

Health Challenges of Military Personnel and Veterans

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Military personnel and veterans meet unique health challenges that stem from the complex interplay of their service experiences, the nature of warfare, and their interactions with both military and civilian healthcare systems.

combat injury

environmental exposure

healthcare accessibility

military personnel

post-traumatic stress disorder

psychological stressors

1. Introduction

Military staff face unique challenges, both in terms of occupational injuries during combat and training as well as exposure to environmental hazards when stationed in high-risk areas. These challenges can lead to a myriad of consequences, ranging from physical and mental stress to life-threatening conditions and enduring disabilities ^{[1][2]}.

While the term “disability” generally refers to impairments that hinder one’s ability to perform everyday activities and interact with the world, it is worth noting that this can encompass challenges in areas such as communication, hearing, learning, mental health, and social engagement. Though it might be tempting to view all individuals with disabilities under a single umbrella, it is crucial to understand the diverse needs and origins of these impairments. For example, the challenges and experiences faced by military service members may differ significantly from those of civilians, emphasizing the importance of specialized care and understanding for this subset of the population. Further research could shed light on these nuanced differences and the unique needs of our military community ^{[3][4]}.

Evidence of these distinct challenges comes from comparisons between civilian and military patients ^[5]. For example, military burn patients from Iraq and Afghanistan displayed more severe injuries in terms of total body surface area but had lower mortality rates. Notably, they had more blast trauma-related injuries, pointing to both a different injury pattern and the benefits of better pre-injury physical conditioning and efficient logistics in the military healthcare system ^{[6][7]}. The nature of injuries, like traumatic brain injury (TBI), also varies between military veterans and civilians, underscoring the importance of tailored care ^{[8][9]}.

Regardless of origin, the management of disabilities—whether from birth or occupational exposure, like in military service members—is multifaceted. It spans activity limitation, impairment, and participation restrictions ^{[3][4]}. The World Health Organization’s International Classification of Functioning, Disability, and Health (ICF) offers a

framework to understand and classify these dimensions, providing tools for assessing overall health and function [4].

From the above discussion, it is evident that military personnel encounter distinct medical challenges necessitating specialized care immediately post-injury and for long-term management. This is further complicated by the integration of military personnel and veterans into civilian healthcare systems, especially in countries with dual healthcare structures. In contrast, Sweden provides a unique example where a single healthcare system serves both civilians and military personnel [10][11][12].

2. Health Challenges of Military Personnel and Veterans

2.1. Physical Impacts and Injuries

Military personnel are susceptible to a wide range of battlefield injuries and medical conditions. These can include shrapnel and gunshot wounds, limb amputations, and traumatic head and brain injuries sustained during combat. Additionally, many suffer from tinnitus and hearing loss due to noise exposure, as well as sprains, strains, and limited range of motion—particularly in the ankles and knees—resulting from strenuous exercises and missions in challenging environments [13][14].

The rate and type of injuries in warfare have evolved, reflecting shifts in combat strategies and technologies. While both urban warfare and armored warfare have been integral components of military strategy since WWII, their prevalence and the contexts in which they are employed have varied. For instance, the Battle of Bachmut in 2014 in Ukraine showcased the intricacies of urban warfare. Concurrently, various campaigns have highlighted the nuances of armored warfare. Recent analyses from the war science literature illustrate these shifts and their implications for military health [2]. This shift has been bolstered by the integration of advanced technologies, such as drones [15]. While not entirely novel, these technologies have revolutionized modern conflict dynamics. The increasing targeting and involvement of civilians in conflicts, as evidenced in wars such as WWII, Vietnam, and more recent conflicts in Sudan, challenges traditional estimation methods. This trend underscores a concerning deviation from or neglect of the principles outlined in international humanitarian law. Numerous reports and studies have highlighted how conflict parties have frequently disregarded these principles, leading to dire consequences for civilian populations [16][17]. Furthermore, the emergence of hybrid warfare—a blend of conventional, irregular, and cyber warfare tactics, often combined with measures to influence public opinion and political policies—has revolutionized modern conflicts. This transformation underscores the need for a comprehensive approach to assessing not only physical casualties but also the mental health repercussions that arise from such multifaceted combat scenarios. This change demands not only rigorous analysis but also continuous monitoring of military healthcare requirements and casualty records [18][19][20].

2.2. Environmental Exposure and Impacts

Military service members are at risk of exposure to environmental hazards, such as contaminated water, chemicals, infections, and burn pits ^[1]. A notable historical instance is the exposure to Agent Orange, a chemical herbicide and defoliant, during the Vietnam War. This exposure has been linked to an increased risk of developing specific types of cancer and other health complications ^[21]. Despite significant research, comprehensive treatments for these conditions are still elusive, primarily due to the diverse range of health issues associated with this exposure. Further complicating matters is the latency period, which can span decades before symptoms appear and prevent early detection and treatment efforts.

Similarly, Gulf War Syndrome, a chronic, multi-symptomatic disorder affecting military veterans from both sides of the 1990–1991 Persian Gulf War, has been characterized by Bjørklund et al. ^[22]. The multifaceted nature of this syndrome, characterized by a wide spectrum of symptoms that include fatigue, headaches, cognitive dysfunction, and other systemic manifestations, poses challenges in both diagnosis and management. To date, there is no universally effective treatment for Gulf War Syndrome, largely due to its heterogeneity and the complex interplay of genetic, environmental, and psychological factors.

In both of these examples, the overarching challenge lies in the complexity and diversity of the health issues involved, the long latency periods, and the complex interplay of various risk factors. These factors combined highlight the need for continued research to better understand these conditions and develop more effective approaches to their early detection, diagnosis, and management.

2.3. Stressors and Psychological Impacts

Military servicemen might be affected by diverse stressors, such as routine stress, stress caused by sudden changes in their lives, and traumatic stress when in danger of or experiencing serious harm or death ^[23]. The latter may result in mental health problems such as anxiety, post-traumatic stress disorder, depression, substance use, and suicide. Some studies have discussed the process of family detachment ^{[24][25][26]}, operational stress ^[27], and the importance of social support and the availability of special psychological care for the military staff, indicating the prevalent occurrence of diverse psychological conditions due to different existing stressors in military life and the need for preventive and responsive measures ^{[28][29]}.

Addressing multidimensional health concerns and improving the well-being of military personnel and veterans requires adopting a multifaceted approach. This includes integrating mental health screenings and support services into routine medical care for service members and cultivating an open dialogue about mental health to reduce stigma within the military community. Moreover, further investment in research to better understand the unique health challenges faced by military personnel is crucial, as it can inform the development of targeted treatments and interventions ^{[30][31]}.

2.4. The Current Issues for Military Service Members to Receive Adequate Healthcare

While civilian healthcare systems have their own distinct challenges, military personnel must receive proper care for their unique and often specialized needs. There are distinct differences between the medical concerns typically seen in military staff, especially combat-related injuries and certain chronic conditions, compared to those in the civilian population. Addressing these disparities requires both training and awareness on the part of civilian healthcare providers [14][32]. It is also crucial to recognize that a lack of familiarity with the full spectrum of conditions and psychological concerns affecting military personnel might exist among civilian healthcare staff [33]. However, in both wartime and peacetime, the goal should always be to ensure equal access and quality of care for all, regardless of civilian or military status.

On the other hand, even in those countries that have a separate military healthcare system, several issues appear to be a real obstacle for veterans and military service members to receive adequate care. For instance, in the US, only around half of the existing veterans (over 9 million) are registered to receive healthcare through the Veteran Healthcare Administration [34][35]. Another report from the RAND Center for Military Health Policy Research also shows that only 30% of the 50% of registered veterans in need of mental health services receive proper and evidence-based care [36]. The most important reasons for not receiving adequate healthcare were (1) the complicated healthcare system and the labyrinth of diverse specialties; (2) long wait times; and (3) disparities in rural areas [32]. Although these issues may be similar to what civilians experience, they also add to the already existing struggles that military staff and veterans face in integrating into civilian society [37].

3. Summary

The distinct health challenges military service members face due to trauma or environmental hazards compared to civilians. These challenges are defined by unique mechanisms, outcomes, and requisite treatments. As military personnel transition to civilian life, they often encounter the healthcare system's constraints. While grappling with their specific medical conditions, many also face hurdles such as navigating a healthcare system that can be complex, characterized by prolonged wait times and disparities in access, particularly in rural regions. Addressing both their immediate and long-term medical needs becomes paramount. Despite efforts, gaps remain in how the system accommodates the specific needs of veterans and active-duty personnel.

The healthcare issues that military personnel and veterans grapple with span a wide spectrum, from post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) to extensive rehabilitation requirements for amputees. This delineates the unparalleled challenges they face, mandating expertise across multiple medical disciplines like neuroscience, orthopedics, and oral and maxillofacial care. The necessity for such a broad spectrum of care accentuates the interlinking nature of their health problems and underscores the urgency for a comprehensive, evidence-backed, and integrated medical approach [28][38][39][40][41][42][43][44].

One crucial avenue to bolstering the understanding of military-specific health challenges lies in the realm of education. By embedding military medicine within medical and allied health curricula, the next generation of healthcare providers can be adequately equipped to address the specialized needs of military personnel and veterans. This integration serves a dual purpose. Firstly, it cultivates a more informed understanding among

practitioners about the unique health challenges, trauma mechanisms, and environmental hazards that military personnel encounter. Secondly, it fosters a bridge of communication and trust between healthcare providers and their military patients by demonstrating a deepened understanding of the latter's experiences and challenges.

To serve the needs of veterans, a supportive ecosystem tailored for them is essential. Such an ecosystem must be built on collaboration among military establishments, healthcare providers, and policymakers, particularly in contexts like the US, where the military–veteran population is significant [\[32\]](#)[\[45\]](#). Furthermore, families and local communities play an invaluable role in promoting the well-being of military personnel and veterans [\[46\]](#). The focus should be on devising strategies that channel resources and support to these key stakeholders.

A pivotal element in this ecosystem is a healthcare system that seamlessly integrates care, whether it is under a military or civilian umbrella. This integrated approach should encompass various phases of medical treatment. While some integrative efforts can be driven by cost-saving measures, it is crucial to ensure that the primary objective remains the provision of holistic and coordinated care. Achieving true integration requires the confluence of various specialties under a multidisciplinary umbrella focused on delivering patient-centered care [\[47\]](#)[\[48\]](#).

References

1. Geretto, M.; Ferrari, M.; De Angelis, R.; Crociata, F.; Sebastiani, N.; Pulliero, A.; Au, W.; Izzotti, A. Occupational Exposures and Environmental Health Hazards of Military Personnel. *Int. J. Environ. Res. Public Health* 2021, 18, 5395.
2. Khorram-Manesh, A.; Goniewicz, K.; Burkle, F.M.; Robinson, Y. Review of military casualties in modern conflicts—The re-emergence of casualties from armored warfare. *Mil. Med.* 2022, 187, e313–e321.
3. World Health Organization. International Classification of Functioning, Disability and Health (ICF) External Icon; World Health Organization: Geneva, Switzerland, 2001.
4. US Department of Health and Human Services. The Surgeon General's Call to Action to Improve the Health and Wellness of Persons with Disabilities; US Department of Health and Human Services, Office of the Surgeon General: Washington, DC, USA, 2005.
5. Wild, H.; Stewart, B.T.; LeBoa, C.; Stave, C.D.; Wren, S.M. Epidemiology of Injuries Sustained by Civilians and Local Combatants in Contemporary Armed Conflict: An Appeal for a Shared Trauma Registry Among Humanitarian Actors. *World J. Surg.* 2020, 44, 1863–1873.
6. Rizzo, J.A.; Pruskowski, K.A.; Le, T.; Gurney, J.; Rowan, M.P.; Chung, K.K.; Cancio, L.C. Comparison of military and civilian burn patients admitted to a single center during 12 years of war. *Burns* 2019, 45, 199–204.

7. Peleg, K.; Jaffe, D.H.; Israel Trauma Group. Are injuries from terror and war similar? A comparison study of civilians and soldiers. *Ann. Surg.* 2010, 252, 363–369.
8. Forneris, C.A.; Gartlehner, G.; Brownley, K.A.; Gaynes, B.N.; Sonis, J.; Coker-Schwimmer, E.; Jonas, D.E.; Greenblatt, A.; Wilkins, T.M.; Woodell, C.L.; et al. Interventions to prevent post-traumatic stress disorder: A systematic review. *Am. J. Prev.* 2013, 44, 635–650.
9. Wolters Kluwer Health. Traumatic Brain Injury in Veterans: Differences from Civilians May Affect Long-Term Care. ScienceDaily. 6 July 2017. Available online: www.sciencedaily.com/releases/2017/07/170706155930.htm (accessed on 8 August 2023).
10. Tanielian, T.; Farmer, C. The US Military Health System: Promoting readiness and providing health care. *Health Aff.* 2019, 38, 1259–1267.
11. Khorram-Manesh, A.; Robinson, Y.; Boffard, K.; Örténwall, P. The history of the Swedish military healthcare system and its path toward civilian-military collaboration from a total defense perspective. *Mil. Med.* 2020, 185, e1492–e1498.
12. Khorram-Manesh, A.; Burkle, F.M.; Phattharapornjaroen, P.; Ahmadi Marzaleh, M.; Sultan, M.A.; Mäntysaari, M.; Carlström, E.; Goniewicz, K.; Santamaria, E.; Comandante, J.D.; et al. The development of the Swedish Military Healthcare System: Part II—Re-evaluating the military and civilian healthcare systems in crises through a dialogue and study among practitioners. *Mil. Med.* 2021, 186, e442–e450.
13. Bergeron, M.F.; Nindl, B.C.; Deuster, P.A.; Baumgartner, N.; Kane, S.F.; Kraemer, W.J.; Sexauer, L.R.; Thompson, W.R.; O'Connor, F.G. Consortium for Health and Military Performance and American College of Sports Medicine consensus paper on extreme conditioning programs in military personnel. *Curr. Sports Med. Rep.* 2011, 10, 383–389.
14. Khorram-Manesh, A. Facilitators and constrainers of civilian–military collaboration: The Swedish perspectives. *Eur. J. Trauma Emerg. Surg.* 2020, 46, 649–656.
15. Hwang, W.J. How are drones being flown over the gray zone? *Def. Secur. Anal.* 2021, 37, 328–345.
16. Burkle, F.M.; Goniewicz, K.; Khorram-Manesh, A. Bastardizing Peacekeeping and the Birth of Hybrid Warfare. *Prehospital Disaster Med.* 2022, 37, 147–149.
17. Khorram-Manesh, A.; Burkle, F.M., Jr. Civilian Population Victimization: A Systematic Review Comparing Humanitarian and Health Outcomes in Conventional and Hybrid Warfare. *Disaster Med. Public Health Prep.* 2022, 17, e192.
18. Belmont, P.J., Jr.; McCrskin, B.J.; Hsiao, M.S.; Burks, R.; Nelson, K.J.; Schoenfeld, A.J. The nature and incidence of musculoskeletal combat wounds in Iraq and Afghanistan (2005–2009). *J. Orthop. Trauma* 2013, 27, e107–e113.

19. Zouris, J.; D'Souza, E.; Wing, V. A Statistical Approach for Estimating Casualty Rates during Combat Operations; Report No. 13–61; Naval Health Research Center: San Diego, CA, USA. Available online: <https://apps.dtic.mil/sti/pdfs/ADA621488.pdf> (accessed on 25 April 2023).
20. Leitch, R.A.; Champion, H.R.; Navein, J.F. Analysis of Casualty Rates and Patterns Likely to Result from Military Operations in Urban Environments. 1997. Available online: <https://smallwarsjournal.com/documents/urbancasstudy.pdf> (accessed on 16 June 2023).
21. Stellman, J.M.; Stellman, S.D. Agent Orange during the Vietnam War: The lingering issue of its civilian and military health impact. *Am. J. Public Health* 2018, 108, 726–728.
22. Bjørklund, G.; Pivina, L.; Dadar, M.; Semenova, Y.; Rahman, M.M.; Chirumbolo, S.; Aaseth, J. Depleted uranium and Gulf War Illness: Updates and comments on possible mechanisms behind the syndrome. *Environ. Res.* 2020, 181, 108927.
23. Clausen, A.N.; Clarke, E.; Phillips, R.D.; Haswell, C.; VA Mid-Atlantic MIRECC Workgroup; Morey, R.A. Combat exposure, posttraumatic stress disorder, and head injuries differentially relate to alterations in cortical thickness in military veterans. *Neuropsychopharmacology* 2020, 45, 491–498.
24. Lowe, K.N.; Adams, K.S.; Browne, B.L.; Hinkle, K.T. Impact of military deployment on family relationships. *J. Fam. Stud.* 2012, 18, 17–27.
25. Landry, C.A. Mitigating the Risk of Opioid Overdose and Death of the Veteran: An Integrative Review. Ph.D. Thesis, Liberty University, Lynchburg, VA, USA, 2021.
26. D'Anci, K.E.; Uhl, S.; Giradi, G.; Martin, C. Treatments for the prevention and management of suicide: A systematic review. *Ann. Intern. Med.* 2019, 171, 334–342.
27. Webb-Murphy, J.A.; De La Rosa, G.M.; Schmitz, K.J.; Vishnyak, E.J.; Raducha, S.C.; Roesch, S.C.; Johnston, S.L. Operational stress and correlates of mental health among Joint Task Force Guantanamo Bay military personnel. *J. Trauma. Stress* 2015, 28, 499–504.
28. Gettings, R.D.; Kirtley, J.; Wilson-Menzfeld, G.; Oxburgh, G.E.; Farrell, D.; Kiernan, M.D. Exploring the role of social connection in interventions with military veterans diagnosed with post-traumatic stress disorder: Systematic narrative review. *Front. Psychol.* 2022, 13, 3646.
29. Moldjord, C.; Laberg, J.C.; Rundmo, T. Stressors, social support and military performance in a modern war scenario. *J. Mil. Stud.* 2015, 6, 1–18.
30. Mendrek, P.; Osiak, B.; Goniewicz, K. Social support for veterans taking part in military service outside their country's borders. *Health Psychol. Rep.* 2019, 7, 177–182.
31. Thompson, J.M.; Lockhart, W.; Roach, M.B.; Atuel, H.; Bélanger, S.; Black, T.; Castro, C.A.; Cooper, A.; Cox, D.W.; de Boer, C.; et al. Veterans' Identities and Well-being in Transition to Civilian Life—A Resource for Policy Analysts, Program Designers, Service Providers, and

- Researchers: Report of the Veterans' Identities Research Theme Working Group. Charlottetown (PE): Veterans Affairs Canada; Research Summary/June 2017. Available online: <https://www.veterans.gc.ca/eng/about-vac/research/research-directorate/publications/reports/identities-transition-civil-life> (accessed on 16 June 2023).
32. Khorram-Manesh, A.; Lönroth, H.; Rotter, P.; Wilhelmsson, M.; Aremyr, J.; Berner, A.; Andersson, A.N.; Carlström, E. Non-medical aspects of civilian–military collaboration in management of major incidents. *Eur. J. Trauma Emerg. Surg.* 2017, 43, 595–603.
 33. Vallerand, A.H.; Cosler, P.; Henningfield, J.E.; Galassini, P. Pain management strategies and lessons from the military: A narrative review. *Pain Res. Manag.* 2015, 20, 261–268.
 34. Mission RollCall. What Are the Barriers to Healthcare for Veterans? Available online: <https://www.missionrollcall.org/post/what-are-the-barriers-to-healthcare-for-veterans> (accessed on 16 June 2023).
 35. Luo, G. A roadmap for designing a personalized search tool for individual healthcare providers. *J. Med. Syst.* 2014, 38, 6.
 36. Tanielian, T.L. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*; Rand Corporation: Santa Monica, CA, USA, 2008; Volume 1.
 37. Gonzalez, J.A.; Simpson, J. The workplace integration of veterans: Applying diversity and fit perspectives. *Hum. Resour. Manag. Rev.* 2021, 31, 100775.
 38. Creamer, M.; Wade, D.; Fletcher, S.; Forbes, D. PTSD among military personnel. *Int. Rev. Psychiatry* 2011, 23, 160–165.
 39. Brasure, M.; Lamberty, G.J.; Sayer, N.A.; Nelson, N.W.; MacDonald, R.; Ouellette, J.; Wilt, T.J. Participation after multidisciplinary rehabilitation for moderate to severe traumatic brain injury in adults: A systematic review. *Arch. Phys. Med. Rehabil.* 2013, 94, 1398–1420.
 40. Moriarty, H.; Winter, L.; Robinson, K.; Piersol, C.V.; Vause-Earland, T.; Iacovone, D.B.; Newhart, B.; True, G.; Fishman, D.; Hodgson, N.; et al. A randomized controlled trial to evaluate the veterans' in-home program for military veterans with traumatic brain injury and their families: Report on impact for family members. *PM&R* 2016, 8, 495–509.
 41. Symsack, A.; Gaunard, I.; Thaper, A.; Springer, B.; Bennett, C.; Clemens, S.; Lucarevic, J.; Kristal, A.; Sumner, M.; Isaacson, B.; et al. Usability assessment of the rehabilitation lower-limb orthopedic assistive device by service members and veterans with lower limb loss. *Mil. Med.* 2021, 186, 379–386.
 42. Hersh, A.M.; Davidar, A.D.; Weber-Levine, C.; Raj, D.; Alomari, S.; Judy, B.F.; Theodore, N. Advancements in the treatment of traumatic spinal cord injury during military conflicts. *Neurosurg. Focus* 2022, 53, E15.

43. Amin, M.R.; Moula, S.M.; Kabir, M.H.; Uddin, M.W.; Chowdhury, M.A.; Chowdhury, K.P. Maxillofacial trauma of psychiatric magnitudes and role of post-traumatic stress symptoms. *Bangladesh Dent. J.* 2013, 29, 1–4.
44. Bogie, D.; Phil, K.M.; Roggenkamp, S.K.; Zeng, N.; Seton, J.M.; Schwartz, K.R.; Henzel, M.K.; Richmond, M.A.; Sun, J.; Zhang, G.Q. Development of predictive informatics tool using electronic health records to inform personalized evidence-based pressure injury management for Veterans with spinal cord injury. *Mil. Med.* 2021, 186 (Suppl. S1), 651–658.
45. Stinner, D.J.; Wenke, J.C.; Ficke, J.R.; Gordon, W.; Toledano, J.; Carlini, A.R.; Scharfstein, D.O.; MacKenzie, E.J.; Bosse, M.J.; Hsu, J.R.; et al. Military and Civilian Collaboration: The Power of Numbers. *Mil. Med.* 2017, 182, 10–17.
46. Huebner, A.J.; Mancini, J.A.; Bowen, G.L.; Orthner, D.K. Shadowed by war: Building community capacity to support military families. *Fam. Relat.* 2009, 58, 216–228.
47. Adirim, T. A military health system for the twenty-first century. *Health Aff.* 2019, 38, 1268–1273.
48. Goniewicz, K.; Carlström, E.; Hertelendy, A.J.; Burkle, F.M.; Goniewicz, M.; Lasota, D.; Richmond, J.G.; Khorram-Manesh, A. Integrated healthcare and the dilemma of public health emergencies. *Sustainability* 2021, 13, 4517.

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