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Pain-related musculoskeletal disorders, psychological comorbidity, and the relationship with physical and mental well-being in Gulf War veterans

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ABSTRACT

Occupational activities such as lifting loads, working in constrained spaces, and training increase the risk of pain-related musculoskeletal disorders (MSDs) in military veterans. Few studies have investigated MSD and psychological disorder in veterans, and previous studies had limitations. This cross-sectional study compared pain-related MSD and psychological comorbidity and well-being between 1381 male Australian 1990–1991 Gulf War veterans (veterans) and a military comparison group (n = 1377, of whom 39.6% were serving and 32.7% had previously deployed). At a medical assessment, 2000–2002, reported doctor-diagnosed arthritis or rheumatism, back or neck problems, joint problems, and soft tissue disorders were rated by medical practitioners as nonmedical, unlikely, possible, or probable diagnoses. Only probable MSDs were analysed. Psychological disorders in the past 12 months were measured using the Composite International Diagnostic Interview. The Short-Form Health Survey (SF-12) assessed 4-week physical and mental well-being. Almost one-quarter of veterans (24.5%) and the comparison group (22.4%) reported an MSD. Having any or specific MSD was associated with depression and posttraumatic stress disorder (PTSD), but not alcohol disorders. Physical and mental well-being was poorer in those with an MSD compared to those without, in both study groups (eg, veterans with any MSD, difference in SF-12 physical component summary scale medians = −10.49: 95% confidence interval −12.40, −8.57), and in those with MSD and psychological comorbidity compared with MSD alone. Comorbidity of any MSD and psychological disorder was more common in veterans, but MSDs were associated with depression, PTSD, and poorer well-being in both groups. Psychological comorbidity needs consideration in MSD management. Longitudinal studies are needed to assess directionality and causality.

1. Introduction

Musculoskeletal disorders (MSDs) are common in the community, occurring in almost one-quarter of adults [4]. Globally, MSDs contribute significantly (21.3%) to years lived with disability, second only to mental and behavioural disorders, while the global burden of pain-related MSD is growing. The main contributors are low back pain, neck pain, osteoarthritis, and other MSDs [47]. MSDs encompass a range of conditions, diverse in their pathophysiology [51], linked anatomically and by their association with pain [51], particularly severe, chronic pain, and impaired physical function [40,51].

MSDs cause considerable morbidity in certain groups, including military populations. Increased osteoarthritis incidence in US military personnel compared with similar-aged community groups was attributed to increased physical demands, repetitive joint-loading physical and occupational activities [6]. MSDs were a leading cause of medical discharge from military service [13], with the burden in deployed populations increasing over time [18,24].

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MSDs were more common in Australian Vietnam veterans than the age-matched general population [37], accounted for 12.8% of self-reported conditions in French Gulf War veterans [41], and were the commonest hospitalisation diagnosis among US Gulf War veterans in 1994–2004 [19] and Veterans' Affairs primary care diagnosis (57%) amongst US Afghanistan/Iraq veterans [39]. The US Institute of Medicine reported no increased MSD hospitalisation risk among Gulf War veterans [22], but recognised that many MSD cases were likely to be treated as outpatients.

Psychological disorders have also been associated with increased morbidity in Gulf War veterans [21]. The important relationship between physical and psychological health and stressful experiences of veterans has been increasingly recognised [30]. Posttraumatic stress disorder (PTSD), depression, and substance abuse disorders in Afghanistan/Iraq veterans were related to a greater medical disease burden, and PTSD was increasingly associated with comorbid medical disorders over time [3]. PTSD was associated with an almost 2-fold MSD increase in Afghanistan/Iraq veterans [3], similar to US Vietnam veterans [5]. Gulf War deployment was characterised by short air/ground wars, specific exposures; for example, oil-well fire smoke, dust, chemical warfare agents, use of nuclear/chemical/biological protective suits, entering/inspecting enemy equipment [16], and stressful experiences among naval personnel, including fear/threat of entrapment below waterline, fear of death, or threat of nuclear/chemical/biological agent attack [20]. The relationship between MSD and psychological disorders may differ between different veteran groups, indeed, a systematic review of arthritis and depression recognised the importance of varying the study population in future cross-sectional studies [9].

Limitations of previous studies of the relationship between MSD and psychological disorders in veterans include a focus on PTSD rather than psychological disorders in general, use of self-report instruments rather than a structured diagnostic interview for psychological assessment, and lack of a military comparison group, including restriction to self-referred participants in clinical evaluation/registry programs.

This study aimed to assess in Gulf War veterans compared with a military comparison group:

- MSD prevalence,
- Comorbidity of psychological disorders in those with MSD compared to those without MSD, and
- Physical and mental well-being in those with MSD, and with or without a comorbid psychological disorder, compared to those without MSD, or with any MSD alone.

2. Methods

2.1. Study population

The overall study population was the entire cohort of 1871 Australian veterans who served in the Gulf region during the period August 2, 1990 to September 4, 1991. The majority of Gulf War veterans, 1249 (85.8%), had served in the Royal Australian Navy at the time of the Gulf War, while 95 (6.5%) and 112 (7.7%) had served in the Army and the Air Force, respectively. The Gulf War group included 38 women. The comparison group of 2924 individuals was selected randomly from 26,411 Australian Defence Force personnel who were in operational units at the time of the Gulf War but did not deploy to that conflict. The comparison group was frequency matched to the Gulf War veteran group by sex, service branch (Navy, Army, Air Force), and 3-year age bands. The comparison group sample included 74 women. Participants were recruited by mailed invitation in 2000–2002, with 2 further mailings and intensive follow-up telephone contact for nonresponders. Overall, 1456 (80.5%) eligible veterans (not deceased or living overseas for the duration of the study) and 1588 (56.8%) of 2796 eligible comparison group subjects participated [21]. The Human Research Ethics Committees of Monash University, Australian Department of Veterans' Affairs, and Department of Defence approved the study.

2.2. Data collection

Participation in the study included completing a postal questionnaire and undergoing a comprehensive health assessment carried out by specially trained doctors, nurses, and psychologists at 10 clinics located around Australia. Participants were reimbursed for their expenses for attending the medical assessment. The questionnaire collected information about demographics, lifestyle factors, military service including deployment history, and reported doctor-diagnosed or -treated medical conditions, including MSD, the year first diagnosed, and whether a doctor had treated them for the condition in the past year.

Participants were provided with 4 options for reporting doctor-diagnosed or -treated MSD, based on categories previously used in overseas Gulf War veteran health studies [25,44,45]: (1) arthritis or rheumatism, (2) back or neck problems, (3) joint problems, and (4) fibrositis or fibromyalgia. Participants were also provided with space to specify/include other medical conditions for which they had been diagnosed or treated by a doctor.

During the health assessment, medical doctors assessed and rated the likelihood of all the reported – including other added, diagnosed, or treated – medical conditions. The assessing doctors asked several questions about the diagnosis, including whether confirmatory investigations had been performed, treatment initiated, specialist referral made, considered whether such management was consistent with standard medical practices, then classified these self-reported doctor-diagnosed conditions as either probable, possible, unlikely, or nonmedical diagnoses [1,26]. This method was adopted to improve classification of the self-reported doctor-diagnosed conditions.

Doctor-diagnosed or -treated musculoskeletal conditions that participants had reported in addition to the 4 options in the questionnaire, and that had been rated as a probable diagnosis, were coded using the International Classification of Diseases, 10th revision (ICD-10 Online Version: 2010), "Diseases of the musculoskeletal system and connective tissue" (Chapter XIII) [54], by medically qualified researchers (H.K., M.R.) who were blinded to the service status of the participants. ICD-10 is the current version of the statistical classification system of disease morbidity and mortality of the World Health Organization [53]. The coded MSDs were allocated to one of the following 4 study MSD categories where applicable: Arthritis or rheumatism includes any Arthropathies (M00-M19); Joint problems includes any other joint disorders from ICD-10 Arthropathies (M00-M25); and Back or neck problems includes any Dorsopathies (M40-M54). As very few participants reported fibrositis or fibromyalgia (M79.7), these were mapped to the more inclusive Soft tissue disorders (M60-M79).

Only probable MSDs were included in the analysis in the present study. MSDs were defined as any probable doctor-diagnosed MSD treated within the past 12 months, as an indicator of the currency of the disorder.

Participants were evaluated for any history of psychological disorder in an interview with a psychologist, using the computer-assisted version of the Composite International Diagnostic Interview (CIDI) [55] according to *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) criteria [2]. Psychological disorders of interest in this study were major depression (herein termed depression), PTSD, and alcohol abuse or dependence (herein termed alcohol use disorder). To be designated as present, participants must have met DSM-IV diagnostic criteria based upon self-reported symptomatology occurring within the previous 12 months of the interview.