilise & locate the wound (15–30 min)

Containment: posture, breath, quiet room; 'We'll take this slowly.'

Name the moral pain: 'What value feels violated? Whose trust feels broken?'

Offer solidarity, not solutions: 'You're not broken; you've been hurt in a moral way.'

Step B - Screen & choose a lane (5–10 min)

Use brief, acceptable tools (select one per domain; keep it light):

Moral injury exposure/symptoms: brief items from MIES / MISS-M(SF) / MIOS

Spiritual wellbeing: FACIT-Sp-12 short

General distress (if needed): DASS-21 short

Alliance/process: one Working Alliance item ('Do you feel this time is helpful?')

Decision lanes:

Lane 1 - Watchful waiting + Pastoral care: mild burden; schedule follow-up

Lane 2 - Chaplain-led moral repair: moderate MI load; offer Pastoral Narrative Disclosure (PND) elements, lament/forgiveness ritual, meaning-mapping, values repair

Lane 3 - Co-facilitation / referral: severe symptoms or safety issues; coordinate with psychology/GP/peer support; remain spiritually present

Step C - Moral repair micro-practices (15–40 min)

Narrative repair: invite the story, pace the hardest parts, mark turning points

Lament & acknowledgement: 'What needs naming out loud?' (ritual optional: candle, coin, soil, scripture/prayer/poem)

Realignment: surface core values; one small act to realign life with values this week

2 This brief guide is for '*information purposes*' only and meant to stimulate the reader to seek professional training and development. It is not intended to offer clinical instructions nor comprehensive steps. Every personal circumstance is different and requires clinical and medical triage and assessment by qualified mental health and medical practitioners.

Forgiveness work (when appropriate): responsibility, remorse, repair, release—never rush it

Community re-link: partner, family, trusted colleague, faith group, veteran peer group

Step D - Close & plan (5–10 min)

Self-compassion practice (60–120 sec): hand on chest, slow breath, phrase: ‘This is painful. Others at work know this pain. May I be kind to myself & do what’s wise next.’

Psycho-spiritual/meaningful detachment and **humility** for next shift: Stop ritual at gate; Body reset (walk, shower); Re-entry intention (who/what matters after work)

Humility: in conjunction with self-compassion, recognise we are all human and get stressed

Book the next contact and, with consent, note a tiny outcome marker (e.g., slept 5 hours, told partner, attended ritual)

3) Micro-skills that lift effectiveness

Humility (relational safety amplifier)

Behaviours: ask before advising; honour each other; wisdom; admit your limits and then co-opt others (to build teamwork); invite collaboration

Phrases: ‘You’re the expert on your experience; I can walk with you.’ / ‘If this doesn’t help, tell me and we’ll try something else.’

Meaningful detachment (boundary keeping with warmth)

‘We must take the risk of legitimate attachment (fully feeling the emotion), learn its important message, and then have the presence and purpose to detach from that fascinating emotion after it has done its work. This is the gift and power of an emotionally mature person’. Richard Rohr

Behaviours: empathic presence + clear edges; time-bound sessions; deliberate handover when risk rises

Phrases: ‘I’m with you in this, and I’ll also help you connect with X for the parts outside my lane.’ / ‘Let’s hold the story here for today; we’ll pick it up safely next time.’

Self-compassion (burnout buffer & modelling tool)

Daily 3-minute reset: breathe, name a stressor, offer kind words, choose a wise next step

After-care for you (post-critical event): peer check-in, brief reflection notes, hydrating/food, movement, sleep target, micro-Sabbath. Seek regular supervision

4) Working with the system (PSC) so chaplaincy can actually work

Brief leadership (10 minutes): top three moral stressors; one practice helping; one barrier command can remove; ask for one Psychosocial Safety Climate (PSC) action this month

Integrate, don’t compete monthly touchpoint with peer support, psychology, welfare, etc

Protect confidentiality: reaffirm in every commander changeover and incident review

5) Documentation & evaluation without killing the soul of the work - ethical, light-touch

Log (de-identified where possible): contacts, themes, lane chosen, brief outcome at follow-up, referrals, rituals

Avoid logging identifying moral content without consent

Use delayed, opt-in feedback (2–6 weeks) with a one-item pulse (‘Did chaplain support help you move one step towards what matters?’)

A minimalist measurement bundle (pick 2–3)

MI focus: brief items adapted from MIOS or MISS-M(SF) (local approvals)

Spiritual wellbeing: FACIT-Sp-12 short

Burnout/STS: ProQOL-5

Alliance/process: 1–2 Working Alliance items

6) Longer term care (7–30 days)

Narrative & ritual: embed a simple lament/meaning ritual after hard calls; co-design language; train two peer champions; success = officers ask for it next time

Detachment at the Gate: end-of-shift 3-minute protocol; cue card at locker; success = earlier switch-off reports

Chaplain + Psych 2-hander: 4–6 session MI group; agenda: values, lament, forgiveness, reconnection; closing ritual; success = shame reduction, renewed belonging

7) Personal sustainability for chaplains (non-negotiables)

Regular supervision (spiritual/clinical)

Peer round (15 min) after tough call: 'What I noticed / carried / am setting down.'

Borders: fixed off-duty windows; say 'not now—tomorrow 0900?' and keep it

Three anchors: movement, presence/prayer/quiet, friendship

Red flags: persistent cynicism, sleep collapse, secrecy about coping, escalate

8) One-page scripts & prompts

Opening: 'What's the part of this that hurts most to remember?' / 'If a trusted mate had lived this, what would you say to them?'

Values repair: 'Which value got bent or broken—loyalty, fairness, duty, care, truth?' / 'Name one small act this week that honours that value.'

Forgiveness (when appropriate): 'Is there anything to ask or offer in forgiveness—towards yourself, another, God?' / 'What would repair look like, even one small step?'

Close: 'Between now and our next chat, what would kindness to yourself look like?' / 'Who could safely walk with you for the next few days?'

9) Rapid Chaplaincy Pathway (flow chart) – see attached

Print and place in notebook or duty folder

10) Leader briefing card (for commander 'catch-ups')

Attitudes, Experiences, and Considerations for Retention and Attrition Among American Active Duty Deployed Navy Women

M Ormeno, M Musilli, Anonymous 1, Anonymous 2, Anonymous 3, Anonymous 4, K Carney, P T Cazares

Abstract

At the time of this article, the number of women serving in the US military has continued to grow, including in occupational specialties previously not open to them. Therefore, research is needed to understand the continued effects of this expansion, along with continued gender integration, on women's experiences and retention decisions in the military. In this pilot initiative, we conducted discussion groups with 78 actively deployed women from the US Navy and US Marine Corps to identify factors influencing their decisions to remain in, or separate from, active-duty service. We also examined the role that comprehensive women's health services may play in addressing servicewomen's concerns regarding military service. Findings indicate that pride in military service and job benefits are among the primary reasons for retention, and negative gender-based experiences are among the primary motivators for separation. Women's health services that address challenges associated with family life and work balance, as well as gender bias and discrimination, were identified as desired resources.

Keywords: military, female, gender, deployment, experiences, retention, mental health

Introduction

Women have served in critical roles supporting all US war efforts. However, their capacity to serve was restricted until 1948, when the Women's Armed Service Integration Act was passed, allowing women to serve in permanent roles in the US Armed Forces,¹ and again in 2013, when the Department of Defense (DoD) opened all military occupations to women.² By 2016, women accounted for 16% of active-duty enlisted personnel and 18% of active-duty officers across all military branches, and these numbers have continued to increase.^{3,4} As women have continued to account for a greater proportion of the US military, research is needed to focus on the complex landscape in which servicewomen decide whether to remain in uniform or leave active-duty

service. This includes understanding the sex- and gender-specific needs and challenges servicewomen face that may affect their retention in the military.¹

Evidence shows that mental, physical and military service needs may differ as a function of gender. These stressors have been associated with lower retention rates of female service members, who report lacking the psychological support they need to navigate these stressors⁵ and for whom social support may have a stronger impact on psychological and physical health.⁶

As women continue to deploy and serve in more diverse occupational specialties, distinct social, environmental, and occupational factors may create unknown and unique health risks with the potential to exacerbate existing health disparities in rates of depressive disorders,^{7,8} posttraumatic stress disorder and numerous other conditions.⁹⁻¹¹ This impact may be further magnified by experiences of stigma or behaviours that are, or are perceived as, marginalising, as known barriers to help-seeking behaviours that could prevent or limit illness.¹² The pilot effort detailed here was undertaken to explore the views and opinions of a sample of military women,

1 Data summarized in 2023 noted that females had graduated Army Ranger School (2015), and the first female Marine led an infantry platoon (2018). By 2019, over 600 female Sailors and Marines were serving in combat arms units previously restricted to men, more than 650 women held Army combat roles and over 1000 had accessed Army combat specialties (Panetta, L and Stoneman, Shelly, The Hill, 1/28/2023).

specifically regarding their mental health needs, and to gain insight into their reasons for remaining in or separating from active-duty service.

Materials and methods

Participants

Participants were 78 active-duty Navy and Marine Corps servicewomen stationed aboard a US Navy-deployed vessel from 26 October, 2016 to 16 April, 2017. Participants ranged in rank from enlisted to officer (E-1 to O-4), with 76% ($n = 60$) enlisted. Ages ranged from early 20s to late 40s. Participants reported their ethnicity as White (47%), Filipino (20%), African American (17%), Hispanic (13%) and Asian (3%). Of those reporting marital status ($n = 27$), 59% indicated they were married. Thirty-three per cent ($n = 26$) of servicewomen reported having at least one child. Although not directly assessed, participants varied in their time in service. Those more senior in both the enlisted and officer ranks had numerous and varied prior service experiences before assignment to this specific platform.

Procedure

As part of the Naval Medical Center San Diego (NMCS) Women's Mental Health pilot initiative, female Navy and Marine Corps personnel were recruited from a deployed US Navy vessel through shipboard dissemination of information about discussion group opportunities. The NMCS Institutional Review Board approved the work as part of a quality improvement process to explore the perspectives of deployed women through informal conversations with a uniformed psychiatrist and officer. The ship's commander also approved it. Participation was voluntary; formal signed consent was neither required nor collected, and no compensation was provided to participants.

A female active-duty medical officer (O-4 rank)

conducted individual interviews and focus group discussions with servicewomen who volunteered to participate. To foster free discussion, focus groups were stratified by rank (officers [O-2 to O-4], Chiefs [E-7 to E-9], and enlisted [E-1 to E-6]). Emails were sent to additional potential participants to solicit their input. Questions used in interviews, focus group discussions and email inquiries are listed in Table 1. Using a discovery-oriented constructivist approach, minor alterations to the questions were made, depending on participants' responses.

The primary investigator compiled field notes for each interview and focus group discussion, which served as the basis for later analyses. Prior to analysing responses, identifying information was deleted to protect confidentiality. The research team reviewed and analysed the field notes, using phenomenological analysis to cluster statements into themes and subthemes. In the case of discordant determinations about a particular construct, an independent research staff member served as a tiebreaker reviewer. Overarching themes identified from the primary questions about remaining on active duty and separating from service were dichotomised into positive and negative valences.

Results

The results indicated three distinct areas of responses: reasons and motivations for remaining on active duty, reasons and motivations for ending active service, and women's mental health topics.

Reasons and motivations for remaining on active duty

Participants described several motivations for remaining on active duty. The main themes endorsed were 1) personal growth (encompassing the subtheme of pride) and 2) standard military benefits (encompassing the two subthemes of available healthcare benefits and financial stability) (Table 2).

Table 1. Questions asked of participants

What drives you to (a) remain on active duty or (b) consider EASing?
What would assist you in remaining on active duty longer?
What women's mental health resources, if any, would assist you in remaining on active duty longer?
Have you ever heard of women's mental health as a specialty within psychiatry/psychology?
What topics do you think are important to women's mental health?

EAS, exit from active service.

Source/Notes: Authors' analysis of focus group data 2016–2017.

Table 2. Results: themes and subthemes

Question	Themes	Subtheme
What drives you to remain on active duty?	Personal growth	Pride
	Standard military benefits	Available healthcare benefits
		Financial stability
What drives you to consider EASing?	Gender bias and discrimination	
	Deployment and separation	
	Family life and work balance	
What topics do you think are important to women's mental health?	Experiences of servicewomen with families	
	Gender bias and discrimination	
What women's mental health resources, if any, would assist you in remaining on active duty longer?	Help with working in a primarily male environment	
	Balancing personal and professional life	
	Deployment resources and programs for women with families	

EAS, exit from active service.

Source/Notes: Authors' analysis of focus group data 2016–2017.

Personal growth. The theme of personal growth contained the most endorsed subtheme. Pride, along with other less unified comments, was related to personal growth. Pride captured servicewomen's sense of achievements and personal accomplishments while serving. One E-5 servicewoman described this theme: 'The Navy has taught me that I am tougher and smarter than I thought I was.' An officer expressed similar sentiments and described a sense of pride in doing 'something girls don't do'. Several Chiefs reported a deep sense of pride in playing a part in history and 'being part of the change'. Several participants were part of the first crews that allowed women to serve aboard ships. Overall, many women described their identity as a service member as a source of pride that enables them to gain personal growth.

Standard military benefits. Standard military benefits contained two of the most highly endorsed reasons to remain on active duty: available healthcare benefits and financial stability. Available healthcare benefits covered themes related to the importance women placed on receiving personal and family medical and healthcare benefits through the military. One E-5 servicewoman mentioned the importance of being able to provide medical insurance for her family. This coverage was also considered a top benefit and an important reason to remain on active duty. Participants expressed satisfaction with the selection, availability and accessibility of coverage for fertility services, pre- and postnatal care, educational classes for parents and care for children with special needs. Regarding perinatal and postnatal care, servicewomen reported

having positive healthcare experiences.² Regarding financial stability, some servicewomen mentioned that their dependable income incentivised them to remain on active duty.

Reasons and motivations for ending active service

Participants described several motivations for ending active military service. The three most highly endorsed reasons were 1) gender bias and discrimination, 2) deployment and separation from family, and 3) family life and work balance.

Gender bias and discrimination. Gender bias and discrimination were the most endorsed themes for separation. This encapsulates participants' struggles with feeling, per direct report, 'targeted' by peers, leadership and military policies. Some women mentioned they felt as though they were working within an 'old boys' club' (specifically reported) and had to work harder than their male counterparts. This issue was prevalent among senior enlisted personnel. When some female Chiefs (E-7 and above) reported that they are reminded by male peers that 'they don't belong', all in this rank group agreed with the statement. It was also noted that a continued lack of women in leadership felt isolating, and biased

- 2 Of note, since this effort was completed, maternity leave policies have advanced across the services, and parental leave has since been added as a protected benefit for non-birth parents. It is not known how the establishment of leave for both parents may have subsequently impacted perceptions around gender-roles and stress around the care of a newborn.

perceptions of women in leadership positions were discussed. For example, in one focus group, one participant mentioned a female officer who was well-liked among female service members but was disliked by male colleagues. Several women also spoke of being the only female person in their departments or divisions. Relatedly, several women deemed liberty and dress code policies during port calls sexist. In the senior enlisted group, Chiefs shared instances during port calls when women's attire was inspected by male leadership, and some women were told to return to their spaces to dress in a subjectively more conservative manner, despite being in compliance with the dress code policy. These women felt the policy 'targeted' women directly.

Deployment and separation. Deployment and separation from family (i.e., significant others and children) for extended periods were frequently mentioned. One woman openly discussed her depression and attributed this to being away from her children. Other women described their difficulties with reunification after deployment, including that some of them experienced their children not recognising them when they returned home.

Family life and work balance. Participants reported challenges in balancing family life and military service. Most servicewomen who mentioned struggles with balancing family life and work felt they could not do both jobs well. For example, one woman who wanted to start having children said she felt she had to choose between the two.

Women's mental health topics

Responses to the question, 'What topics do you think are important to women's mental health?' were sparse and primarily related to experiences of servicewomen with families, including family separation, parenting while deployed and finding balance. One servicewoman stated that women with families have unique sources of stress not well understood by others. This was a central point in the broader conversation about servicewomen's mental health. The theme of gender bias and discrimination was the second-most discussed topic. This included managing interactions with 'male egos' in the workplace, differential treatment in male-dominated work centres and gender-based misunderstandings.

When servicewomen were asked about women's mental health resources that could promote retention, three topics emerged: 1) quality improvements in the work environment, particularly in terms of gender dynamics; 2) resources to assist them in balancing personal and professional life; and 3) deployment resources and programs for women with families.

Several women proposed requiring Navy-wide gender-bias training to assist their male counterparts and those in leadership. Others requested support for servicewomen, including assistance with managing various gender-discrimination issues. Regarding work-life balance, one servicewoman requested a support group, and another sought reading resources. Several women specifically requested resources on parenting while deployed. Respondents felt that these resources would help prepare mothers and families for both deployment and reintegration.

Discussion

The first aim of this project was to explore the factors that influence servicewomen's decisions regarding their voluntary service. This sample of servicewomen provided an insightful look into the factors influencing their decisions. The primary reasons given for remaining on active duty were pride in serving, access to healthcare benefits and financial stability. In contrast, the primary reasons for leaving were related to gender isolation and bias, deployment and separation from family, and difficulties in balancing their military career with family responsibilities.

The second aim of this study was to identify issues that servicewomen perceived as important to their mental health and to assess the resources they believed would be helpful during their military career. In this context, as in the first aim, themes emerged about difficulties associated with being a mother/partner who is also an active-duty service member, a challenge that disproportionately affects women. Participants also raised the issue of gender bias and discrimination in a predominantly male environment. These two themes appeared across both sections of the interviews/discussions.

The complicated tangibles of remaining on active service

The military is conceived of as a meritocracy, and the tangible benefits associated with service are expected to be gender blind. In this sense, the military can be considered an experiment in which the civilian economic impacts of gender are, by design, eliminated. In the absence of direct gender differences in the financial benefits and resources available to service members, we should be able to objectively examine the impact of gender bias and stress on the outcomes of servicewomen. This would allow us to identify areas where this theoretically gender-blind framework fails to produce equal outcomes for military men and women.

Notably, a US military gender gap in retention and promotion persists, with male service members showing better outcomes than their female counterparts,¹³ with resultant gender pay differences.³ Still, when compared with civilian women, military women experience a much smaller gender pay gap, comparatively better maternity and family benefits, and more stable economics. In fact, this extends to their civilian lives as veterans, where they financially outperform their civilian female counterparts.¹⁴ Not surprisingly, these tangible benefits emerged here as stated reasons for retention.

The intangibles of military service: pride and the gender stress gap

Interestingly, the positive intangibles mentioned in this study are shared by both men and women in the military. The social capital that comes with having served in the military includes a contemporary positive public perception and membership in a recognisable organisation. The concept of 'pride', the top intangible reason cited by this group for remaining on active service, is undoubtedly accessible to both genders. We found that pride in military service may be greater among servicewomen compared with servicemen. Specifically, these servicewomen reported finding pride in doing work that only a small portion of American women have elected to perform. Thus, in addition to the pride both genders take in serving their country, this group of women took pride in performing work that is often seen as atypical for women. The military draws heavily on this sense of pride and belonging as a recruiting and retention tool¹⁵ and our findings suggest that women may be even more likely than men to perceive this as important when deciding to remain on active duty.

While the military provides stability for women that improves their economic status compared with civilian female counterparts, inequality in promotion and retention rates¹⁷ forces consideration of the role that the intangibles of military service play in these women's occupational decisions. While these have improved over time, with some reports noting female officer promotions slightly exceed male promotion rates, some of the intangible distractors are reported to be so personally challenging that they may override the relative economic comfort that comes with military service, and contribute to female attrition, wherein women remain 28% more likely to leave the service than men.¹⁶ We refer to this as the 'gender stress gap'. Additional intangible factors that detract from the appeal of military service are also important. Servicewomen are more likely than servicemen to be in dual-military families (20% vs 4%), and they are also more likely to be

single parents (8% vs 3%).³ For these reasons, and because of traditional assumptions that women are the primary caregivers, challenges related to family separations and maintaining work-life balance fall disproportionately on servicewomen. Studies of marriage, retention and sex/gender influences are plentiful. While the nuances fall outside the scope of this paper, it is worth noting that marital status and sex are intersecting variables that also overlap with service. For example, one post-9/11 US Reserve and National Guard sample showed military attrition was associated with being unmarried (vs married).¹⁷ However, for active-duty populations, a recent RAND review noted marginally higher 36-month attrition rates for married service members, which vary both by time in service and military branch.¹⁸ These factors can be seen as contributing to the gender stress gap in the military, potentially affecting women's decisions to remain on active duty.

However, the most significant factor contributing to the gender stress gap and undermining military retention among this group of servicewomen was gender bias and discrimination. While no participants volunteered experiences of sexual harassment or assault during interviews or focus groups, many of them described being the target of sexist behaviour by their male counterparts. The stressors of gender bias and gender isolation are not theoretical. There are known tangible outcomes of these stressors related to performance in both the military¹⁹ and civilian sectors, where a 'sense of belonging' was described as the mediator between workplace sexism and both mental health and job satisfaction.²⁰ While the results from this small qualitative study cannot be extrapolated to the larger military population, our findings suggest that gender stress and discrimination may be potent influences on individual women's decisions to continue or leave active-duty service.

Strengths and limitations

Among the study's notable strengths, this qualitative effort had a relatively large sample, from which clear patterns emerged regarding the themes that influence servicewomen's intentions to leave or remain on active duty. In addition, the sample was demographically diverse, including enlisted ranks and officers. Lastly, this study provided primary source data on factors that impact servicewomen's intentions to leave or remain on active duty, thereby informing programs and resources that uniquely assist them.

Several limitations to this pilot initiative should be noted. First, data were derived from a variety of

sources, including individual interviews, discussion groups and emailed responses. A second limitation is that themes were extracted from the facilitator's field notes rather than audio transcripts, potentially leading to team misinterpretation during the analysis phase and precluding a more powerful systematic analysis at the individual participant level. A consideration is that the interviewer/discussion group leader was a female officer. While the responses appeared candid, deference to rank and socially desirable responses must always be considered a potential limitation in military research. The data were collected from servicewomen deployed on a single ship; thus, the themes we identified may not be representative of the issues affecting servicewomen in other duty assignments or across different services. Although the numbers were robust for the discussion groups, they do not allow for analysis by rank or ethnicity, and they are solely from women, without a comparison to male servicemembers, who may have both similar and different considerations in their decisions to remain on active duty or leave. Lastly, these data were collected before the onset of the COVID-19 pandemic, and opinions and perspectives on labour have been greatly influenced since then.

Conclusion

Although this pilot initiative provides important insights into servicewomen's potential for continued active-duty service, additional research is needed to establish the generalizability of these findings across both individual difference factors (e.g., rank, years of service, marital and dual-military status, race/ethnicity, having children) and factors related to one's environment or situation (e.g., unit location, sex of unit leaders, egalitarian beliefs and biases of leadership, gender proportions within unit, branch of service, military occupational specialty), as well as other demographic and service-specific factors. Future research should use objective measures to identify both individual and environmental factors that affect women's experiences in the military and how those experiences can translate into feelings of gender isolation and mental health symptoms. If national and military leadership does find an

assessed value in having a military force that reflects the sex-based population of the US, as well as the nations in which the US military deploys, it would then also be important to investigate specific improvements that can be made to reduce women's experiences of ostracism, bias and unequal treatment within the workplace. Ultimately, it would be important to develop, implement, and evaluate programs or resources to improve retention of women on active duty by targeting women's unique experiences. Incorporating recommendations from the Defense Advisory Committee on Women in the Services (DACOWITS), established in 1951, may also continue to improve specific military recruitment and retention efforts.

Many workplaces, including the military, lean heavily on tangible benefits to incentivise employees and members to remain. This effort has demonstrated that the nearly unmatched economic benefits and stability that narrow the global gender pay gap are not sufficient to ensure equal outcomes for servicewomen and servicemen. Instead, servicewomen's retention and health are adversely impacted by the more intangible and nebulous gender stress gap. The gender stress gap in the military must be addressed as it adversely affects not only servicewomen's health but also their retention, thereby adversely affecting the readiness of the US Armed Forces.

Acknowledgements

We thank the leadership team at the time this work was completed at the Navy Medicine Readiness and Training Command (NMRTC) San Diego, CAPT (ret) Joel Roos and now Adm. (ret) Cindy Kuehner. We thank the command triad of the participating naval ship for their support of this project. We also thank Dr Glennie Leshen for her critical review of the manuscript.

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The Influence of Psychosocial Health on Military Performance: Fit for Service?

J Weber, M Elbe

Abstract

When considering military fitness, the focus must be on psychological and physiological ability and thus suitability for service, determinants which are themselves influenced by health. Health, especially in the military context, is the product of several factors (including psychosocial ones), as will be highlighted in the current study. The influence of psychosocial health and health-related factors on military fitness and, therefore, on military performance and fulfilment of military tasks must be assessed. To this purpose, implications from the current situation in the German Armed Forces will be considered. Environmental factors (e.g. superiors, comrades, family) are of special interest in this respect. The study aims first to provide a brief insight into what constitutes or hinders military fitness and fitness for service in the German Armed Forces, with special emphasis on the psychosocial and environmental perspective. Second, to provide insights into the German Armed Forces' work-health programme in order to broaden the dialogue between military personnel carrying out such programmes among armed forces worldwide.

Keywords: military fitness, occupational health, psychology, social environment, health management

Introduction

The ability to perform mentally and physically is said to be crucial for the fulfilment of military operations, missions and assignments. Health and athletic fitness also play a supposedly important role in this respect. In the German Armed Forces, problems arise in this context. These may be rooted in several aspects, including the organisation of work and processes, and the lack of or improper material. These aspects can negatively influence health and thus performance and fulfilment of all kinds of military tasks. At the same time, the German Armed Forces seem to experience problems with prevention and work-health programmes due to a lack of time to implement specific measures, for example, because superiors hesitate to implement public health measures, as these measures themselves consume resources, such as personnel. This leads to the need for further exploration of problems and possibilities in this context.

To systematically enter the research, concepts such as health, physical training, performance and on-duty requirements must be clearly defined, as well as potential on-duty stressors.

The World Health Organization (WHO) defines health not only as the absence of illness, but also as a state of complete social, mental and physical wellbeing.¹

Although this position is currently facing a great deal of criticism (a Google Scholar search yields a multitude of scientific articles arguing against it, some of which have been summarised by Schramme, 2023², amongst others), there is justification for this definition in the military context, especially regarding mental health, which is crucial to military operational capability.³

Mental health in particular, is crucial to military task fulfilment, since the WHO defines mental health as a state of wellbeing in which an individual is capable of performing according to their abilities, coping with daily life stressors, working productively and giving back to society.² For military personnel, the contribution to society consists of the fulfilment of military tasks, which is only possible under certain preconditions.

These preconditions most likely include fulfilling a set of individual needs, as previously noted by Maslow and Lewis.⁵ Individual needs in this context are named as basic needs (water, food, air, appropriate temperature), security, social needs, appreciation by others and individual fulfilment. If these needs are not met or only partially met over a longer period, performance will drop and the individual may fall ill.⁶ When considering proceedings within the German military, for example, for units that conduct courses for other units, it becomes apparent that even basic

needs are not met in these units. This is especially true for courses that include joint combat training, so that health may present a problem in this context.

When considering physical activity within military contexts, it is clear that exercise and sports have been instrumentalised for military purposes for quite some time, for example, in the British Empire around 1900⁴. A lack of physical fitness even has consequences for the military when it occurs in the civil population, as it can lead to a lack of recruits.⁸ Physical performance is crucial to military tasks such as shooting, which requires core stability, balance, strength-endurance and body tension.⁹ Military personnel, especially soldiers, must perform at a very high physical and cognitive level under extreme pressure, comparable to that in competitive sports.¹⁰⁻¹³

In this context, the UK military uses mental training.¹² Also, mindfulness training with military personnel showed that the intervention group suffered less from stress and their cortisol values, a measure for physiological stress response, decreased significantly.¹⁰ When considering factors such as mindfulness and resilience, it must be said that these also affect task fulfilment. Resilience training significantly increased regeneration after demanding military training exercises within a group of Swiss Army cadets and led to lower cortisol levels in the intervention group.¹⁴ Swiss cadets who took part in a stress reduction training were less stressed during strenuous situations.¹⁵ Also, resilience increases performance in military settings,¹⁶ and preventive resilience training improved coping in patients who later acquired posttraumatic stress disorder (PTSD).¹⁷ Resilience also influences expected self-efficacy, which in turn is influenced by the perceived role within a team or process.¹⁸ Furthermore, there is a connection between expected self-efficacy and sports performance, suggesting that sports performance increases psychological performance.¹⁹ Even when no resilience training is implemented but only normal sports training, there are positive effects on psychological factors, such as a reduction of anxiety and depression.²⁰ Sports activities can also improve sleep quality.²¹

Requirements between different military tasks can vary according to unit, as has been pointed out by a study²² within the German Armed Forces. The study showed that soldiers must move dynamically and carry loads. At the same time, civilian workers within the military often practice trades or perform office duties.²² Physical demands are therefore present in soldiers' daily tasks and, to lesser degree, also in those of civilian workers within the German

Armed Forces, such as trades, folding of parachutes or explosive ordnance disposal. Office work includes its own unique risks, stressors and requirements, as will be outlined below. German health insurance data shows that 18% of the civilian population in Germany suffer from psychological diseases, which may be related to social circumstances.²³ This could also affect military work settings. With these findings in mind, connections between health and performance in the military context can be drawn.

Sometimes demands on duty exceed what can be delivered by civil or military personnel. However, the inability to meet physical performance demands on duty may also arise from a lack of fitness or health-related problems, which may increase the risk of injury and dropout from military training.²⁶⁻²⁸ When considering paratroopers, incorrect landing technique is one of the most common injury patterns. This underlines the necessity of position-specific sports training, which should include complex training components such as coordination and strength.²⁹ Concerning more general military functions, injury prevention can be achieved through marching and sports activities.³⁰

During international missions, health and fitness levels can decline,³¹ leading to injuries.³² Generally, there is a higher risk for injury abroad,³³ especially during lifting and carrying loads.³⁴ Injury prevention training that incorporates military requirements can, at least up to a point, reduce injury risk.³⁵

In addition, health and fitness levels can improve military performance.³⁶ During military basic training, in particular, special consideration should be given to the selection and qualifications of trainers.³⁷ Medical studies showed that patients who had been training before medical surgery benefited during rehabilitation and recovered faster.^{38,39} This leads to the conclusion that physically trained military personnel will recover faster following an injury and subsequent rehabilitation.

Musculoskeletal diseases are very often caused by psychosocial stressors in the workplace,⁴⁰ while neck and shoulder pain are common.⁴¹ Psychosocial factors influence work health in distinct ways^{40,42} (Tables 1 and 2). The longest sickness absences were caused by workplace bullying,⁴³ which leads to the assumption that a 'healthy' work environment can boost mental health.⁴⁴

Psychosocial factors also influence sports performance, which can be affected by sleep quantity and quality, religion, financial situation, gender, political situation, behaviour of members of the

Table 1: Findings from literature regarding fitness for service.

Finding	Studies
Lack of fitness in civil population causes lack of recruits.	Maclean & Cawley, 2014
Physical performance is crucial to military tasks, shooting requires core stability, balance, strength-endurance, body tension.	Nourizadeh et al., 2019
Military personnel, especially soldiers, must perform at a very high physical and cognitive level under extreme pressure, which constitutes a parallel to competitive sports.	Meland et al., 2015; Wagstaff & Leach, 2015; Fitzwater et al., 2018; Brückner, 2023
UK military uses mental training.	Fitzwater et al., 2018
Mindfulness training with military personnel significantly reduced stress and cortisol levels.	Meland et al., 2015
Resilience training increased regeneration after demanding military trainings within a group of Swiss Army cadets and led to lower cortisol levels.	Zueger et al., 2023
Swiss cadettes coped better during straining situations after special training.	Niederhauser et al., 2022
Resilience increases performance in military settings.	Niederhauser et al., 2023
Resilience increases coping in patients who suffer from post PTSD.	Kottlow, 2020
Resilience influences self-efficacy, which itself is influenced by perceived role within a team or process.	Lang et al., 2007
There is a connection between self-efficacy and sports performance.	Moritz et al., 2000
Physical training has positive effects on anxiety and depression.	Panza et al., 2020
Sports activities increase sleep quality.	Johnston et al., 2021
Requirements vary according to unit: soldiers have to move dynamically, cope with carrying of loads, civil workers often carry out crafts or office duty.	Rohde et al., 2017
Lack of fitness or health-related problems increase injury risk.	Vaara et al., 2020
Lack of fitness leads to dropout from military trainings.	Peake, 2000; Wyss et al., 2014
In paratroopers, wrong landing technique is related to injury; demand for physical training (complex exercises including coordination, strength).	Ekeland, 1997
Injury prevention can be achieved by marching and sports activities.	Roos et al., 2015a
During international missions, health and fitness level can decrease.	Sharp et al., 2008
Decreased fitness during international missions leads to injuries.	Knapik et al., 2012
Increased injury risk abroad especially during lifting/carrying of loads.	Roy et al., 2012a, b
Prevention training regarding military requirements reduces injury risk.	Knapik et al., 2003
Health and fitness level improve military performance.	Friedl et al., 2016
Selection and qualifications of the trainers important for basic training.	Roos et al., 2015
In medical studies patients who had been training before medical surgery had benefits during rehabilitation and recovered faster.	Catalayud et al., 2017; Hall et al., 2023

Table 2: Connections between symptoms of the musculoskeletal system and psychosocial workplace factors according to Lang et al. (2012) and Bezzina et al. (2023).

Localisation of symptoms	Influencing factors
Lower back	High demands (including psychological) and stress Limited control Low security and contentedness regarding the workplace Minimal support from superiors and colleagues Minimal support from social surroundings Lack of resources needed for work Monotonous and repetitive tasks
Neck and shoulders	High demands and stress Limited control Minimal support from superiors and colleagues Minimal support from social surroundings Monotonous and repetitive tasks Contentedness regarding the workplace Psychosocial stress, bad atmosphere at work Wrong job decision, role conflict
Upper extremity	High demands and stress Limited control Minimal support from social surroundings Monotonous and repetitive tasks Psychological demands and stress
Lower extremity	Limited control Minimal support from social surroundings Monotonous and repetitive tasks

soldiers' social surroundings (e.g. communication styles or expectations of others, such as colleagues, comrades, family) and psychological factors such as self-efficacy.⁴⁵ The influence of the social environment in this respect has also been mentioned.⁴⁰

It can be summarised that physical and psychological fitness for duty (and therefore, task fulfilment and operational capability) are determined by the presence or absence of conditions that positively or negatively affect them, including work-related and non-work-related factors such as family, partner, travel/distance to work, social environment and so on.

Research questions

Which aspects have to be considered performance limiting in regard to task fulfilment within the German Armed Forces, and how can these aspects be optimised during daily duty?

Which specific situations and obstacles are present within the German Armed Forces concerning the implementation of work-health programmes?

Materials and methods

Results from two surveys within the German Armed Forces will be analysed to assess the relationships among health, physical fitness and the fulfilment of military tasks. Analysis in this respect will be twofold. General connections between psychosocial and physical health, physical or mental fitness and performance in the military context based on the results of the surveys, and the situation regarding these aspects within the German Armed Forces will be outlined. Results from the implementation phase of the AIG-Screen Bw²⁴ (survey on individual health perception within the German Armed Forces), conducted between 2019 and 2024, and the attractivity survey of the German Armed Forces²⁵ will be included in the analysis and compared with the findings from the current literature. Regarding the AIG-Screen Bw, it was not possible to include the entire dataset due to results being classified, but calculations in this paper can give an initial insight into how public health survey data could be used within a military context. Due to classification reasons, only a small number of units were included in the study. Sample units were selected according to service branch in order to incorporate different work environments.

The AIG-Screen Bw is (or should be) conducted within every unit in the German Armed Forces every two years as part of the Forces' work-health programme in order to specify public health needs within individual units and supply adequate countermeasures for each unit. It consists of questions regarding work material, infrastructure, leadership, organisation of work processes, subjective perception of health and wellbeing, as well as motivational and demographic factors. It targets both civilian and military posts alike, and is provided to participants online or on paper over 2 weeks. Participation is voluntary and response rates so far varied between 10% and 65% within units. A full set of questions cannot be shown in the article due to the questionnaire being classified material. This survey tool allows the assessment of connections between the survey items as well as improvement or deterioration of factors. Also, the AIG-Screen Bw can be used to audit the German Armed Forces' work-health programme (Betriebliches Gesundheitsmanagement, German abbreviation: BGM) itself, for example, through intervention studies. Thus, it is technically and statistically possible to assess potential for improvement regarding work-health factors. Within the current study, AIG-Screen Bw-data from $N = 21$ units with military and civil personnel¹ have been used to calculate Pearson and Spearman correlation coefficients between the possibility to coordinate the individual's needs with demands on duty and the perceived amount of illness in individuals within the unit, as well as correlations between the possibility to use the individual's personal strengths on duty and the possibility to coordinate the individual's needs with demands on duty. Weak correlation was set at ≥ 0.1 , moderate correlation at ≥ 0.3 , strong correlation at ≥ 0.5 and significance at ≤ 0.05 . Calculations were done using SPSS 29.

The attractiveness survey of the German Armed Forces examines the relationship between wellbeing in the military and four central influencing factors (health, justice, recreation/family and learning) based on data from personnel surveys in the German Armed Forces in 2013 (7744 questionnaires, 26% response rate), 2016 (2121 questionnaires, 33% response rate) and 2020 (2412 questionnaires, 36% response rate). Questionnaires were sent via mail and included questions regarding health, recreation and family, fairness and possibilities for learning. Findings from the survey were compared to results from the AIG-Screen Bw. The two surveys were viewed separately with no joint calculations being performed.

1 In the German Armed Forces, civil and military personnel work together and are administered under the same public health programme.

Results

Conditions regarding physical fitness and workplace health in the German Armed Forces vary between units. When considering teaching and training units whose personnel are almost constantly involved in joint combat training at military training facilities including military training grounds, it is clear that the individual needs according to Maslow and Lewis⁵ are not covered over long periods of time: Dusty air in the field due to vehicle movement, limited possibility to carry drinking water, bagged meals from military catering facilities instead of properly cooked meals, cold and rainy weather, loud, hot barracks, not enough clothes to change after hot or wet weather and limited possibilities of communication with loved ones as well as pursuing hobbies lead to difficult living conditions with regards to all basic and individual needs.

Job satisfaction influences personnel's mental and physical health.^{46,47} At the same time, only 60% of military personnel in the German Armed Forces approve of their direct superior's performance, and workplace contentment correlates with contentedness with leadership.⁴⁸ Regarding these circumstances within the German Armed Forces, the AIG-Screen Bw and the attractiveness survey paint a similar picture.²⁵

Various factors can influence workplace health, as discussed earlier (Tables 1 and 2). In the AIG-Screen Bw, participants can rate, among others, the feedback they receive, the freedom of action they have while carrying out their duty, as well as the appreciation they receive, the degree to which they can spot their individual success when accomplishing their tasks, the degree to which they feel supported by colleagues or superiors and the degree to which conflicts are present within their unit. As stated by Lang et al.⁴⁰ and Bezzina et al.,⁴² psychosocial factors appear to exacerbate problems within the musculoskeletal system due to excessive psychological stress, leading to an imbalance in the nervous and hormonal systems.⁴²

The German Armed Forces have been rolling out the BGM since 2016, but the completion has been delayed due to COVID-related events. Unfortunately, the BGM is sometimes mistaken for 'back therapy training' rather than an effective quality and productivity management tool. The AIG-Screen shows that there are correlations between psychosocial factors and health, for instance, a moderate correlation between the possibility to combine individual needs with daily duty on the one hand and the sum of illnesses subjectively perceived by participants ($p \leq 0.047$,

Fig. 1: Connection between the possibility to coordinate individual needs with requirements on duty and the amount of illness and sickness within selected units of the German Armed Forces²⁴ (Data from anonymous units, calculation method of rankings is classified)

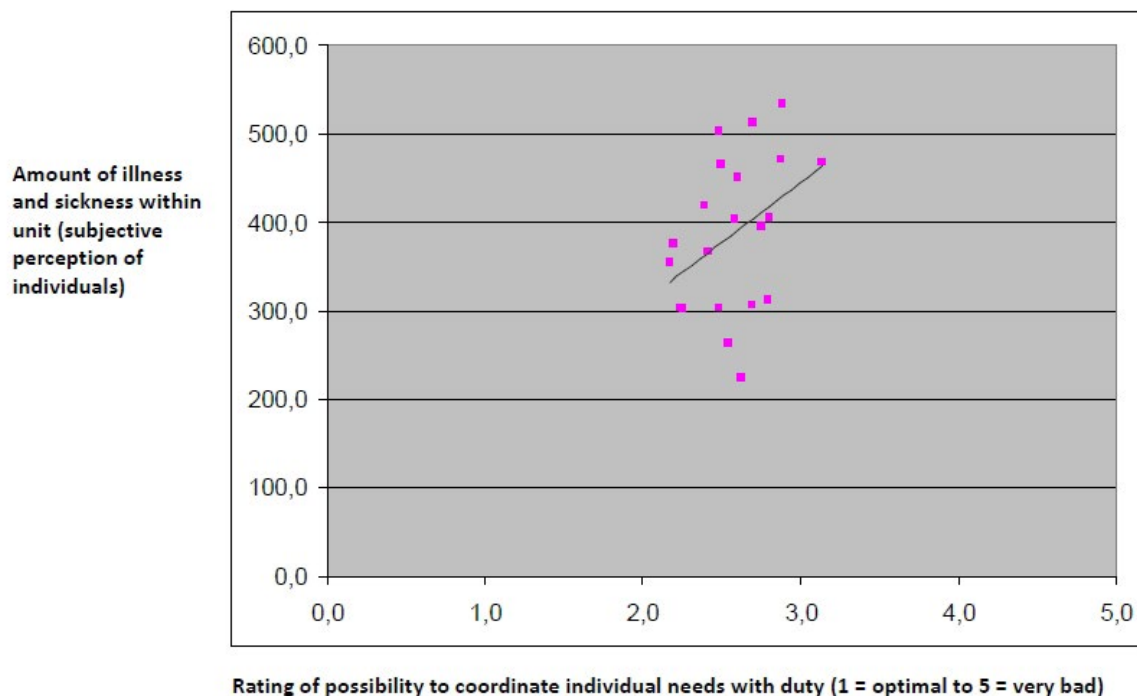
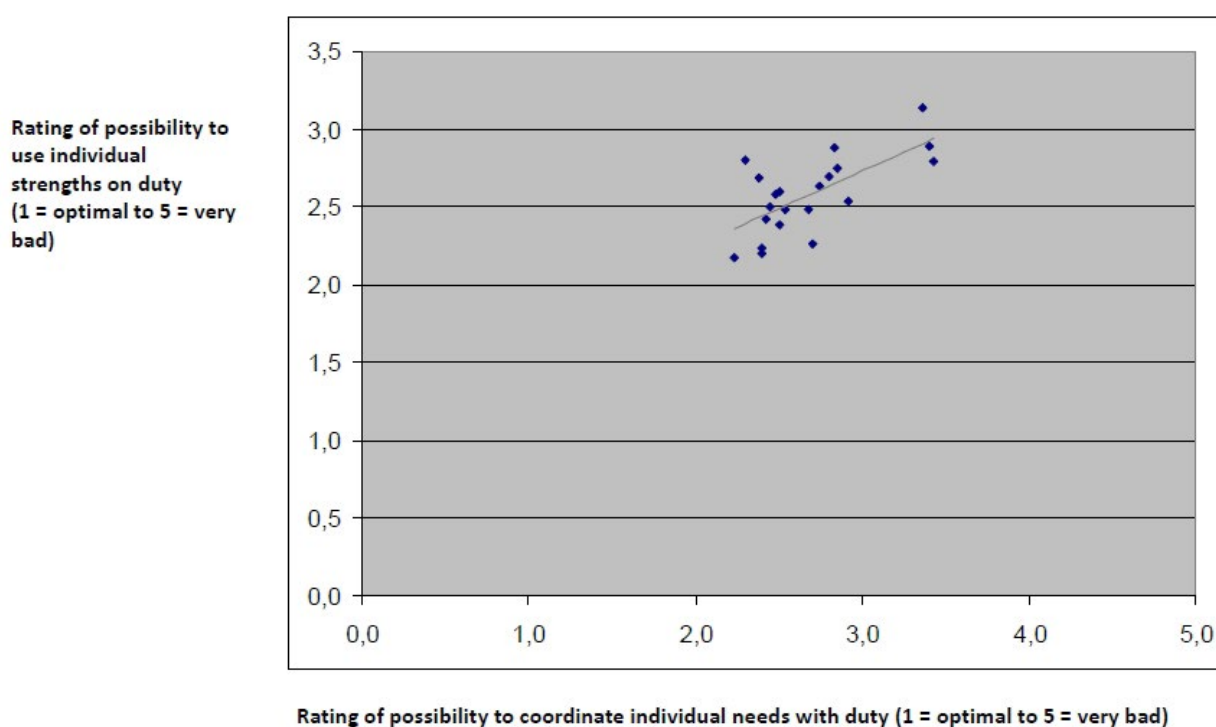


Fig. 2: Connection between the possibility to use individual strengths on duty and possibility to coordinate individual needs with duty within selected units of the German Armed Forces²⁴ (Data from anonymous units, calculation method of rankings is classified)



Spearman's $\rho = 0.439$; see Figure 1), which aligns with Maslow and Lewis's⁵ theory. Furthermore, there is a strong correlation between the possibility to use one's strengths on duty and the possibility to coordinate individual needs with daily duty ($p \leq 0.001$, Pearson's coefficient = 0.669; see Figure 2).

Correlations can also be found when analysing the data²⁴ regarding the availability of working materials and parameters of wellbeing. According to the attractivity survey, which is conducted at three points in time within the German Armed Forces, wellbeing has increased steadily since 2013.²⁵ Not only health but recreation/family also had a large impact on wellbeing among the surveyed soldiers. Health also affected workplace contentment, suggesting that the two factors influence one another.

Discussion

Limitations of the study include a small sample size arising from military classification restrictions. However, it has to be noted that aggregated data from several hundred personnel were used.

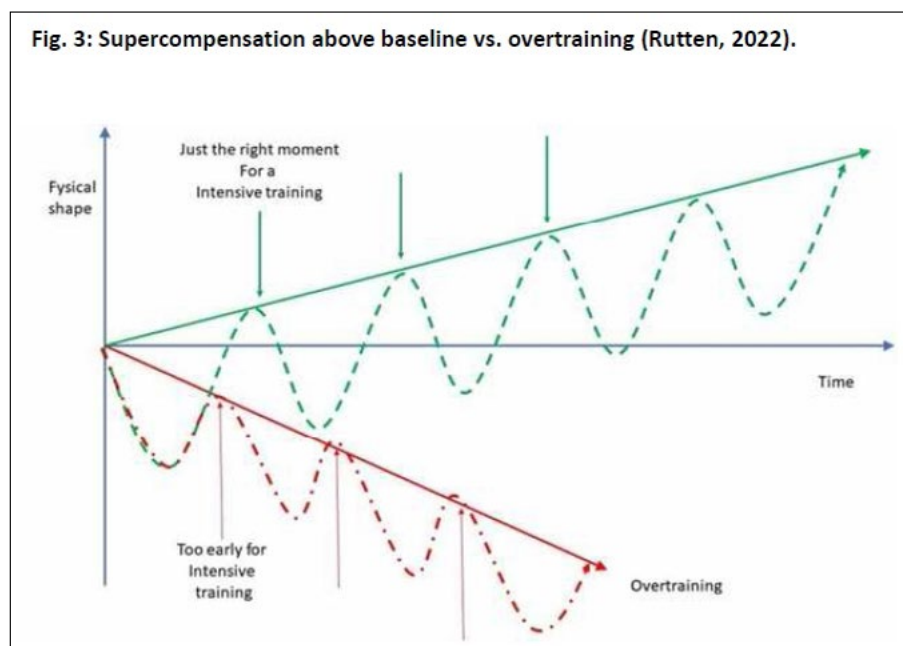
Results from the AIG-Screen Bw and other internal data or documents could be analysed in multiple ways, but this is not the case within most units. The topic seems to be treated as something that, in practice, is applied only to very few select groups (e.g. pilots within the Human Performance enhancement programme [HPE] within the German Armed Forces). In some units, BGM measures are implemented in a way that ensures each unit receives some form of 'easily implemented' measures, regardless of circumstances or actual needs. Here, the main BGM activities on duty are gymnastics and yoga, etc., implemented to 'have done something'. So far, no detailed scientific analysis has been used to implement a scientifically guided approach in the German Armed Forces, and the question arises whether this is also true in other countries. Practitioners and superiors seem unable to adequately address the connections that appear to exist between leadership and interpersonal workplace stressors, or stressors that most likely arise from a lack of material and improper workplace organisation. This probably leads to a lack of practical solutions derived from these studies, the reasons for which will be outlined below.

Results from the AIG-Screen Bw as well as the attractivity survey lead to several options for the German Armed Forces (and probably also armed forces in other countries), which are sometimes not easy to pursue due to internal obstacles, for example, some superiors are sceptical about yielding

too much freedom of action, probably due to a fear of losing control or being overwhelmed by demands from inferiors. Also, the provision and acquisition of materials and infrastructure can cause problems and be a lengthy process, such as when the helmet needs to fit the radio circuit, or when lashes are in frequent contact with safety glasses, causing eye inflammation and so on. In some cases, duty is not compatible with attending sports or movement activities provided by the BGM programme, such as for personnel working in trades or at training grounds. Also, current projects within the units can lead to superiors neglecting their subordinates' health and wellbeing, as they themselves need to deliver results, often resulting in decreased performance due to stress (as shown in Figure 3). BGM processes need to be optimised accordingly, especially regarding the scientific evaluation process, the communication of the BGM standard operating procedure and the actual implementation within military units. The key problem seems to be that healthy, thus performance-promoting conditions need to be incorporated into daily duties to improve operational capability.

To better outline the relationships among individual needs, regeneration/recreation and on-duty performance, the principle of supercompensation can be used.⁴⁹ The model, which originates from sports science, can in principle also be transferred to work- and duty-related settings. It states that after strenuous activities, performance decreases due to fatigue, but then increases above the initial level. If no new strain occurs, performance returns to the starting level. If confronted with a new stimulus, performance increases and may establish a new, higher starting point. However, during a state of constant overwork/overload due to high workloads or other unfavourable factors, performance constantly decreases and the risk of injury and sickness increases (Figure 3).⁵⁰

This leads to increased demand for the optimal organisation of work-related processes and healthy leadership, which cannot be met under constant overload of duty-related demands. The aforementioned model has direct implications for the German Armed Forces and most probably for other military settings. Regeneration must be made accessible, at both the physical and mental levels, and coping skills must also be trained to achieve optimal performance in military settings. Or, as one of the reviewers for this article phrased it: 'The GAF should not be doing their opponent's job for them by killing or injuring its own people, least of all in the non-combat setting'.



In summary, it can be said that mental and physical fitness are limiting factors in the fulfilment of military tasks, as the requirements in this respect are clearly psychological and physical. Adjusting these factors on duty is a difficult measure due to a lack of knowledge among leadership on how to address these circumstances, as well as problems with setting priorities for health and its implications for productivity. For the most part, using personnel and resources to perform daily duties will take priority over using them to improve working conditions.

The findings of the current study align with literature.^{5,6,18,40,42,44} Regarding health, especially psychosocial health, the results demonstrate a strong need to research further what actually constitutes workplace health in the military and, most importantly, to translate those findings into action. What are the demands with respect to the environment and workplace when aiming for optimal task fulfilment? Which influence factors are significantly involved? And what influence, if any,

do leadership, lack of material resources, workflow organisation and process management, sports activities, nutrition, sleep, social surroundings, as well as the perception of armed forces within societies have? Do political or policy factors also influence the military work environment? These questions could be answered in more detail through surveys within the German Armed Forces if proper scientific monitoring, including the analysis of survey results and the actual addressing of identified problem areas, is implemented while at the same time fulfilling daily demands.

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Alcohol and Malaria Recurrence

G D Shanks

Abstract

Alcohol was widely believed to induce malaria recurrence in the early 20th century, but no physiological mechanism was recognised. Allied military units during World War II experienced vast numbers of malaria infections without any obvious reported overlap with alcohol ingestion. Historical and recent reports of malaria's relationship to alcohol have been reviewed and found inconclusive. It is most likely that social factors associated with chronic ethanol use, such as late-night, outdoor activities, promoted mosquito exposure and parasite infection. Relapsing malaria (*Plasmodium vivax*) was very common in soldiers in the Southwest Pacific theatre. However, there is no substantial evidence that binge drinking promotes relapses of latent parasites from the liver. Alcohol's association with malaria is likely due to sociology and not pharmacology.

Keywords: malaria, alcohol, military, World War II

*The explanation of these cases appears to be that the subtertian malaria infection is lying latent until aroused into activity by the exposure to cold, alcohol or some other factor.*¹ - Philip Manson-Bahr, 1926

Alcohol was widely believed to induce malaria attacks as described in the classical tropical medicine texts; an example is shown above from a century ago. It is easy to see how such beliefs arose, given the stereotype of the colonial-era, alcoholic expatriate plantation owner in Africa, taking intermittent quinine doses between his whiskey shots. In my own experience in East Africa, it was the town drunkards who first became malaria positive during malaria prevention trials, suggesting that there was some factual basis for alcohol-induced malaria reoccurrence.² Mosquitoes may be more attracted to those consuming beer.³ Malaria parasites must go through a developmental stage in the liver, implying that a hepatotoxic drug like alcohol might have a role in reoccurrences from the liver (relapses) as opposed to resurgences from the blood (recrudescences). The factual basis for alcohol-induced malaria reoccurrences during World War II is reviewed here and found wanting. Social factors associated with alcohol use may be a better explanation for apparently increased malaria rates in chronic users of ethanol rather than any pharmacological effect on the parasite in the blood or liver.

Even before the mosquito vector of malaria was discovered, the US Army associated malaria and alcohol use. An epidemic of malaria occurred in US soldiers stationed at Washington Barracks and Fort Myer in Washington, DC, in 1896 along the Potomac River.⁴ MAJ Walter Reed, who later discovered that mosquitoes spread yellow fever, was called to conduct an epidemiological investigation, which

did not confirm the locally accepted understanding that malaria was due to a defective water supply at Washington Barracks. Reed's opinion was that the soldiers were getting infected with malaria while travelling from their barracks at night through the Potomac swamplands to reach the saloons of Washington. This was especially true of those so inebriated by alcohol that they collapsed on their return journey and slept in the swamps among the mosquitoes.⁴ Reed did not figure out that it was the mosquitoes that spread malaria, but he came close by eliminating water but not ethanol ingestion as the cause of the epidemic.

Malaria can recur either as a recrudescence of an existing blood infection, usually *Plasmodium falciparum* or as a relapse of a latent hepatic infection, usually *P. vivax*. Most of what seemed to be discussed as an alcoholic predisposition to increased malaria in the colonial era appears to be the former case, with alcohol causing more clinical attacks of existing malaria infections. Intemperate habits were often linked to alcohol use in expatriate administrators and soldiers scattered widely across isolated tropical postings. Since the only effective medication for malaria in the early 20th century was quinine, which had to be taken as a daily suppressive dose, any hangover-induced interruption in such a demanding routine was likely to result in a febrile attack.⁵ One colonial adaptation of quinine was to put the drug into 'bitters' as flavouring and mix it with the gin. Intermittent quinine use was linked to blackwater fever, a still poorly understood consequence of imperfectly suppressed falciparum infections.⁶ The role of alcohol was uncertain at best, as there was never enough quinine in the bitters of gin and tonic to constitute an effective dosage against parasites, despite the belief by no less a person than Winston Churchill that the tonic given with gin had saved

many lives in the British Empire.⁷ It seems most likely that malaria and alcohol were coincident factors in colonial governments and militaries' approach to living in the tropics, regardless of any medical connections between the two factors.

*Alcoholics are more susceptible to malaria than the temperate, and in them malaria is more severe.*⁸ – Patrick Hehir, 1927

Allied armies were particularly challenged by malaria infections during World War II, particularly in soldiers deployed in Africa, India and the Pacific Islands. Malaria casualties were of utmost concern in the Southwest Pacific theatre as entire infantry divisions required months after deployment on Pacific Islands to rehabilitate in non-malarious areas during multiple bouts of relapsing malaria.⁹ The extraordinary frequency of malaria relapses, often exceeding 10 in a single soldier, raised questions about why this was so different from prewar medical experience. Although imperfect chemosuppression, frequency of infection and wartime conditions likely explained much of the increased malaria incidence, there were attempts to blame the victim.¹⁰ Alcoholic excess has been blamed as the cause of many soldiers' shortcomings, including malaria, especially when the analogy from the drunken colonial plantation owner was carried over into the military.

However, the logistical problems created by distances in the Indo-Pacific Region made alcohol a difficult-to-obtain commodity for most military members. Unlike the British Royal Navy, which continued its daily issue of diluted rum (grog) to its sailors, or the French Army, which gave each soldier half a litre per day of *vin ordinaire*, most Allied soldiers had only episodic exposure to alcohol, usually when on leave and rarely any at all during combat operations.¹¹ Those with access to superior transportation assets such as the Air Forces often found creative means to obtain alcohol over long distance supply lines. See Figure 1. Medicinal ethanol was distinctly limited and was supposed to be issued only by medical units. Limitations on sources of ethanol in the Pacific region were often so severe that sailors resorted to locally devised distilleries of fermented sugar (so-called raisin-jack) and citrus juice mixed into torpedo fuel (so-called torpedo juice) before the quartermasters diluted it with poisonous methanol.¹¹ Certainly, soldiers on leave in Australia during World War II had greater access to alcohol than in New Guinea and used it freely, as noted in civil disturbances fuelled by alcohol, such as in the 'battle of Brisbane'.¹²

But did alcohol have any causative relationship with the extraordinary numbers of *P. vivax* relapses



Figure 1: Two RAAF airmen drinking beer in Morotai, Halmahera Islands, Netherlands, East Indies (now Indonesia) in March 1945. Photo AWM OG2308 by John T. Harrison, now in the public domain.

encountered in the Allied Armies in the Pacific during World War II? Binge drinking would seem to be the most likely situation in which malaria relapses could have been induced, and the intermittent supply of alcohol certainly promoted such behaviour.¹³ There are significant problems trying to relate an individual's behaviour with alcohol to malaria relapses in large military populations, primarily due to lapses in chemosuppression with mepacrine (atabrine). Enforced military compliance with daily mepacrine was effective in stopping malaria casualties but was also resented by soldiers who would often omit taking daily medication while on leave. Chemosuppression, indiscipline or non-compliance may have been linked to hopes that a malaria relapse might prolong one's leave period and thus limit exposure to combat conditions back in the jungle. Fairley best described the epidemiology of malaria in the Australian Army and shows 1943 and 1945 epidemic peaks overseas (mainly in New Guinea) with echo increases afterwards in Queensland, as seen in Figure 2.¹⁴ The 1944 peak of malaria in Queensland was almost entirely due to *P. vivax* relapses from soldiers returned from New Guinea and was most likely due to withdrawal of mepacrine chemosuppression.¹⁵ There is no direct way to relate malaria relapses in Queensland to increased access to alcohol compared to combat operations in New Guinea. However, it cannot be ruled out for some individuals.

An analogous situation existed with the US Army fighting in North Africa and Italy. By 1945, many soldiers still had residual parasites in their livers from previous infections, which were largely suppressed by daily mepacrine as the war moved further north

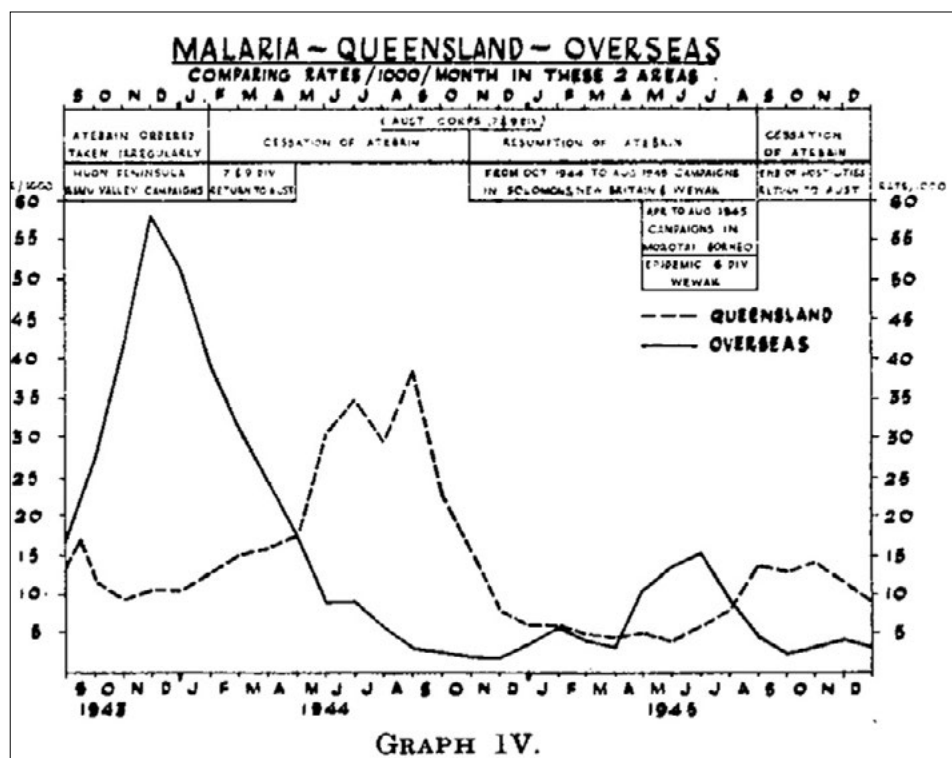


Figure 2: Malaria in Australian Army Soldiers in Queensland and Overseas (mainly New Guinea) during World War II, 1943–45. Note the dotted lines showing secondary peaks of relapsing malaria, largely occurring in Queensland following overseas malaria (solid line). Access to alcohol in Australia was much greater than overseas. However, the explanation for the secondary peaks in Queensland is more likely to be discontinuation of suppressive drug prophylaxis.¹⁴ Reproduced from Medical Journal of Australia 1946.

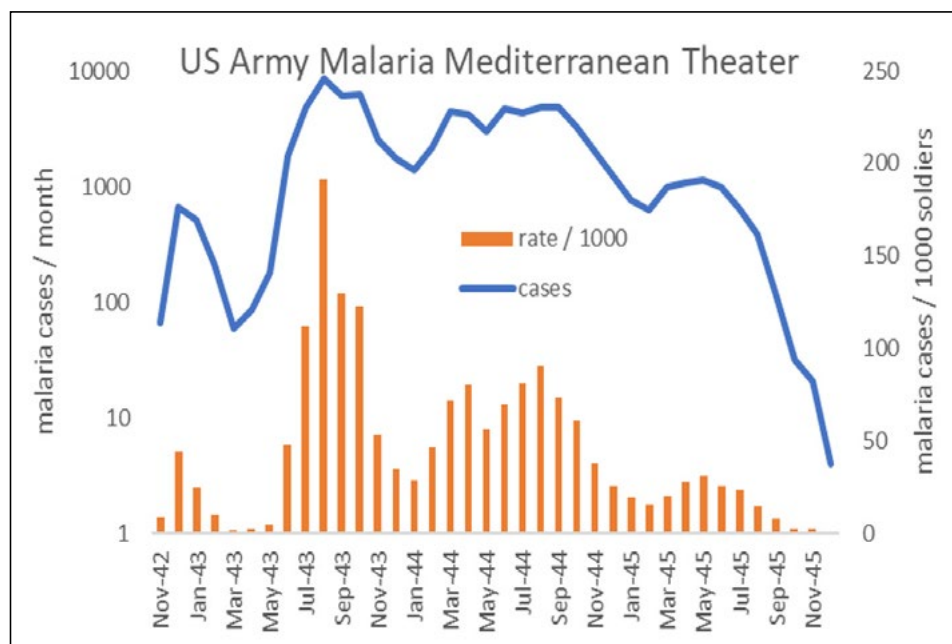


Figure 3: Adaptation of epidemiological observations of malaria in the US Army in the Mediterranean theatre taken from the Official Medical History of the US Army in the Second World War.^{16,18} Note that Victory in Europe (VE) Day occurred on 8 May 1945 and was accompanied by a great deal of celebratory binge drinking. No upward change in malaria incidence was noted in 1945, but suppressive medications were not formally discontinued until soldiers returned to the USA. Note that malaria cases on the left axis are on a logarithmic scale.

into Europe. Alcohol was certainly more available in Europe than in the Pacific Theater. This was particularly true when the armed conflict ended in May 1945. The end of World War II in Europe resulted in much Allied rejoicing and alcohol bingeing. Many US soldiers did not remember much about the Victory in Europe (VE) celebrations other than the huge hangover afterwards. Figure 3 shows the overall malaria epidemiology for the Mediterranean Theater for the US Army.¹⁶ There is no evidence of any increase in malaria associated with VE Day, but neither was there any removal of chemosuppression as had occurred in Australia. Therefore, there is no population-based data to indicate that alcohol ingestion promoted *P. vivax* relapse in either the Australian or US Armies of World War II. However, the data are insufficiently granular to rule out such an effect in some individuals.

It is reasonable to think that a hepatotoxic drug such as ethanol might affect a parasite like malaria, which undergoes an obligatory hepatic phase after inoculation by mosquito. There are many associations of alcohol and the tropics, which may share some overlap with malaria. The problem is seeing whether these associations have any causative value. Despite long traditions, such as gin and tonic, the tropical myths about what does and does not promote malaria largely remain in the category of mythology.⁷ Binge drinking in soldiers is important but has only been seriously studied recently.¹³ Alcoholism was not really considered in the entire 20-volume British Official Medical History of World War II, despite its extensive details on malaria.¹¹ Social observations combining alcohol and malaria are common, but it appears to be mostly coincidental. Walter Reed's observation that the drunken soldiers were the ones who got malaria was correct. However, the connection was the mosquitoes in the swamps around Washington, not the ethanol in the saloons.⁴ Chemotherapy remains the basis of most malaria control in the military. Military malaria is often presented as a

management problem associated with discipline and medication compliance.¹⁷ Wartime epidemics of *P. vivax* malaria in Queensland and Italy centred on the use of mepacrine, not ethanol.^{14,16} Therefore, it is fine to enjoy tonic water in your gin in moderation, but do not expect the quinine in the bitters to protect you from malaria or the gin to induce a relapse.

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Funding: No specific funding was given for this work. The author is an employee of the Australian Defence Force, a retired US Army officer and claims no conflicts of interest.

Acknowledgments: The author recognises our medical officer predecessors of the Second World War who provided outstanding service during great hardships and thanks the many unnamed military officers, scientists, historians and medical librarians who have unselfishly provided data and ideas for this manuscript, especially the librarians at the Australian Defence Force Library at Gallipoli Barracks, Queensland.

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Hookworm Infections in the Military

G D Shanks

Abstract

Soil-transmitted helminths such as hookworm are rarely a problem for military units unless they directly contact faecally contaminated soil during tropical operations. Localised epidemics incapacitating small infantry units have been recorded in the Solomon Islands and Bougainville during World War II and in Vietnam, Grenada and Sierra Leone more recently. Scattered hookworm infection cases and *Strongyloides stercoralis* were seen during the Regional Assistance Mission to the Solomon Islands (RAMSI). Cutaneous reactions such as 'ground itch' from skin penetrating parasites and gastrointestinal disturbances mimicking ulcers occur after massive exposures and may occur prior to eggs appearing in the stool. Post-deployment mass anti-helminth treatment with albendazole and ivermectin is safe but likely kills few worms in most low-risk situations. Consideration should be given to focusing post-deployment treatment on infantry units conducting wet jungle operations in faecally contaminated environments and minimising chemotherapy for lower-risk groups conducting other international engagements.

Keywords: hookworm, Melanesia, geohelminths, chemotherapy, disease casualties

Besides 'ground itch' and 'foxhole cough', the parasite may cause an acute duodenitis that clinically simulates an ulcer diathesis, except that eating aggravates the pain.¹

Enteric disease control depends on sanitary disposal of faecal material, which is less than universal in some of the Melanesian and Polynesian countries of the Indo-Pacific.² Geohelminths spread by soil contamination with worm eggs are now very uncommon in Australia except for some isolated Aboriginal communities but remain an issue in the Indo-Pacific, particularly on small islands.³ Soldier disgust with visible worms or obvious faecal material does not protect against skin contamination, especially during engineer operations or when muddy water leaks into boots. Skin penetrating parasites are part of the life cycle of hookworms and are seen as a circuitous pruritic rash caused by migrating larvae in cutaneous larva migrans.⁴ Eosinophilia is one of the few laboratory clues to the presence of hookworm infections, as faecal eggs are not seen early in the disease and are often not searched for until the diagnosis is suggested by eosinophilia. Despite such exposures in poorly sanitised areas, hookworm outbreaks that incapacitate small infantry units rarely occur unless there is massive cutaneous exposure to focally contaminated soil. This brief review looks at some of these historical outbreaks to gauge the actual risk to current operations and calibrate the need for post-deployment chemotherapy against helminths.

During World War II, malaria was the predominant parasitic infectious disease, creating casualties in the Southwest Pacific Theater, but filariasis and geohelminths remained tropical diseases of interest.^{5,6} Initially the worry was from the large number of troops being massed in bare bases with rudimentary sanitation recently established in Queensland and the Northern Territory before being sent to Papua New Guinea and the Solomon Islands. Although sanitation was imperfect, the disease outbreaks primarily comprised dysentery and diarrhoea.⁷ Outbreaks specifically attributed to geohelminths were few in comparison, although the *Medical Journal of Australia* did warn in 1943 of hookworm as a cause of anaemia in returned soldiers.⁵ New Zealand's 40th Battalion was deployed in the Solomon Islands and reported an April 1944 outbreak of gastrointestinal disease described as 'malaise, upper abdominal pain, anorexia, nausea and vomiting, general apathy, and loss of energy' on Nissan Island.⁸ A third of the battalion had eosinophilia, as did at least 5% of the entire force. Mass treatment with tetrachloroethylene was instituted, and many were repatriated to New Zealand. A similar event occurred in 58/59th Battalion of the 2nd Australian Imperial Force (AIF) on Bougainville in March 1945 when 117/418 soldiers were found to be excreting hookworm eggs.⁹ Mass treatment again usually resolved the general malaise and gastrointestinal symptoms associated with hookworm. Although mild disease symptoms were the rule, some individuals with heavy exposure to gardens fertilised by faeces

were severely affected, including pulmonary signs indicative of mass larval migration.¹⁰ Investigations of Australian soldiers in Australia at least six months following tropical deployments showed that those with proven hookworm were not significantly more anaemic than soldiers without hookworm eggs.¹¹

The USA military also experienced hookworm outbreaks in the Solomon Islands (Guadalcanal, New Georgia) and northern Burma, particularly in the infantry, during combat operations in wet, tropical conditions.^{12,13} Overall infection rates and worm burdens were low (<1/1000 hospitalised). High-risk exposures occurred in local villages and enemy encampments, lacking latrine disposal of human faecal material during combat operations. Logistics and support troops not involved in combat had a much lower risk of hookworm.^{12,14,15} Eosinophilia detected by differential blood leucocyte counts was a common way of detecting hookworm and other geohelminth risk, given the laborious nature of stool examinations for parasite ova.¹⁵ Mass treatment of field infantry units based on eosinophilia was done to avoid introducing exotic parasites (*Ancylostoma duodenale*) into the USA.¹⁴ Vague gastrointestinal complaints and cross-over into neuropsychiatric diagnoses made eosinophilia a useful objective finding indicative of likely hookworm infection.¹⁶

There have been relatively few reports of hookworm as a military problem since the Second World War. During the Vietnam War, 46 USA soldiers from a single unit of the 1st Cavalry Division were admitted to the hospital with severe gastrointestinal complaints found to be due to hookworm infection several weeks following initial exposure.¹ Other localised hookworm outbreaks were documented in combat units occasionally severe enough to mimic gastric ulcer disease. Five to seven weeks after the 1983 invasion of Grenada >20% of 684 USA Army soldiers of the 82nd Airborne Division reported gastrointestinal symptoms, with many also demonstrating eosinophilia of >10%.¹⁷ Thirty-two cases of confirmed hookworm infection were found on stool examination. In 1990, the UK's Parachute Battalion encountered geohelminths during a very brief hostage rescue mission in the West African country of Sierra Leone. Half the company had both gastrointestinal symptoms and eosinophilia 6 weeks later and 26% were found to have hookworm infections. Disease risk was concentrated in one sub-unit that conducted a ground assault through the enemy camp area, including the latrines.¹⁸

Despite numerous recent tropical deployments for humanitarian and disaster relief missions, the ADF has had little recent experience with documented

geohelminth infections, particularly hookworm. The decade-long deployment of the Regional Assistance Mission to the Solomon Islands (RAMSI) was a possible exception due to its size and duration. One hookworm (*Ancylostoma ceylanicum*) and 14 Strongyloidiasis infections were documented in RAMSI.^{4,19} This low-level disease risk led to improved post-patrol cleaning of field equipment to minimise exposure to soil and the routine administration of albendazole and ivermectin post-deployment to eliminate residual infections. Given the variability of exposure to faecally contaminated soils, the likely small number of worms in most infections and the unknown compliance with any post-deployment medication, it is difficult to judge the extent of geohelminth risk, particularly hookworm to the modern ADF in the Indo-Pacific.

Is routine albendazole and ivermectin still appropriate post-exposure prophylaxis for ADF members returning from tropical deployments in the Indo-Pacific Region? Post-deployment medications aim to prevent illness in the individual, stop any cross-border introductions of exotic pathogens and minimise any relapses or chronic illness. The medications are extremely safe, having been given to a large proportion of the global population, but are they actually killing any worms when given to ADF members post-deployment in the Southwest Pacific?²⁰ The very low infection rate of ADF members and the decreasing disease burden make the utility of routine anthelmintic drugs in the ADF very marginal. The need for post-deployment medication likely depends on the exposure risk; estimates from the military-specific literature suggest that only soldiers deployed under arduous or combat conditions in poorly sanitised, tropical countries are likely at risk of hookworm infections. Improved sanitation across Southeast Asia and mass administration of anti-helminthic drugs throughout the Indo-Pacific have likely lowered the environmental risk of hookworm exposure.² Would risk-based medication use be practical knowing that most health support plans are copied and pasted from previous exercises and staff officers resist changing what they do not understand? Such an approach would suggest that an infantry company deployed to Wewak for jungle exercises (e.g. Olgetta Warrior) could continue to receive albendazole and ivermectin. In contrast, such medication could be omitted for those staying in hotels or barracks in Port Moresby and Lae. It is logical to either use both drugs for a synergistic effect in highly exposed groups or neither medication in the vast majority who have little exposure to contaminated soils during their deployment outside of Australia. Since some gastrointestinal complaints

are nearly universal following such deployments, it is difficult to see how symptom screening has anything to contribute to such a decision. Eosinophilia has been a sensitive but non-specific indicator of helminth infection and could be used in recently returned ADF members requiring evaluation for medical complaints or generic symptoms. The COVID-19 pandemic graphically demonstrated that getting an entire population to participate in public health measures is often problematic, especially when healthcare providers find it challenging to communicate the risk of the medication versus the anticipated benefit. Limitations on the admittedly very safe anti-helminthic drugs used post-deployment in the ADF need to be seen in this context and not as an economic measure. Rational use of any medication needs to focus on the populations most likely to benefit.

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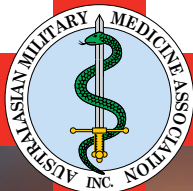
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