Turkish Journal of Sport and Exercise /
Türk Spor ve Egzersiz Dergisi
http://dergipark.gov.tr/tsed
Year: 2024 - Volume: 26 – Issue 2- Pages: 252-264
10.15314/tsed.1505385

Turkish Journal of Sport and Exercise
Türk Spor ve Egzersiz Dergisi
ISSN: 2147-5652
https://dergipark.org.tr/tr/pub/tsed

Physical Fitness in the Armed Forces: A Comprehensive Study of International Assessment Practices

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

(Date Of Received): 26.06.2024 (Date of Acceptance): 20.08.2024 (Date of Publication): 31.08.2024
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Abstract

The aim of this study is to thoroughly examine the physical fitness assessment methods used in the armed forces of various countries and to evaluate the physical fitness criteria necessary for military personnel to maintain their operational capabilities and overall health. Within the scope of the research, physical fitness assessment tests used in the armed forces of 17 countries, including the United States, Germany, Australia, Austria, the Czech Republic, China, Finland, France, Georgia, Canada, Ireland, the United Kingdom, Israel, Sweden, Latvia, Russia, and Turkey, were examined. It was observed that the tests aim to determine the soldiers' muscle strength, aerobic capacity, endurance, and overall physical fitness status. Additionally, it was found that while the physical fitness test and evaluation criteria applied by these countries vary, their fundamental purposes in practice are similar. Research has shown that maintaining physical fitness levels results in increased resilience of soldiers against problems and difficulties they may face in combat conditions, contributing to operational success. In this context, it is of great importance for national armies to continue and enhance their physical fitness programs. Moreover, it is essential to systematically review and update physical fitness test evaluations in accordance with scientific advancements, which will contribute to varying operational requirements in the armies. In conclusion, maintaining and improving physical fitness levels is a critical factor for the operational success of soldiers. Therefore, it should be regularly monitored and enhanced. This research aims to emphasize the importance of physical fitness test evaluations applied in national armies and contribute to the development of related studies. By sharing the practices implemented, it aims to take significant steps internationally towards enhancing soldiers' physical capacities.

Keywords: Armed forces, physical fitness, testing methods.

Silahlı Kuvvetlerde Fiziksel Uygunluk: Uluslararası Değerlendirme Uygulamalarının Kapsamlı Bir İncelemesi

Özet

Bu çalışmanın amacı çeşitli ülkelerin silahlı kuvvetlerinde kullanılan fiziksel uygunluk değerlendirme yöntemlerini detaylı bir şekilde incelemek ve askeri personelin operasyon yetenekleri ile genel sağlık durumlarını sürdürebilmeleri için gerekli olan fiziksel uygunluk kriterlerini değerlendirmektir. Araştırma kapsamında; Amerika Birleşik Devletleri, Almanya, Avustralya, Avusturya, Çekya, Çin, Finlandiya, Fransa, Gürcistan, Kanada, İrlanda, İngiltere, İsrail, İsveç,

Letonya, Rusya ve Türkiye olmak üzere 17 ülke ordusunda kullanılan fiziksel uygunluk değerlendirme testleri incelenmiştir. İcra edilen testlerin askerlerin kas kuvvetini, aerobik kapasitesini, dayanıklılığını ve genel fiziksel uygunluk durumlarını belirlemeyi amaçladığı gözlenmiştir. Ayrıca, ülkelerin uygulamış olduğu fiziksel uygunluk test ve değerlendirme kriterlerinin değişiklik gösterdiği fakat uygulamadaki temel amaçlarının birbiri ile benzer olduğu anlaşılmıştır. Yapılan araştırmalar ile fiziksel uygunluk seviyesinin muhafaza edilmesi sonucu, askerlerin savaş şartlarında yüzleşebilecekleri problem ve sıkıntılara karşı dayanıklılıklarının yükseldiği ve bu durumun operasyon başarısına katkı sağladığı gözlenmiştir. Bu kapsamda, ülke ordularının fiziksel uygunluk programlarını sürdürme ve geliştirmeye devam etmeleri büyük önem taşımaktadır. Ayrıca, fiziksel uygunluk test değerlendirmelerinin bilimsel gelişmelere uyum sağlayacak şekilde sistemli olarak gözden geçirilmesi ve güncellenme çalışmalarının yapılması, ordularda değişiklik gösteren operasyon gereksinimlerine katkı sağlayacaktır. Sonuç olarak, fiziksel uygunluk seviyelerini korumak ve geliştirmek, askerlerin operasyon başarısı açısından kritik bir etmendir. Bu sebeple düzenli olarak gözlenmeli ve geliştirilmelidir. Bu araştırma, ülke ordularında uygulanan fiziksel uygunluk test değerlendirmelerinin önemini vurgulayarak, bu kapsamda yapılacak çalışmaların geliştirilmesine katkı sağlamayı amaçlamıştır. Böylece yapılan uygulamaların paylaşılması ile uluslararası alanda askerlerin fiziksel kapasitesini artırmaya yönelik önemli adımların atılması hedeflenmiştir.

Anahtar Kelimeler: Silahlı kuvvetler, fiziksel uygunluk, test yöntemleri.

INTRODUCTION

Physical fitness is defined as an individual's capacity to perform work. It ensures the optimal completion of all activities, including the basic necessities of routine life such as transportation, household and office tasks, as well as physical activities like walking, running, and cycling (18).

Physical fitness is defined by the World Health Organization (WHO) as the ability to successfully perform activities that involve muscle skills. In other words, physical fitness is the capacity of individuals to effectively carry out physical activities, whether these abilities are innate or acquired over time (1).

Physical fitness also encompasses the concepts of well-being, wellness, and health (9). As a critical determinant of health, physical fitness is considered essential for maintaining and improving health. Low levels of physical fitness are associated with an increased risk of cardiovascular diseases, diabetes, and musculoskeletal problems. Enhancing physical fitness helps to reduce these risks and contributes to the healthy functioning of the body (4,20).

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 (59). In later periods, many scholars, from Hippocrates to Galen, investigated the relationship between physical fitness, health, and work efficiency (51).

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 (19).

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" (37).

In the 1940s, the U.S. Air Force and Navy used physical fitness test batteries consisting solely of motor tests. Physical examinations conducted during World War II revealed that a dangerously high number of young individuals were physically unfit. During and after the war, efforts were made to develop tests to classify soldiers based on their physical fitness and to address their weaknesses. During these years, particularly in countries like the United States and Canada, the poor physical fitness levels of young people became a significant concern. During World War II and the Korean War, the primary reason for rejecting young men from military service was insufficient physical fitness levels. During these periods, the American Association for Health, Physical Education, and Recreation (AAHPER) reported that no single test could adequately determine physical fitness levels. They developed a comprehensive physical fitness test for young people that included pull-ups, sit-ups, shuttle run, standing long jump, 45-meter sprint, softball throw, and a 550-meter run (11).

In 1947, Cureton proposed a test battery that included motor, cardiovascular, respiratory, metabolic, and anthropometric measurement tests. Overall, it was understood that physical fitness could not be validly measured with a narrowly focused test battery and could not be reduced to a single test. Initially synonymous with strength, the concept of physical fitness underwent a transformation in the 1950s with the acceptance of the idea that cardiovascular measurements were more meaningful in determining physical fitness levels (37).

The most comprehensive and institutional step related to physical fitness was observed in the United States in 1953. Hans Krauss and Bonnie Pruden, in their article "Muscular Fitness and Health," revealed that with the increasing prosperity and ease of life, there was a rapid decline in the muscle strength of American adults and children. This article caught the attention of President Dwight D. Eisenhower, who invited the authors to the White House and organized a meeting with other experts. As a result of this meeting, the "President's Conference on Physical Fitness of American Youth" was held in 1956. President Eisenhower, a former military officer, placed great importance on the physical fitness levels of the youth, considered America's potential wartime force. He was also aware of the complaints from officers about the poor physical fitness of young recruits during World War II and the Korean War. Eisenhower ordered the establishment of the "President's Council on Physical Fitness and Sports" to raise public awareness and promote the development of physical fitness (51).

The primary aim of physical fitness development is to ensure that individuals are aware of their physical fitness levels not only during their educational periods but throughout their entire lives. It seeks to encourage lifelong engagement in physical activities, enable progress in various areas of development, and minimize the ailments caused by a sedentary lifestyle (25,47).

As a result of ongoing developments, various tools and methods are used to determine individuals' physical fitness levels. Data obtained from these measurements are compared with appropriate normative values, allowing for a concrete expression of individuals' physical fitness levels. This approach helps identify deficiencies and aims to improve physical fitness through suitable exercise programs (9).

Components of Physical Fitness

Physical fitness is examined in three main categories: health-related fitness, skill-related fitness, and physiological fitness (27).

Health-related fitness is a concept that enables the performance of daily activities without feeling fatigued and reduces the risk of hypokinetic diseases. The components of this type of fitness include cardiovascular fitness (CVF), muscular strength and endurance, flexibility, and body composition (33,40,54).

The components of skill-related fitness include agility, balance, reaction time, speed, and power. These components are directly related to success in performing motor skills (40).

The term physiological fitness is used particularly in the medical field to describe the effects of physical activity on biological systems and its role in disease prevention. The components of this type of fitness include metabolic fitness, morphological fitness (which refers to body composition), and bone integrity (27).

According to another classification, the components of physical fitness are outlined in seven distinct categories. In this classification, physical fitness includes aerobic power, aerobic endurance, muscular

strength, muscular endurance, flexibility, metabolic fitness, and balance/coordination/kinesthetic awareness. Although these components appear different from other classifications, they are fundamentally the same (5).

Various military authorities have provided definitions of physical fitness. For instance, the U.S. Army, in its Physical Fitness Training Manual, defines physical fitness as "the ability to perform physical work, training, and other activities efficiently, and to have enough energy to handle emergencies" (57). The Canadian Army defines physical fitness as "the energy and physical capability necessary to complete specific tasks, remain alert for sudden situations, and react swiftly; effectively counter stress and perform under challenging operational conditions" (7). The U.S. Military Academy, in a report, describes physical fitness as "the ability to perform daily duties energetically and dynamically, engage in recreational activities, and reserve energy for emergencies; the capability to counter stress, exhibit endurance, and withstand situations that would overwhelm someone without good physical fitness" (3,40).

Military Physical Readiness

Military physical readiness is defined as "the capacity to efficiently perform the physical tasks required by military duties and combat." This concept comprises components of physical fitness, health, and motivation (58).

The U.S. Marine Corps, in its 1988 document "Marine Corps Physical Training for Combat Readiness," emphasizes the importance of military physical readiness as follows (62):

Military physical deficiencies become evident in the initial stages of combat. This issue was recognized after the Civil War and has been repeatedly observed in every national threat situation.

a. Success in combat is directly proportional to the hours of training conducted under combat conditions. Losses and injuries in the initial phases of combat often result from inadequacies in coping with challenging terrain or climatic conditions. Sufficient preparation is essential to prevent these outcomes.

b. The first scientifically based physical conditioning doctrine was developed during World War II. As the war progressed, the positive effects of this program on soldiers became clearly evident.

c. Post-war periods have typically been times for discussing the sufferings and losses. Unfortunately, some commanders have viewed physical preparation as something only necessary during wartime. With this perspective, physical readiness was relegated to a secondary priority, reducing combat effectiveness. Soldiers sent to the Korean War reported that their low levels of physical readiness negatively impacted their combat effectiveness.

d. The hard-won military experiences have created an increasing awareness regarding the physical readiness of military personnel. Today, there is no longer a need to debate or emphasize the importance of physical fitness during combat or peacetime. Despite increasing modernization and mechanization, the factor that most significantly affects a soldier's chance of survival is their level of physical fitness.

e. Today, commanders are aware of the need for highly physically fit personnel and must create time for exercise for their personnel amidst the increasing workload due to daily tasks, maintenance, training, operations, and other time-consuming activities.

Physical Fitness for Armies

The primary objective of physical fitness tests in the world's militaries is to identify individuals who possess the physical fitness and readiness necessary to meet the physical demands of military duties, contribute to overall health, and best represent the armed forces in terms of image (39).

Physical fitness has always been one of the most crucial factors in winning battles for armies and has maintained its importance throughout history without losing its significance. Those who have won wars are those who were trained and ready (13). Although today’s operational conditions are technologically supported, the physical fitness level of personnel remains essential for the successful completion of missions (34).

An armed forces that will maintain a deterrent power for peace and participate in multinational forces organized by the UN, NATO, and other international organizations will undertake diverse and multi-

dimensional tasks such as disaster relief, embargo enforcement, the establishment of no-fly zones, refugee operations, search and rescue, peacekeeping, and peace enforcement. Regardless of the weapons, equipment, vehicles, and tools used in these missions, the primary effectiveness will be achieved through the quality of human resources (29).

Individual physical readiness forms the foundation of the military profession and a successful career. Physical activity is critical in maintaining physical fitness and readiness for military personnel. The daily duties that military personnel must perform require a high level of physical readiness (43).

The U.S. Army implements necessary measures to ensure that all military personnel, regardless of their rank, class, or duty, are combat-ready. Army personnel are expected to, among other duties, react swiftly in combat situations, cover distances on the battlefield, know close combat techniques, control and evacuate masses. All these tasks involve strenuous physical activities that require a high level of physical fitness (46).

Military personnel need to possess not only general endurance but also specialized endurance at a high level. Endurance gained through training specific to operational conditions, rather than just sports training, will be far more beneficial in terms of effectiveness. Although transportation by vehicles is preferred during peacetime for speed and convenience, war conditions and terrain obstacles often make such transportation challenging. There are numerous recent examples related to this issue (7,16,44).

The challenging nature conditions, one of the greatest adversaries of military personnel, must also be taken into account, and readiness for all situations is essential. In wars fought under harsh conditions, soldiers contend with two enemies: enemy forces and nature. Often, nature can be more formidable than enemy forces (13).

The physical readiness of military personnel can be achieved through well-planned training programs with progressively increasing difficulty levels. These programs should integrate physical training activities into the military training curriculum. A properly organized military physical fitness (PF) training program should be incorporated into the training schedules of units at every level. Military training prepares personnel, leaders, and units to fight under any conditions. The main objective of an army is to be combat-ready, becoming more agile, resilient, lethal, and capable of survival. Combat conditions require soldiers to possess attributes such as strength, endurance, mobility, flexibility, and coordination. Victory and a soldier's survival depend on these qualities. Combat conditions include marching long distances over rough terrain with weapons and equipment, engaging effectively in combat upon reaching the point of contact, swiftly operating tracked and motorized vehicles over rugged terrain, running and crawling long distances, jumping over obstacles, mounds, and ditches, lifting and carrying heavy objects, and enduring hours of combat without sleep. All these activities demand extraordinary physical conditioning (24).

Military administrations place great importance on physical appearance, which is perceived as an indicator of physical fitness level and influences the public's perception of the military for many psychosocial reasons. It is believed that physical appearance strengthens the sense of belonging and affects how a country's armed forces are perceived on the international stage. Additionally, it is known that physical appearance boosts self-confidence and positively impacts acceptance within the group (35).

The U.S. Department of Defense Physical Fitness Directive emphasizes that all military personnel must possess cardiovascular endurance and strength to be ready for potential combat situations. It also mandates that forces make adjustments suited to their specific needs to enhance combat effectiveness (58).

Recent examples show a clearer understanding of the sensitivity of senior personnel towards physical fitness and particularly physical readiness. In a speech in 1982, U.S. President Ronald Reagan stated (21):

"America's freedom depends on a strong defense. Our military must always be ready both physically and mentally; there should be no doubt about the nation's determination and ability to defend itself. Therefore, it is essential to better understand the importance of physical fitness. Despite today's modern weapon systems, it is the soldiers who are prepared to serve their country spiritually, mentally, and physically that will make the difference in future conflicts."

The research report prepared and published by Major Mark P. Hertling from the U.S. Armed Forces Academy (26) concludes with the following statements:

"The army must be strong. When watching an overweight officer or non-commissioned officer struggle to climb a set of stairs without getting winded, the real concern should be their ability to perform their assigned duties on the battlefield. If personnel tire during training while carrying a light backpack, their only fate will be death when advancing towards enemy lines with a fully loaded pack in combat. If personnel have not experienced grueling muscular fatigue during training, they will be unable to repeatedly lay signal cables where needed. If a non-commissioned officer cannot swim and is asked to lead their unit across a river, a leader must be prepared for personnel losses. If a tank gunner has never approached an exploding shell casing and does not know what to do, the superior performance of a multi-million dollar weapons system becomes meaningless. If we, as an army, do not subject ourselves to physical and emotional stress beyond two minutes of push-ups, sit-ups, and a 20-minute run around the barracks, our high technology and doctrine will be ineffective."

Regarding the necessity of maintaining peak physical fitness, D.M. Day stated the following (49):

"Your level of physical fitness should be such that you no longer need to think about it. Having a high level of physical fitness is critical not just for survival or excelling in any physical task, but because it enables you to serve as a commander or leader in combat. Your physical fitness must be excellent so that you can lead, think, plan, and complete your mission. Everything else is mere showmanship and therefore meaningless."

Physical Fitness Assessment Methods of Armies

United States Army

For U.S. Army personnel, physical fitness tests include assessments of aerobic fitness (2-mile run), body composition evaluation, and muscular strength (push-ups and sit-ups). Scoring tables and standards have been established for each age group and gender. However, personnel who declare a valid medical excuse may participate in one of the alternative tests instead of the 2-mile run. These alternative tests include a 400-meter swim, a 10-kilometer bicycle ergometer test, a 10-kilometer bicycle test, or a 4-kilometer walk test (50,57).

United States Navy

The United States Navy conducts physical fitness tests that include a 2,400-meter run for aerobic fitness, push-ups and sit-ups for muscular strength, a height-to-weight ratio for body composition, and a 450-meter swim for assessing strength characteristics. Personnel who are unable to participate in the run have the alternative option of an elliptical bike test. Personnel scoring below an average of 45 points on these tests are classified as "unsatisfactory" (15,50).

United States Air Force

In the United States Air Force, military personnel are subjected to body composition (BC), aerobic fitness, and muscular strength (MS) tests. The BC assessment is conducted by measuring waist circumference. For aerobic fitness, a 2,400-meter run test is administered, with a 1,600-meter walk test as an alternative. The MS assessment is determined by the number of correct push-up and sit-up repetitions performed in one minute. All Air Force personnel are expected to maintain a sufficient level of physical fitness at all times, or they may face consequences. Commanders are responsible for taking necessary measures to ensure that uniformed personnel do not undermine the military image (14).

United States Marine Corps

The physical readiness tests of the United States Marine Corps are conducted in three phases. All tests are performed in training attire, and there is no gender differentiation in the execution of the test items. The performance evaluation is determined as "pass/fail" (53,60,61).

The test items are as follows:

Approach to Point of Contact (800-meter run).

Ammunition Loading (Upper Body Strength and Endurance Test. In this test, a 15 kg (33 lbs) 5.56 mm ammunition box is lifted from shoulder height to above the head as many times as possible within a 2-minute duration).

Movement Under Fire (This test is a multi-stage exercise that includes various movements and tasks. The descriptions of these stages are provided below):

Stage One: From a prone position, the test includes a sprint, a 10-meter high crawl, a 15-meter low crawl, a zigzag run, and the grasping of a wounded personnel.

Stage Two: Dragging the wounded over a 10-meter S-shaped course, followed by a 60-meter carry using the fireman's carry technique.

Stage Three: A 50-meter sprint with ammunition boxes, a 25-meter zigzag run, grenade throwing, and completing 3 push-ups.

Stage Four: Rising from a prone position, picking up ammunition boxes, followed by a 25-meter zigzag run and a 50-meter sprint.

Chinese Army

Military personnel in the Chinese army are subjected to the following physical fitness tests: a 5000-meter run, a 3000-meter cross-country run with weapons and other equipment, a 400-meter obstacle run, an 800-meter breaststroke swim, a 100-meter sprint, horizontal pull-ups, 2 minutes of sit-ups, 2 minutes of push-ups, and grenade throwing (8).

German Armed Forces

Since 2010, the German Armed Forces have implemented a new physical fitness test. This test was developed using 82 female and 1,100 male subjects. The test allows for the evaluation of military personnel's physical fitness in five key categories. These categories include a 4x9 meter shuttle run to measure movement speed, sit-ups to assess the strength endurance of abdominal and hip flexor muscles, standing long jump to determine explosive power for the lower extremities, push-ups to measure muscular endurance for the upper extremities, and a 12-minute run to evaluate aerobic endurance (34).

Canadian Armed Forces (Combat Personnel)

The tests used for combat personnel in the Canadian Armed Forces consist of applications designed according to combat conditions. These tests are conducted in five stages (6,63).

The explanations for the tests are provided below in order:

Trench Digging: The energy expenditure during trench digging is approximately 400 kcal/hour, with a heart rate of 130-160 bpm. The workload corresponds to 70% of aerobic capacity. During this task, approximately 0.5 cubic meters of soil are removed, and the task is completed in under 10 minutes. The shortest times recorded are 2 minutes for men and 4 minutes for women. The average time for men under 35 is 4 minutes and 14 seconds, while for men over 35, it is 5 minutes and 36 seconds.

Loaded March: The distance covered in a loaded march ranges from 10 to 16 kilometers. During this task, the personnel carry equipment weighing 24.5 kg.

Casualty Evacuation: The rapid evacuation of an injured personnel from the battlefield to a safe area is of critical importance. The ability of one personnel to quickly rescue another from the combat zone is crucial for the safety of both the rescuer and the injured personnel. The designated distance for this task is approximately 100 meters, assuming that the weights of the personnel are equal.

Fuel Can Carrying: Refueling vehicles that run on gasoline requires carrying fuel cans to the vehicle and lifting them to a fuel tank cap approximately 1 meter high. The number of cans to be carried is determined by the amount of fuel needed for the refueling operation.

Loading/Unloading Combat Equipment: This task involves carrying ammunition boxes and lifting them to the height of a truck bed. Therefore, the ability to transport and load a specified number of ammunition boxes is included in the physical fitness tests for military personnel.

French Armed Forces

The French Armed Forces employ various tests to evaluate the physical fitness of their personnel. These tests include the Cooper test, a modified shuttle run test with increasing tempo each lap, the standard 20-meter shuttle run test, a 100-meter swim, a 10-meter underwater swim, a 5-meter rope climb, crunches, push-ups, and pull-ups (36).

Georgian Army

In the Georgian army, physical fitness assessment includes a 2400-meter run, push-up, and sit-up tests (42).

Swedish Army

A study by Wyss and colleagues (67) aimed to develop a new physical fitness test battery for the Swedish Army. Based on data from 12,862 subjects and subsequent statistical analyses, it was concluded that a battery consisting of endurance running, seated shot put, standing long jump, core strength test, and one-legged stance test was appropriate for measuring physical fitness.

Russian Army

The physical fitness tests used in the Russian army include a 3 km run with a rifle and equipment, pull-ups, a 5-meter rope climb without using legs, an obstacle course, throwing a rifle at a chest-height target 6 meters away, a 10 km march with equipment and backpack, and close combat training (55).

Australian Army

In 1995, the Australian Army made changes to its physical fitness programs by replacing the 400-meter run test with an 800-meter run test and the 5-kilometer run test with a 2,400-meter run test. Additionally, they incorporated a standardized loaded march and deep-water running test into their programs. Following these changes, a 40.8% reduction in health expenditures was recorded (65).

Israeli Army

The Israeli Army uses the Bar Or test, developed by Oded Bar Or, to assess the physical fitness levels of its personnel. This test battery is also used by the Israeli Police. The test battery includes push-ups, sit-ups, and a 2,000-meter run. The push-up and sit-up tests are conducted without a time limit, ending only when the individual can no longer continue the test or pauses the movement for 2 seconds (38).

Czech Army

In the Czech army, physical fitness assessment includes tests such as sit-ups, push-ups, a shuttle run (4x10 meters), grenade throwing, a coordination course, a 2,000-meter run, and a 300-meter swim (42).

UK Army

In the United Kingdom Armed Forces, physical fitness assessments are conducted through various tests. In the Navy, personnel undergo the Multistage Fitness Test or a 2,400-meter run test. The Army conducts 2,400-meter run, push-up, and sit-up tests. The Air Force administers the Multistage Fitness Test, push-up, and sit-up tests, while the Royal Air Force Regiment includes tests such as loaded marches, rapid walking, man dragging, and barrel carrying. Combat personnel are subjected to 800-meter runs, pull-ups, sit-ups, 5-kilometer fully loaded marches, swimming, and 2,400-meter run tests (30).

Austrian Army

In the Army, personnel undergo a 2,400-meter run and push-up test on an athletics track; for personnel over 35 years old, a modified pull-up test is administered. In the Special Forces, the tests include a 2,400-meter run, bicycle ergometer, inclined pull-ups, push-ups, and sit-ups (17).

Irish Army

Military personnel in the Irish Army are assessed for physical fitness through push-up, sit-up, and 2400-meter run tests (28).

Finnish Army

Military personnel assess their physical fitness through various tests, including a 12-minute run or ergometer test, sit-ups, push-ups, a 60-second squat test, grip strength test, body mass index (BMI), field test, shooting, and an annual choice among a 20 km walk, 25 km ski, or 80 km cycling test (31).

Latvian Army

In the Latvian army, physical fitness assessment includes push-ups, pull-ups, a 3,000-meter run, and an obstacle course test (42).

Turkish Armed Forces

Article 35 of Law No. 211 on the Internal Service of the Turkish Armed Forces states that "The duty of the Armed Forces is to defend the Turkish homeland against threats and dangers from abroad, to maintain and strengthen military power in a way that provides deterrence, to perform tasks assigned abroad by the decision of the Grand National Assembly of Turkey, and to assist in the maintenance of international peace" (52).

Article 86 of the Turkish Armed Forces Internal Service Regulation outlines the "Moral and spiritual qualities that every soldier must possess," and in subsection f of this article, it addresses the aspect of "Preparation for war" as follows:

"...to thoroughly learn how to use weapons and equipment in war, to have enough theoretical and practical knowledge and experience to make decisive and correct decisions and to act even during the difficult and stringent phases of war and even in the absence of commanders due to casualties, to condition the body to endure and withstand the inherent deprivations of war such as fatigue, sleeplessness, and, if necessary, hunger for long periods, to gain and continuously enhance the high capability that will ensure self-confidence in all these aspects, and to strive to increase these abilities at all times" (56).

In the Turkish Armed Forces, in accordance with existing legal regulations, physical fitness tests are conducted once a year. These tests consist of a 2-minute push-up test, a 2-minute sit-up test, and a 3,000-meter run (31).

Physical Fitness Research on Armies

A study conducted by Conway and Cronan (10) on 3,045 personnel in the United States Navy examined the effects of smoking and exercise on physical fitness. The results of the study revealed that smoking negatively impacts both muscular endurance and aerobic endurance in individuals who exercise and those who do not. However, smoking did not cause changes in muscle strength or body fat percentage.

In a study examining changes in physical fitness among doctors in the U.S. Army during their residency training, physical fitness tests were administered at the beginning of the residency and repeated three years later. The results of the study revealed a significant decrease in performance, with a significance level of $p<0.01$ (2).

An examination of the performance of personnel in the Swedish army from 1982 to 2005 revealed significant declines in performance due to an increasingly sedentary lifestyle. During this period, the distance covered in the Cooper test decreased by 4.1%, the time to climb a pole worsened by 19.8%, and the long jump distance decreased by 2.1% (66).

A study conducted on Canadian military personnel found a significant relationship between high body mass index (BMI) and waist circumference with performance in tasks such as evacuation, low and high crawling, sandbag carrying, VO2max, push-ups, and sit-ups ($p<0.05$) (22).

In a study conducted by Weiglein (64) involving military personnel from the Air Force, maxVO2 data obtained from a 1,600-meter walk, a 2,400-meter run, and treadmill tests were calculated and compared. The results indicated no significant differences between the tests; however, it was found that participants who performed at a lower level in terms of performance achieved better results in the 1,600-meter walk test.

Nindl (41) investigated the differences in performance of personnel under stress during military operations over a 72-hour period. As a result, he found a reduction of 7.3-15.0% in the overall work potential of the participants.

It was hypothesized that having strong respiratory muscles could enhance the endurance performance of German Special Forces personnel during intense physical activity. To test this hypothesis, a study conducted by Sperlich et al. (48) investigated the effects of increasing respiratory muscle strength using the "Ultrabreathe respiratory muscle trainer." The study found that enhancing respiratory muscle strength did not affect VO_2max development.

Similar to elite athletes, the physical fitness level required for U.S. Navy SEAL (Sea, Air, and Land Special Operations Force) personnel to successfully complete their missions is critical. Some of their tasks may involve extended submarine operations. In this context, the performance of SEAL personnel participating in a 33-day submarine mission was evaluated using the Cooper test. Upon return from the mission, a 7% decrease in distance covered and a 47% increase in recovery time were observed. Such a significant decline in fitness could negatively impact the personnel's combat readiness. Additionally, the limited movement space and insufficient sports facilities or equipment may adversely affect individuals' motivation to engage in regular physical activity (23).

A study conducted by Crawford et al. (12) demonstrated that U.S. Army personnel with lower body fat percentages exhibited higher aerobic and anaerobic performance compared to those with higher body fat percentages.

In a five-day study conducted by Knapik et al. (32), the effects of combat simulation on the performance of infantry soldiers were investigated. Military personnel were allowed four hours of sleep per day, with the remaining time dedicated to tasks simulating combat conditions. As a result, a decrease in performance compared to the initial level was observed. This reduction was notably evident in anaerobic capacity and upper body strength. However, no significant changes were found in other parameters.

The physical fitness levels of soldiers serving in the U.S. Air Force and the factors affecting these levels were examined. As a result, it was observed that women's physical fitness levels were negatively affected by obesity and insufficient aerobic exercise, while men's levels were adversely impacted by insufficient aerobic exercise, obesity, and tobacco use. As a result, it was determined that sedentary, smoking, and obese men had a 77% risk of having low physical fitness levels (45).

The studies mentioned above detail various factors affecting the physical fitness levels of soldiers and the impact of these factors on their performance in military operations.

DISCUSSION AND CONCLUSION

This study investigates the methods used to assess the physical fitness of military personnel serving in various countries' armed forces, establishing the physical fitness criteria necessary for maintaining soldiers' overall health and operational capabilities.

Within the scope of the research, physical fitness assessment criteria applied in the armed forces of 17 different countries were examined. These armies employ various tests to evaluate physical fitness. Through these tests, they aim to determine the endurance, muscle strength, and overall physical fitness of their soldiers. The physical fitness test criteria vary according to the operational requirements and needs of each army. However, it is observed that there is a common point in the physical fitness test criteria of all armies. This common point is to ensure that soldiers are psychologically and physically prepared for combat.

The Canadian and U.S. armies use comprehensive physical fitness test batteries. These tests evaluate endurance, strength, and aerobic capacity. On the other hand, Russia and China assess their military personnel in multiple aspects using detailed physical fitness test batteries, including swimming, pull-ups, running, and obstacle courses. Sweden, France, and Germany employ more specific test batteries to evaluate physical skills. The U.S. Army implements alternative tests for personnel who report health issues as an excuse, providing various options for maintaining physical fitness. The U.S. Marine Corps does not differentiate between genders in its physical fitness tests, ensuring that male and female personnel are evaluated based on the same criteria. The Australian Army, in addition to standard running tests, uses deep-water running and loaded march tests in their physical fitness assessments. Canada and the United Kingdom place great importance on maintaining the physical fitness levels necessary for operations. In this context, they implement tests appropriate to combat conditions to enhance the combat skills of their personnel. The Turkish Armed Forces

apply different test levels based on the age variable of the personnel, thereby supporting the maintenance of physical fitness in older personnel.

Physical fitness has been one of the most crucial factors in winning wars for armies. Additionally, it has maintained its importance without losing popularity over time. Continuous and regular physical activity among soldiers is critical for maintaining operational skills and combat readiness. In the current era, operational conditions are supported by technological advancements. However, despite this, the physical fitness level of personnel remains of great importance in the successful completion of missions.

In conclusion, it is recommended to use comprehensive and integrated test batteries (including strength, endurance, flexibility, and coordination) to thoroughly evaluate the physical fitness levels of military personnel. Additionally, implementing flexible and alternative test options for personnel who report health issues as an excuse, adapting physical fitness tests considering age and gender variables, and including continuous and regular training programs to maintain the physical fitness levels of personnel would be beneficial.

REFERENCES

1. Alpözgen AZ, Özdinçler AR. Fiziksel aktivite ve koruyucu etkileri: Derleme. Sağlık Bilimleri ve Meslekleri Dergisi. 2016;3(1):66-72.
2. Arora R. The Effects of Residency on Physical Fitness Among Military Physicians. Military Medicine. 2004;169(7):522-525.
3. Brown MJ. Fitness and Its Affects on the Military. US Army War College Strategy Research Project. Pennsylvania; 2005.
4. Bruce MJ. Physical activity, physical fitness and health: Leisure-time physical activity trends in Canada from 1981 to 1998 and the prospective prediction of health status from health-related physical fitness. National Library of Canada: Bibliothèque nationale du Canada, Ottawa; 2003.
5. Buckley JP. Exercise Physiology in Special Populations. Philadelphia: Elsevier; 2008.
6. Canadian Land Force Command. Army Fitness Manual (B- GL-382-001/PT-001). Ontario; 2005.
7. Chahal HPS. Army Physical Fitness Performance Standards Based on Body Composition, Muscular Strength and Endurance. Doctoral thesis. Alberta: University of Alberta; 1993.
8. Chen Z, Du J, Hu Y, et al. Weekly cumulative extracurricular core training time predicts cadet physical performance: A descriptive epidemiological study. Heliyon. 2023;9(4):e14756. doi:10.1016/j.heliyon.2023.e14756
9. Civil T. Sporun kavramsal temelleri-1. İstanbul: Efe Akademi; 2020.
10. Conway TL, Cronan TA. Smoking, Exercise, and Physical Fitness. Preventive Medicine. 1992;21(6):723-734.
11. Corroll VA. AAHPER Youth Fitness Test Items and Maximal Oxygen Intake. Doctoral thesis. Illinois: University of Illinois; 1967.
12. Crawford K, Fleishman K, Abt JP, et al. Less Body Fat Improves Physical and Physiological Performance in Army Soldiers. Military Medicine. 2011;176(1):35-43.
13. D'Eliscu F. A Manual In The Organization and Conduct of a Conditioning Program for Physical and Military Fitness and for Combat Training. Doctoral thesis. New York: New York University; 1944.
14. Department of the Air Force. Personnel Fitness Program (AFI 36-2905). United States Air Force Headquarters; 2010.
15. Department of the Navy. Physical Readiness Program (6110.1J). Office of the Chief of Naval Operations; 2011.
16. Eaton R. Prepare for Battle. The Army Doctrine and Training Bulletin. 1999;2(2):16-19.
17. Eisinger GC, Wittels P, Enne R, et al. Evidence-Based Job Analysis and Methodology to Determine Physical Requirements of Special Military Occupations. In: NATO. Optimizing Operational Physical Fitness (AC/323(HFM–080)TP/200). p. 6-1/6-64; 2009.
18. Ekelund U, Sjöström M, Yngve A, Nilsson A. Total daily energy expenditure and pattern of physical activity measured by minute-by-minute heart rate monitoring in 14–15 year old Swedish adolescents. European Journal of Clinical Nutrition. 2000;54(3):195-202.
19. Ergen E. Spor Hekimliği. Ankara: Milli Eğitim Basımevi; 1986.
20. Erikssen G. Physical fitness and changes in mortality: the survival of the fittest. Sports Medicine. 2001;31:571-576.
21. Fitness in the Military. Does the Joint Environment Dictate One DoD Test? http://www.scott.af.mil/news/story.asp?id=123112808; 2012.
22. Flanagan S. Fitness and Performance Classified According to Body Mass Index and Waist Circumference for Canadian Forces Personnel Aged 50–59 Years. Master's thesis. Ottawa: L'Université Canadienne; 2008.
23. Fothergill DM, Sims JR. Aerobic Performance of Special Operations Forces Personnel After a Prolonged Submarine Deployment. Ergonomics. 2000;43(10):1489-1500.
24. Headquarters Department of the US Army. Army Physical Readiness Training (TC 3-22.20). Washington; 2010.
25. Heper E, Sertkaya Ö, Koca C, Ertan H, Kale M, Terekli S. Spor bilimlerine giriş. Eşkişehir: Açık Öğretim Fakültesi Yayını; 2012.

26. Hertling MP. Physical Training for the Modern Battlefield: Are We Tough Enough? Capstone thesis. Kansas: U.S. Army Command and General Staff College; 1987.
27. Hoeger WW, Hoeger SA. Principles and Labs for Physical Fitness. 7th ed. Belmont: Wadsworth Cengage Learning; 2010.
28. Irish Defence Forces. Defence Forces Fitness Testing. https://www.military.ie/en/careers/faqs/defence-forces-fitness-testing/; 2024.
29. Isır T. Örgütlerde Personel Seçim Süreci: Bir Kamu Kuruluşundaki Yönetici Personelin Kişilik Özelliklerinin Tespit Edilerek Personel Seçim Sürecinin İyileştirilmesi Üzerine Bir Araştırma. Doctoral thesis. Adana: Çukurova University; 2006.
30. İngiliz Savunma Bakanlığı Web Sitesi. Fitness Training-A Sensible Guide to Preparing for Selection in the Gurkhas; 2012.
31. Kamuk YU. Türk Silahlı Kuvvetleri'nde fiziksel uygunluğun değerlendirilmesi. Doctoral thesis. Ankara: Gazi University; 2013.
32. Knapik J, Daniels W, Murphy M, et al. Physical Fitness and Infantry Operations. Massachusetts: U.S. Army Research Institute of Environmental Medicine; 1983.
33. Knapik JJ. The Validity of Self-Reported Physical Fitness Test Scores. Military Medicine. 2007;172(2):115-120.
34. Lison A, Pothoff T, Raida K, et al. Aussagekraft Sportmotorischer Testverfahren für die Streitkräfte. Wehrmedizinische Monatsschrift. 2011.
35. McLaughlin R, Wittert G. The Obesity Epidemic: Implications for Recruitment and Retention of Defence Force Personnel. Obesity Reviews. 2009;10:693-699.
36. Ministère de la Défense. Instruction Relative au Controle de la Condition Physique du Militaire (CCPM 126/DEF/EMA/EMP.3/NP). ÉTAT Major Des Armées, Paris; 2007.
37. Moore GC. An Analytical Study of Physical Fitness Test Variables. Doctoral thesis. Illinois: University of Illinois; 1955.
38. Moran DS. Gender Differences in Physical Fitness of Military Recruits During Army Basic Training. NATO AC/323(HFM-158/TP/237 Impacts of Gender Differences on Conducting Operational Activities RTO Meeting; 2008.
39. Naghii MR. The Importance of Body Weight and Weight Management for Military Personnel. Military Medicine. 2006;171:550-555.
40. Nande PJ, Vali SA. Fitness Evaluation Tests for Competitive Sports. Mumbai: Himalaya Publishing; 2010.
41. Nindl BC. Physical Performance Responses During 72 h of Military Operational Stress. Medicine & Science in Sports & Exercise. July 2002:1814-1822.
42. Plavina L. Characteristics of Physical Preparedness and Physical Fitness of the Military Officers and Soldiers. Papers on Anthropology. 2007;16:237-243.
43. Plavina L. Preparedness and Physical Fitness of Military Personnel. Papers on Anthropology. 2008;17:255-264.
44. Porter SC. The Soldier's Load. Infantry. May-June 1992:19-22.
45. Robbins AS, Chao SY, Fonseca VP, Snedecor MR, Knapik JJ. Predictors of Low Physical Fitness in a Cohort of Active-Duty U.S. Air Force Members. American Journal of Preventive Medicine. 2001;20(2):90-96.
46. Sackett PR, Mavor AS. Assessing Fitness for Military Enlistment: Physical Medical and Mental Health Standards. Washington: National Academies Press; 2006.
47. Sandıkçı MB. Sportif rekreasyonel faaliyetler ile sağlık açısından metaverse ve sanal gerçeklik teknolojisi. Beden Eğitimi Ve Spor Araştırmaları. 2022;65.
48. Sperlich B, Fricke H, Marees M, Linville JW, Mester J. Does Respiratory Muscle Training Increase Physical Performance? Military Medicine. 2009;174:977-982.
49. Stophel WC. The Marine Corps Physical Fitness Test: The Need to Replace It with a Combat Fitness Test. Virginia: United States Marine Corps Command and Staff College; 2008.
50. Strong GR. Descriptive Comparisons of United States Military Physical Fitness Programs. The Sport Journal. 1999;2(2).
51. Sturgeon J, Meer J. The First Fifty Years 1956–2006, The President's Council on Physical Fitness and Sports Revisits Its Roots and Charts Its Future. 2011.
52. T.C. Millî Savunma Bakanlığı Genelkurmay Başkanlığı. Görevi. https://www.tsk.tr/Sayfalar?viewName=Gorevi; 2024.
53. The Marine Corps Community Services. Introduction to the Corps Fitness Test; 2011.
54. The President's Council on Physical Fitness and Sports. PCPFS Research Digests. 2000.
55. The Russian System of Physical Training. https://www.dragondoor.com/articles/the-russian-system-of-physical-training/; 2007.
56. Türk Silahlı Kuvvetleri İç Hizmet Yönetmeliği. https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=5905&mevzuatTur=KurumVeKurulusYonetmeligi&mevzuatTertip=5; 2024.
57. United States Army Headquarters. Physical Fitness Training FM 21–20. Washington; 1992.
58. US Department of Defense. DoD Physical Fitness and Body Fat Program Directive. Number 1308.1; 2004.
59. US Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta: Department of Health and Human Services; 1996.

60. US Department of the Navy. Marine Corps Physical Fitness Test and Body Composition Program Manual (MCO P6100.12). Washington; 2002.
61. US Department of the Navy. Marine Corps Physical Fitness Program (MCO P6100.13). Washington; 2008.
62. US Marine Corps. Marine Physical Readiness Training for Combat, MCRP 3-02A. Virginia; 1988.
63. Wayne LS. Task Related Aerobic and Anaerobic Physical Fitness Standards for the Canadian Army. Doctoral thesis. Alberta: University of Alberta; 1992.
64. Weiglein LH. The Validity of the One-Mile Walk Test as a Predictor of Aerobic Capacity in Air Force Males. Master's thesis. Illinois: Southern Illinois University; 2010.
65. Worden TE. A Comparison of the US Air Force Fitness Test and Sister Services' Combat-Oriented Fitness Tests. Master's thesis. Ohio: The Air Force Institute of Technology Air University; 2009.
66. Wyss T, Beuchat C, Zehr S, Mader U. Physical Performance in Young Men at Swiss Army Recruitment 1982 to 2005. 2011.
67. Wyss T, Marti B, Rossi S, Kohler U, Mader U. Assembling and Verification of a Fitness Test Battery for the Recruitment of the Swiss Army and Nation-wide Use. Schweizerische Gesellschaft für Sportmedizin. 2007;55(4):126-131.