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The Importance of Physical Fitness and Health for Soldiers: The Role of Military Doctors

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Abstract
Physical fitness and overall health are essential components of military readiness, directly influencing a soldier's operational performance, resilience, and survivability in both combat and non-combat situations. In the physically and mentally demanding environment of military service, optimal fitness is not just a personal asset but a strategic necessity. This review paper explores the multifaceted importance of physical fitness and health for soldiers, while emphasizing the critical role played by military doctors in safeguarding and enhancing these attributes. Military doctors contribute far beyond conventional medical care; they are integral to preventive health strategies, fitness assessments, injury management, rehabilitation, and the promotion of mental and physical well-being. "Through regular health screenings, tailored fitness plans, nutritional guidance, and psychological support, military doctors help soldiers maintain peak performance and reduce the risk of injury or illness. They also play a pivotal role in deployment readiness by managing health challenges related to extreme environments, including heat, altitude, and fatigue. In recent years, the integration of technology, such as wearable fitness trackers and data analytics, has further empowered military doctors to make informed decisions and implement proactive interventions. However, their role is not without challenges—limited field resources, time constraints, and cultural barriers to seeking medical help can hinder their impact. Despite these challenges, military doctors continue to act as a cornerstone of force health protection and performance enhancement.
Keywords: Military Health, Physical Fitness, Combat Readiness, Military Doctors, Soldier Wellness, Preventive Medicine, Operational Health, Injury Prevention

Introduction

In the demanding and high-stakes environment of military operations, the physical fitness and overall health of soldiers are not merely desirable traits but critical components of national security and military effectiveness. Soldiers are expected to operate in extreme conditions, carry out physically strenuous tasks, endure prolonged stress, and remain alert in unpredictable and often life-threatening situations. As such, physical fitness directly influences a soldier's endurance, agility, strength, mental resilience, and combat readiness. Maintaining peak physical condition helps prevent injuries, reduces the risk of disease, enhances recovery, and ensures sustained operational performance. In this context, military doctors play a pivotal role in preserving and promoting the health and fitness of armed forces personnel. Their

responsibilities extend far beyond clinical treatment; they are tasked with preventive care, medical screenings, injury rehabilitation, mental health support, and the promotion of healthy lifestyles through education and ongoing monitoring. Military doctors must also address the unique health challenges that soldiers face in diverse operational environments, including temperature extremes, high altitudes, jungle warfare zones, and extended deployments in isolated locations.

Moreover, they are key advisors to commanders, ensuring that fitness protocols, training regimens, and health policies are tailored to the physical demands of specific units and missions. With the growing importance of technology in modern warfare, military medical professionals are increasingly leveraging tools such as wearable health monitors, telemedicine, and data-driven diagnostics to improve the efficiency and precision of care. Despite their critical role, military doctors often face challenges such as limited medical infrastructure in field settings, high patient loads, and the reluctance of soldiers to seek timely medical help due to stigma or fear of medical downgrading. This review aims to explore the integral connection between physical fitness and military readiness while shedding light on the indispensable role of military doctors in building and sustaining a healthy, resilient, and combat-ready force. It examines the preventive and curative dimensions of military medicine, discusses recent innovations and operational challenges, and provides recommendations for enhancing the role of medical professionals in the armed forces. By highlighting the intersection of health, fitness, and defense preparedness, this paper reinforces the idea that military doctors are not just caregivers, but strategic enablers of mission success.

Military Medicine

The term Military Medicine implies many potential concepts. It is a specialized medicine. Specifically, it is a branch of occupational medicine (military occupations) concerning risks and needs soldiers and other military members confront (including prevention and cure). Military Medicine focuses on supporting healthcare in military operations. It serves in various contexts like prevention and cure for infections among military servers, ergonomics, and health consequences of special military devices and machines, such as submarines, tanks, helicopters, planes, etc., planning for surgery management for the wounded people in as well as supporting them.

Military Medicine is the science of diseases and harms (injuries) resulting from military operations. It also involves special forms of the organization providing medical support to military forces and transferring or curing the war patients as quickly as possible. Nowadays, military forces require nonstop medical support, from first aid for soldiers on the front to advanced hospitals within the interior lands". Through this continuum, the more the patients are taken back, the more advanced the medical services are. Military Medicine has enhanced life expectancy among the wounded people by providing medical services closer to the battlefields. In addition to common diseases, Military Medicine seeks treatment for a range of syndromes or special harms that are unknown or rare for ordinary populations. "The effects and consequences of modern weapons, mental pressure from frequent operations, noise, poisons together with other dangers of the battlefield, cause many symptoms and syndromes

that are not normally seen in non-military peaceful conduction. Historically, armed conflicts among military forces have been a trigger for advances in military medical facilities. Today, even in distinguished countries, there are similarities among the Military Medicine systems. These days, one of the most significant features of Military Medicine is its emphasis on prevention. The main goal of medicinal support is to preserve military power. Avoiding human force loss as a result of diseases or catastrophes preserves the united power before the battle. Hence, expanded security and improved safety programs are among the features of military medical care.

The major mission of Military Medicine worldwide is to provide medical support for military forces concerning their problems, risks, harms, and diseases resulting from their special occupational conditions. In sum, Military Medicine services would lead to preserved healthcare of the individuals as well as promoting health, which in turn leads to enhanced military power in missions.

History of Military Medicine worldwide

There is indeed a relationship between the history of war and surgery (medical services). From the 18th century, medical services have gained much attention from most armies. Lack of professional physicians and low levels of experience in taking care of victims and wounded people in wars in armies of such nations as England and France during the waterloo battle led to higher rates of casualties among soldiers. As a result, from that time on, nations began to mobilize their doctors for this. Namjoo Nik writes on the history of Military Medicine: Although the clear distinction between Military Medicine as a distinct specialized field of study, both martial and non-martial, from general aspects of medicine has been proposed from the early 20th century, it dates back to even Iranian-Roman battles and ancient Iranian wars as a simple clear cut matter. Because the highest rates of casualty were for epidemics/pandemics among army forces and the residents of the areas in war, and because of the high numbers of the wounded ones and the implication of fighting against diseases, a sort of organization and education as well as employing medical aid forces was needed.

On the other hand, from early times, bioterrorism was used as a strategy to beat enemies, just like contaminating water wells with dead bodies of animals in 300 B.C. to spread diseases, or the disintegration of Tatar reign in 1344 by throwing bodies dead from plague into their castles, which led to plague epidemic all over Europe and consequently killed one-quarter of Europeans. Another example is donating clothes and blankets of measles and pox victims to naïve aborigines of northern and southern America by the English in 1763, which killed a large number of aborigines. These events led to the employment of trained people to help the injured people and patients, and the first rescue teams were founded at the time of the independence wars of the United States of America, and they were completed gradually in the US and the world. By the 20th century, global Military Medicine had no specialized place, and doctors were employed generally at times of war and peace throughout military organizations and facilities.

Hetzcool notes on the causes of the development of Military Medicine: at the same time as a revolution in military equipment, Military Medicine grew as well. As the weapons in wars grew

more destructive and fatal, the related medical services were developed more, and consequently, the number of saved soldiers increased. In the early 20th century, the concept of military triage was introduced, and advances in transferring the injured led to referring the soldiers with serious wounds to the military medical system, who had no access to medical facilities in the past. In addition, structures and systems of Military Medicine had to be adjusted to the number and variety of injured people as a result of modern weapons. Before developing general anaesthesia, abdominoplasty, cranioplasty, and thoracoplasty surgeries were rare. A lot of medical care was limited to injuries in limbs, and the only surgical intervention was amputation. With the introduction of general anaesthesia and improvements in first aid care, as well as the facilitation of transferring soldiers from battlefields to hospitals, the concept of triage was introduced as a crucial action in dealing with wounded people in wars and with the increase of saved wounded individuals, systems of Military Medicine were obliged to enhance their facilities for transferring and placement of patients to a safer place to reach a stable condition and then transferring them to a place where more healthcare service is provided.

Review of literature

Author(s) & Year	Title	Focus Area	Key Findings
McCarthy et al. (2017)	Health Promotion Research in Active Duty Army Soldiers	Nutritional and body composition research in soldiers	Obesity and poor nutrition impact readiness; health promotion is vital
EMEA§ & Asahi (2024)	Physical Fitness in the Armed Forces: International Assessment	Fitness assessment practices across 17 countries' armed forces	Consistent focus on strength, endurance, and aerobic capacity
Besemann (2011)	Physical Rehabilitation Following Polytrauma in Canadian Forces	Rehabilitation for polytrauma in military settings	Hybrid civilian-military rehab improves recovery expectations
Caravalho (2015)	Improving Soldier Health and Performance	Army medicine transformation to promote resilience	Performance Triad (sleep, activity, nutrition) is crucial
Kaufman et al. (2000)	Military Training-Related Injuries: Surveillance, Research, and Prevention	Musculoskeletal injuries in training and their prevention	Injury rates high; prevention needs focus on modifiable risk factors
Lincoln et al. (2002)	Natural History and Risk Factors of Musculoskeletal Conditions	Risk factors for disability due to musculoskeletal issues	Low job satisfaction and physical demands increase disability risk
Jennings et al. (2008)	Soldiers With Musculoskeletal Injuries: Perspectives	Impact of injuries on task performance and soldier sentiment	Back/knee injuries affect duties; frustration with care system noted
Mala et al. (2015)	Strength and Power During High-Intensity Military Tasks	Relationship between strength/power and load performance	Strength & power strongly linked to success in loaded tasks

The History of Physical Fitness

From a historical perspective, the relationship between physical activity and health extends back to 3000- 1000 BCE. In ancient China, Huangdi, known as the Yellow Emperor, emphasized in the classic work Yellow Emperor's Book of Internal Medicine that harmony with nature is key to disease prevention, and that preventing diseases is fundamental for longevity. In later periods, many scholars, from Hippocrates to Galen, investigated the relationship between physical fitness, health, and work efficiency. In the 5th-4th centuries BCE, in city-states such as Athens, Sparta, and others, it was emphasized that specific ideal criteria needed to be adhered to in order to maintain the physical health of both military personnel and civilians. However, during the same period, Hippocrates warned that excessive exertion of the body could lead to dangerous outcomes and disrupt the body's natural balance. In more recent history, prior to 1913, physical fitness levels were evaluated using anthropometric measurements and dynamometer tests. By 1918, the importance of strength tests had increased, but it was realized that these tests alone were insufficient for assessing physical fitness comprehensively. In 1923, Schneider developed his eponymous test, and a modified version of this test began to be used by the medical units of the U.S. Army and Navy. In 1924, Collins and Howe critically evaluated physical fitness tests. They argued that physical fitness could not be measured by a single test and proposed the application of various test groups, including motor control tests, physiometric tests, and somatometric tests. In 1938, studies conducted by Wellesley College led to the emergence of the concept of endurance, which is closely related to circulatory-respiratory condition, nutrition, and an individual's training level. In 1925, F.R. Rogers introduced the concepts of strength scale and physical fitness scale.

Military health and hygiene in the nineteenth century

The story of the ravages of disease experienced by the British Army during the Crimean War (1853–1856) and the role of Florence Nightingale to bring this experience to the attention of the British government and the public is widely recognized. Less well known is the impact of disease on the army in garrisons both abroad and in England. In 1858, a Royal Commission led by Sidney Herbert (Secretary of State for War and a close friend of Florence Nightingale) published a report on the health of the army. This report showed that the mortality of soldiers stationed in England was 17.5 / 1000 peopleyear, which was substantially greater than the mortality rate of the general adult male population at 9.2 / 1000 people-year [2]. Even more surprising, the mortality of the army when garrisoned in England was nearly onethird greater than that of the army when it was stationed at Sevastopol, Crimea, in 1856 (at 12.5 / 1000 peopleyear). It was demonstrated through statistical analysis that substantial savings in army manpower could be attained by improving the health of the army through better hygiene, better army hospitals and better-trained army doctors. The report made wide-ranging recommendations for the improvement in the organization and management of the Army Medical Services, army hospitals, and the education of army medical officers in military medicine and hygiene. This report made the health of soldiers into a political and executive issue rather than solely a medical issue.

Edmund Parkes - the first professor of military

hygiene There was a substantial reform of the Army Medical Services over the course of the second half of the nineteenth century. This reform included the creation of the Army Medical School in 1860 at Fort Pitt in Chatham (which became the Royal Army Medical College, Millbank, in 1907). The school was endowed with three professors: one of clinical and military medicine, one of clinical and military surgery, and one of sanitary science and military hygiene. The appointment of Edmund Parkes as the first Professor of Military Hygiene became one of the most important innovations in the education of military medical personnel. Parkes joined the army at the age of 22 and served for 3 years before establishing himself in private practice in London and University College. In 1855, he was sent to Turkey and established a military hospital at Renkoi based on a prefabricated structure that was designed and manufactured by Isambard Kingdom Brunel". After his appointment, Parkes wrote the Manual of Practical Hygiene that had influence across the public health movement in the UK and overseas. The manual's preface highlighted the altered position of the army medical officer because of changes to the Queen's Hospital regulations in 1859. "Previously, the Army Surgeon had been entrusted officially merely with the care of the sick…..(now) he is ordered to advise commanding officers in all matters affecting the health of troops, whether as regards garrisons, stations, camps and barracks, or diet, clothing, drill, duties or exercises'. This is the epitome of occupational medicine. In the introduction, Parkes defines hygiene as the '..art of preserving health; that is, of obtaining the most perfect action of body and mind during as long a period as is consistent with the laws of life. In other words, it aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote'. This is the epitome of public health. The introduction continues by stating that '..in many cases, the employer of labour finds that, by proper sanitary care of his men, he reaps at once an advantage in better and more zealous work, in fewer interruptions from ill-health so that his apparent outlay is more than compensated. This is shown in the strongest light by the Army. The State employs a large number of men, whom it places under its own social and sanitary conditions. It removes from them much of the self-control with regard to hygienic rules which other men possess and is therefore bound by every principle of honest and fair contract to see that these men are in no way injured by its system. But more than this: it is as much bound by its selfinterest. It has been proved over and over again that nothing is so costly in all ways as disease and nothing is so remunerative as is the outlay which augments health, and in doing so, augments the amount and value of the work done'. These three quotes provide enduring social and economic arguments for protecting the health of soldiers in the army and show the interrelationship between the modern clinical specialities of occupational medicine and public health in advising on the health of army personnel. This focus on military hygiene reduced all-cause admissions to hospitals per thousand strength from 1060 in the 1870s to 1020 in the 1880s, 850 in the 1890s, and Bricknell and Ross Military Medical Research (2020) 7:18 Page 2 of 7 500 in the first decade of the twentieth century. By the time of his death in 1876, Parkes had established the importance of hygiene within the military and of the contribution of military hygiene experts within the wider public sector alongside the civilian Medical Officers of Health in

towns and cities. Teaching military hygiene now had equal status to military medicine and surgery.

The health of the public and its impact on the health of the Army

The army faced many challenges during the Boer War in South Africa (1899–1902) both in trauma care and preventive medicine. However, the requirement to mobilize the manpower of Great Britain for the war also exposed the very poor standards of health amongst the civilian male population. This resulted in very high rates of rejection for military service. Such was the concern that Parliament set up a Committee on Physical Deterioration 'to determine, with the aid of such counsel as the medical profession are able to give; the steps that should be taken to furnish the Government and the Nation at large with periodical data for an accurate comparative estimate of the health and physique of the people; to determine generally the causes of such physical deterioration as does exist in certain classes; and to point out the means by which it can be most effectually diminished. This report made 53 recommendations, many of which are recognizable as public health and industrial health improvements that persist today. These recommendations included a national anthropometric survey of the population; the medical examination of school children, factory workers and coal miners; the training of mothers in the domestic economy (which became Health Visiting); and health education and sport as part of the school curriculum. The army continued with the progress of sanitary reform after the Boer War. In 1904, training in basic hygiene was added to the curriculum for officer training, and the Army School of Sanitation was established in 1906. There was considerable technical progress in subjects such as water purification, the 'hygiene of the march' and immunization against infectious disease. Institutional knowledge was codified as the Manual of Elementary Military Hygiene, published by the War Office in 1912 [9]. Thus, by the beginning of World War I, the public health movement had unified the importance of both the health of the population to be recruited into the army and the maintenance of the health of soldiers once in the army.

Army Health separation into Public Health and Occupational Medicine in the 1970s

This integrated Army Health Organisation continued until the late 1970s, when postgraduate professional training for medical officers in the RAMC was formally Bricknell and Ross general practice, hospital specialities and a new grouping, namely, Army Community and Occupational Medicine (ACOM). Doctors in this third stream were required to qualify for Membership of the Faculty of Community Medicine or Occupational Medicine. ACOM changed to Army Public Health and Occupational Medicine (APHOM) when the Faculty of Community Medicine was renamed the Faculty of Public Health in 1989. Slowly, the professional training routes for Army Health doctors split, despite the considerable overlap of their roles as preventive medicine or health specialists. Consultants in each speciality were quite public in their views of the differences in their professional knowledge. The postgraduate medical training route for both specialities followed the discrete civilian faculty models with a blend of military and civilian experience . This led to the demise of the dualspeciality education course at the Royal Army Medical College and the competition to label the previous health

posts as either public health or occupational medicine. An Army Health research capability was created by the formation of the Army Personnel Research Establishment in 1965. This developed into the Army Occupational Health Research Unit in the 1980s that was manned by occupational physicians. It was disestablished when QuinetiQ was formed from the Defence Evaluation and Research Agency in 2001 with its military manpower being incorporated into the Army Health Unit in the Army Medical Directorate in the early 2000s. Occupational medicine in the military has become a more clinical speciality, as army general practitioners and hospital specialists have become less closely associated with army personnel in their workplace. This has also led to the creation of military occupational health (OH) nurses in a model that partially mirrors civilian practice. Public health has become a central staff function, with posts in the Joint Medical Group and the service commands. This separation of medical specialties has also distanced the environmental health care from a 'military health' identity. Indeed, a review of occupational health in the armed forces published in 2009 did not mention the relationship between occupational health and the specialities of public health or environmental health". "Thus, the unifying identity of 'Army Health' became disaggregated during the 1980s into the early 2000s as the individual professions aligned to their separate identities in the civilian sector.

Conclusion

In conclusion, physical fitness and health are fundamental to the effectiveness and readiness of soldiers, directly impacting their operational performance, endurance, and recovery. Military doctors play a crucial role in this domain by offering preventive care, managing injuries, guiding rehabilitation, and promoting long-term wellness through structured programs. Their collaboration with fitness trainers, use of modern technology, and holistic health strategies significantly enhance soldier resilience". As warfare evolves and physical demands intensify, the role of military medical professionals becomes increasingly vital in sustaining a healthy, capable, and combat-ready force, reinforcing the need for ongoing support and innovation in military healthcare systems.

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