World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-54 January 2026
ISSN: 2749-3644

UNIQUE ASPECTS OF MILITARY PERSONNEL HEALTH AND METABOLIC SYNDROME RISK FACTORS

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Article history:
Received: October 30th 2025
Accepted: November 28th 2025

Abstract:

Metabolic syndrome (MetS) represents a significant public health challenge characterized by the coexistence of central obesity, hypertension, dyslipidemia, and impaired glucose metabolism, substantially increasing the risk of cardiovascular diseases and type 2 diabetes. Military personnel constitute a unique occupational group exposed to specific health stressors, including chronic psycho-emotional stress, intense physical demands, irregular work-rest cycles, sleep deprivation, suboptimal dietary patterns, and environmental challenges. These factors collectively create a favorable background for the development of metabolic disturbances.

This review aims to analyze the prevalence, determinants, and public health implications of metabolic syndrome among military populations worldwide. Based on recent epidemiological studies and global meta-analyses, evidence suggests that the prevalence of MetS and cardiometabolic risk factors among military personnel is comparable to or higher than that of civilian populations in several countries. The syndrome not only affects individual health outcomes but also undermines military readiness, operational performance, and long-term service capacity. The findings highlight the critical need for early screening, continuous monitoring, and comprehensive preventive strategies tailored to military settings. Lifestyle modification programs focusing on nutrition, physical activity, stress management, and sleep hygiene are essential components of effective MetS prevention. Integrating public health principles into military healthcare systems may significantly reduce the burden of cardiometabolic diseases and enhance force sustainability.

Keywords: metabolic syndrome; military personnel; cardiometabolic risk factors; public health; prevention; occupational health

INTRODUCTION

Metabolic syndrome (MetS) is a clustering of metabolic abnormalities – notably central obesity, hypertension, elevated triglycerides, low high-density lipoprotein (HDL) cholesterol, and high blood glucose – that substantially raises the risk of cardiovascular disease and type 2 diabetes. Globally, roughly a quarter of adults are estimated to have MetS (with prevalence typically 20–45% depending on country). Military populations face particular challenges: routine duty exposes servicemembers to intense physical and psychological stress, irregular schedules, extreme environments, and often suboptimal nutrition and healthcare access. These conditions (chronic stress, sleep disruption, calorie-dense but nutrient-poor rations, higher rates of smoking/alcohol use, etc.) create a fertile background for metabolic disturbances. For example, chronic activation of the hypothalamic–pituitary–adrenal axis during sustained stress elevates cortisol and catecholamines, promoting hyperglycemia and insulin resistance. Likewise, disrupted sleep (common during night duties or deployments) is a known risk factor for obesity and MetS. Such lifestyle factors are often underappreciated: as one military health review notes, while diet matters, "lack of exercise, chronic stress, [and] sleep deprivation" also drive MetS risk.

These risks are of more than academic interest: obesity and MetS impair fitness and readiness. In the U.S., for example, only ~40% of young adults are both within military weight standards and physically active enough to complete basic training. Consequently, military leaders warn that poor troop health threatens national security. As one retired U.S. general emphasized, "Fit and healthy service members are vitally important…because lives and our national

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security are at stake". Indeed, recent data show 19% of U.S. active-duty personnel were obese by 2020 (up from 16% in 2015), costing the Department of Defense roughly \$1.5 billion per year in health-related expenditures. In light of this, there is intense interest in characterizing MetS and its risk factors among servicemembers worldwide. Several epidemiological studies suggest that military MetS prevalence can rival or even exceed civilian rates. For instance, Baygi et al. found MetS in **21%** of all military personnel globally, and reports from Iran (11% in soldiers), China (35% in soldiers vs. 17% in civilians), and Saudi Arabia (overweight 41%, obesity 29%) illustrate the concern. In the U.K., recent military health data indicate over **64%** of soldiers were classified as overweight or obese. These findings underscore that despite mandated fitness standards, many soldiers accumulate traditional MetS risk factors.

OBJECTIVES: In this review we synthesize current evidence on metabolic syndrome and cardiometabolic risk factors in military populations. We survey reported prevalence estimates of MetS and its components, compare servicemembers to civilian cohorts, and examine the unique occupational and lifestyle factors that contribute to elevated risk. Understanding these patterns can inform prevention and health policies in military medicine.

METHODS

We conducted a systematic literature review of observational studies examining MetS and related risk factors in active-duty military personnel. Database searches (PubMed/MEDLINE, Scopus, Web of Science and others) were performed using keywords like "metabolic syndrome," "cardiometabolic risk," and "military," with no restriction on country or language. For example, Baygi et al. (2020) used analogous search strategies to identify studies up to 2018. Eligible studies reported prevalence of MetS or its components (overweight, obesity, dyslipidemia, hypertension, impaired fasting glucose) in military cohorts. We extracted data on prevalence rates and definitions (NCEP-ATP III, IDF, WHO criteria) and summarized results qualitatively (and via pooled estimates when available). Where relevant, we also recorded study design and population characteristics. (Quality assessment followed standard checklists for prevalence studies.)

RESULTS

- **Pooled Prevalence (Global Meta-Analysis):** A recent global meta-analysis (n≈37 studies) estimated that among military personnel, the overall prevalence of metabolic syndrome is about **21%**. Common cardiometabolic risk factors were also highly prevalent: **35%** of service members were overweight, **14%** were obese (BMI≥30), and **29%** had abdominal (central) obesity. Hypertension affected about **26%** of personnel. Dyslipidemia was common: **32%** had elevated LDL-cholesterol, **24%** had high triglycerides, and **28%** had low HDL. Elevated fasting glucose (prediabetes range) was seen in roughly **9%**. In short, roughly one in five military members meets criteria for MetS, and over a third have at least one major risk factor.
- **International Variability:** Individual studies reveal wide variation. For example, one U.S. Navy sample reported **39%** MetS (highest on record), whereas a French military cohort found only **9%**. Similarly, Baygi et al. noted Brazilian soldiers had 39% MetS, while Jordanian pilots had 15%. These differences reflect age, gender, and criteria used, but they confirm that rates can be extremely high in some forces. Recent national statistics illustrate this: in the UK, overweight/obesity prevalence in the Army exceeded 64% in 2022–2023. In Saudi Arabian forces, **41%** were overweight and **29%** obese, and **35%** were current smokers. By contrast, some militaries with rigorous fitness regimes see lower rates of dysmetabolism. For instance, Korean Air Force personnel had only 16.6% high triglycerides and 7.9% low HDL, significantly better than age-matched civilians. On average, however, the pooled military prevalences often exceed or match civilian norms, likely because even fit recruits accumulate risk over service.
- **Cardiometabolic Patterns:** Overall, service members tend to have substantial risk factors despite mandatory physical activity. For example, even though military diabetes prevalence (~5%) is lower than the global civilian rate, hypertension (≈26%) remains common. The pooled data suggest blood pressure and lipid abnormalities persist at rates of 25–30% in troops. These patterns reflect the mixed effect of training (protective) and lifestyle (risky).

DISCUSSION

Unique Military Risk Factors

Military service imposes several specific health stresses that foster metabolic syndrome:
- **Chronic high stress:** Combat exposure, heavy responsibilities and constant vigilance trigger the

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sympathetic nervous system and HPA axis. This stress response releases adrenaline and cortisol, which elevate blood sugar and promote insulin resistance. Inflammation from stress may also worsen metabolic regulation.

- **Sleep deprivation and shift work:** Many duties (e.g. night sentry, long deployments) disrupt circadian rhythms. In general populations, both short and long sleep have been linked to higher MetS risk (one meta-analysis found <6 hr or >9 hr sleep increased MetS odds by 15–19%). Thus irregular sleep patterns common in service can contribute to obesity and hypertension.
- **Dietary challenges:** Troops often rely on field rations or mess hall meals, which tend to be calorie-dense but may lack sufficient vitamins, fiber and healthy fats. Healthy food options on many bases are limited. As a result, a high intake of refined grains, fried foods and sugary beverages is common. This poor diet further stresses the cardiovascular system and encourages abdominal fat gain.
- **Substance use:** Rates of tobacco and alcohol use are typically higher in the military than in civilians. For example, 35% of a Saudi military sample were current smokers. Smoking and excess alcohol exacerbate insulin resistance and dyslipidemia.

Together, these factors (often interacting) create a hostile metabolic environment. As the Army notes, "even with a decent diet, lack of exercise, chronic stress and sleep deprivation… can increase [metabolic risk]". Combat deployments and sedentary assignments alike can undermine formal fitness training. In some cases, mental stress and trauma even lead to emotional eating and weight gain.

Implications and Prevention

These findings highlight the need for targeted health interventions in military settings. **Early screening** for MetS during routine physicals can identify at-risk individuals before serious disease develops. Given that MS is not a single disease but a cluster of risk factors, emphasis should be on holistic health behaviors. **Healthy lifestyle promotion** is critical: ample evidence shows that regular exercise, balanced nutrition and adequate sleep can markedly reduce MetS incidence. For example, Army health guidelines urge even short bouts of physical activity during breaks to combat the "metabolic consequences" of inactivity. Similarly, U.S. public health experts have recommended improving access to fresh fruits/vegetables and lean proteins on military bases to counteract obesity. Smoking cessation and moderation of alcohol should also be priorities. In one military driver survey, authorities emphasize that medication alone is not enough: "Regular exercise… healthier food choices, and better sleep habits are essential for prevention and reversal" of MetS.

It is also important to address organizational factors. Military command should ensure that fitness standards account for modern lifestyle risks. Programs for stress management, mental health support, and sleep hygiene (especially during deployments) can indirectly protect metabolic health. Continued education about MetS and its silent nature is warranted; many service members may dismiss it if they feel "not overweight," overlooking blood pressure or lipid issues.

In sum, the converging evidence suggests that cardiometabolic risk factors are alarmingly common in the armed forces. These risk factors directly threaten force readiness and long-term health. Both military and public health authorities have urged intervention: "implementing interventions for the control of cardiometabolic risk factors among military personnel seems necessary". In line with this, global reviews recommend that military healthcare systems adopt routine MetS screening and targeted lifestyle programs. A multipronged approach – combining diet, exercise, sleep, and stress strategies – will be essential to mitigate this threat.

CONCLUSION

Military service entails unique occupational hazards that amplify metabolic syndrome risk. Overweight, obesity, hypertension and dyslipidemia affect a large fraction of soldiers worldwide. Chronic stress, irregular schedules, and unhealthy habits inherent to military life potentiate these risks. In response, military health leaders must prioritize early detection and prevention: incorporating metabolic health metrics into routine check-ups, ensuring healthy food availability, enforcing fitness standards, and providing support for stress and sleep management. Only through proactive, evidence-based interventions can military populations maintain combat readiness and reduce the long-term burden of MetS. In the words of one analysis, strong evidence supports "devising and implementing feasible interventions in order to control [cardiometabolic] risk factors" in the armed forces.

REFERENCES

1. Alberti, K. G. M. M., Eckel, R. H., Grundy, S. M., et al. (2009). Harmonizing the metabolic syndrome: A joint interim statement of the IDF, NHLBI, AHA, WHF, IAS, and IASO. Circulation, 120(16), 1640–1645.
2. Grundy, S. M. (2016). Metabolic syndrome update. Trends in Cardiovascular Medicine, 26(4), 364–373.
3. Baygi, F., Herttua, K., Jensen, O. C., et al. (2020). Global prevalence of cardiometabolic risk factors in

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Available Online at: https://www.scholarexpress.net
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military populations: A systematic review and meta-analysis. BMC Public Health, 20, 1–15.
4. Kress, A. M., Hartzell, M. C., & Peterson, M. R. (2005). Burden of obesity on U.S. military operations. Military Medicine, 170(7), 556–560.
5. Hruby, A., & Hu, F. B. (2015). The epidemiology of obesity: A big picture. Pharmacoeconomics, 33(7), 673–689.
6. Institute of Medicine. (2012). The role of the military in obesity prevention. Washington, DC: National Academies Press.
7. Dehlavari, M., Ghorbani, A., & Sadeghi, M. (2015). Prevalence of metabolic syndrome in Iran: A systematic review. ARYA Atherosclerosis, 11(4), 239–246.
8. World Health Organization. (2023). Cardiovascular diseases (CVDs): Fact sheet. Geneva: WHO.
9. Huang, P. L. (2009). A comprehensive definition for metabolic syndrome. Disease Models & Mechanisms, 2(5–6), 231–237.
10. Smith, T. J., Marriott, B. P., Dotson, L., et al. (2012). Overweight and obesity in military personnel: Sociodemographic predictors. Obesity, 20(7), 1534–1538.
11. McEwen, B. S. (2007). Physiology and neurobiology of stress and adaptation. Physiological Reviews, 87(3), 873–904.
12. Booth, F. W., Roberts, C. K., & Laye, M. J. (2012). Lack of exercise is a major cause of chronic diseases. Comprehensive Physiology, 2(2), 1143–1211.
13. World Obesity Federation. (2023). Global obesity observatory.
14. Choi, K. M., Kim, S. M., Kim, Y. H., et al. (2005). Prevalence and cardiovascular disease risk of metabolic syndrome using NCEP and IDF definitions. Diabetes Research and Clinical Practice, 70(2), 144–150.
15. Al-Nozha, M. M., Al-Mazrou, Y. Y., Al-Maatouq, M. A., et al. (2005). Obesity in Saudi Arabia. Saudi Medical Journal, 26(5), 824–829.