

The role of physical fitness training programs in improving armed personnel's tactical and combat readiness to secure land and borders

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ABSTRACT

Physical fitness is a fundamental tool for an effective soldier to maintain vigor, alertness, and stamina in operations, and in the performance of all assigned duties in tackling insurgency and insecurity across the nation. Through a review of past studies, this paper highlights the importance of physical fitness of soldiers for combat missions, and its efficacy in ensuring their combat readiness. It also highlights the role of commanders in ensuring that soldiers adhere to standardized physical training fitness programs. This paper concludes by recommending the importance of commanders, physical instructors, tactical unit leaders, coaches, and trainers in soldiers attaining the required physical professional standards in discharging their duties during missions and combat.

Keywords : physical fitness, combat readiness training, continuous operational activity, Nigerian army personnel, soldier

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Introduction

Armed forces have played a role in protecting of national territory from external forces and promoting peace in a country. For the role, they have to perform tasks such as guard duty, counter threats, weapons of mass destruction, and contingency operations from its adversaries that require basic physical ability. Due to the use of advanced technologies to enhance human performance (e.g., using exoskeleton for load carriage: Shao, Wu, & Zhou, 2021), individuals still need the ability to relieve their psychological tension for mission success and maintenance (Sharp et al., 2017). Especially, because soldier's physical fitness has it will greatly influence their performance (US Army, 2003), they must be actively fit to carry combat equipment. In this sense, military basic training is crucial to attain optimal physical performance and deployment as it forms the basis of the development of military for immediate and long-term health benefits. Plavina (2008) emphasized the importance of physical activity to sustain high fitness levels for a soldier's survivability during reconnaissance and tactical operations required for the achievement of their daily duties including provision of support during conflicts, and supply of food and water to internally displaced camps (IDPs) and the protection of its citizenry from external forces.

Despite of importance of physical requirement to safely and effectively perform military operations in the complexity and constrains environment (Vaara et al., 2022), it has revealed that the average aerobic fitness of military personnel has declined due to promotion of sedentary lifestyles among personnel's (Akila, 2015; Knapik, Sharp, & Steelman, 2017; Santtila et al., 2006). Similarly, the sedentary lifestyle prominent among Nigerians today is spilling over into military profession leading to obesity and diseases (Akila, 2015). An endless use of computer, television, smart phones replacing outdoors sports events and socializations has greatly influenced personnel's non-participation in physical activity leading to poor physical fitness (Stanley, 2018). During mission, a lack of basic fitness often can lead to injury. This is why most military personnel's must be actively engaged in sport competitions and it's a mandatory requirement for officers (Carow & Gaddy, 2015).

Consequently, the previous studies have reported that the successful performance of military duties requires commitment to a high level of physical fitness with proper nutritional dietary intake and particularly aerobic fitness, endurance, agility, and muscular strength (Hauschild et al., 2017; Sharp, Patton, & Vogel, 1996; Warburton, Nicol, & Bredin, 2006). In view of the above, the current study aims to investigate the role of physical training in the military, in terms of

combat readiness, through a review of past studies.

Review of related to Physical Fitness for Soldiers

Physical fitness has been identified as an indispensable tool and pillar of combat readiness for individuals and commanders to boost productivity, good health, shape and stamina, agility to survive tough living conditions, and promote job performance required for missions (East, 2013). The US Department of Health and Human Services (2008) viewed physical fitness in two categories: health-related and performance-related fitness. The general public focuses on health-related fitness, which is the amount of physical training required to reduce the risk of disease and health conditions like high blood pressure, stroke, coronary heart diseases, obesity, and type 2 diabetes (Medicine Net, 2022). The engagement of military personnel on physical activity like walking, cycling, and sports has proven to have significant health benefits on physical fitness and non-engagement is a leading risk factors of mortality and morbidity (World Health Organization, 2022).

On the other hand, military servicemen need to focus on performance-related fitness and training to achieve a physical goal, such as climbing a mountain, hiking, walking long and short distances, and load carriage to control weight, sugar levels and by making healthy choices to reduce health medical care costs (Kaufman, Brodine, & Shaffer, 2000; Roy, Springer, McNulty, & Butler, 2010). Therefore, physical and combat readiness is encompassed with objectives of personnel's high levels of cardiovascular and muscular endurance ability to meet the physical demands of any combat and missions, and drive to fight and win (Kyröläinen et al., 2017).

Military Physical Fitness

According to the Army Manual FM 21-20 on Physical Training: *“War places a great premium upon the strength, stamina, agility, and coordination of the soldier because victory and his life are so often dependent upon them. To march long distances with full pack, weapons, and ammunition through rugged country and to fight effectively upon arriving at the area of combat, drive fast-moving tanks and motor vehicles over rough terrain; to make assaults and to run and crawl for long distances; to jump into and out of foxholes, craters, and trenches, and over obstacles; to lift and carry heavy objects; to keep going for many hours without sleep or*

rest—all these activities of warfare and many others require superbly conditioned troops.” (Roy et al., 2010).

Extensive research review published by Mayo Clinic (2018) asserted that physical training equips an individual with regular exercise and its benefits: weight control, ability to combat ill health conditions and diseases, the improvement of mood and sexual performance, energy boost, and promotion of better sleep. Good physical fitness, including nutrition, sleep, training, and recovery, has been found to have both physiological and psychological benefits that may reduce stress, illness, and injuries (Tharion et al., 2005; Tomczak, 2012).

Similarly, Colonel Stephen D. Cellucci, Commandant, USAPFS recommended that “*soldier must be physically fit*” for all rigors of tasks indicating the importance of good physical fitness in soldiers to help build character, and improve soldiers’ perception of being prepared for the mission (Dyrstad, Giske, Barlaug, & Pensgaard, 2010). They further opined that physical training within a soldier’s career is revealed as the most effective method for maintaining and improving physical performance. These factors differ individually among personnel which directly influences optimized training adaptations. Among recruits, training starts from a high amount of low-intensity physical activity for improvements in strength performance and the ability to deal with the physical and psychological stress caused by battles or missions, or any other taxing crisis.

Promotion of Combat Readiness and Tactical fitness for Military Personnel’s

As healthy muscles are less prone to injury among missions and physical fitness testing, service members in most combat operations must have a high level of cardiovascular fitness and survival skills to avoid injuries and fractures. So, it is necessary for soldiers to be improve combat readiness and tactical fitness that make adjustment and reaction easier in unpredictability of environments causing mentally and physically tough (van Dyk, 2016). In that vein, military combat readiness of Nigerian Army personnel has standardized training fitness tests for the preparedness of various units based on the tasks for deployed combat operations, including security, covert operations and reconnaissance missions (Oko, 2022). The change from civilian routine to the physically demanding military routine led to significant improvements in body composition, postural control, trunk muscle fitness, lower risk of osteoporosis, cancer, aerobic fitness, and total physical fitness (Hofstetter, Mader, & Wyss, 2012; Mikkola et al., 2012). A low level of physical fitness among recruits is likely to affect their military training

and fulfilment of military duties (Tomczak, Bertrandt, & Kłos, 2012). Evaluations of tactical proficiency, appropriate equipment, and general serviceability, check personnel's deployment readiness status (Akila & Alu, 2021).

Combat readiness is measured using the standardized situational force scoring (SFS) test to improve the representation of ground force close combat in aggregate combat models to score soldiers attrition. It includes the applicability and use of military gadgets and the resistant to last in austere conditions during missions (Allen, 1987). The application of military training with standardized training programmes and operations ranges from tasks including foundational combined strength and endurance training to increase and enhance training responses during tactical missions (Fyfe, Bishop & Stetpto, 2014; Kraemer et al., 2004; Papay & Simonek, 2017; Santtila, Häkkinen, Nindl, & Kyröläinen, 2012; Santtila, Pihlainen, & Viskari, 2015).

As suggested by Smith (2017), physical fitness must be incorporated into the individual lives of military personnel and constantly reviewed with the current trends in military warfare. Physical fitness may protect soldiers against combat stress symptoms during deployment, reduced risk of injuries, and the optimal balance required for the military training, warfare, and missions (Bedno, Cowan, Urban, & Niebuhr, 2013; Heyward, 2014; Papay & Simonek, 2017; Rintamäki et al., 2012).

The Role of Commanders in the Administration and Implementation of Physical Training Programs

A military training plan, toolkits, and military environment programs for military instructors, commanders, and tactical strength and conditioning facilitators, must be adopted to meet performance goals or task requirements in training programs. Besides, it is important to note that training factors with the trainees' individual needs and initial fitness levels must be included individual training plans and programs for optimized training adaptations in military environments. Furthermore, a commander takes charge of maintaining, self-control and disciplined to lead team members in the unit to success of a mission, and so his/her personal fitness may impact on the level of physical readiness of soldiers. For instance, in condition of a commander's being physically fit, it can inspire subordinates' stamina and endurance for higher levels of achievement during mission (Courtright et al., 2013; Nindl et al., 2016; Santtila, Kyröläinen, & Häkkinen, 2009). That is, proper fitness will assist individual' better physical functional status in maintaining physical health and energy for perseverance during mission.

Based on this recommendation from the Army Physical Fitness Program (APFT) and Physical Fitness Assessment (PFA), the army commander's administration and application of physical fitness tests proposed to be at the discretion of the commander. Reason being that the commanders understand individual physical levels of the teams' members and implementation of the programme must be directed on individual readiness and ability depending on the missions and combat training experienced (East, 2013). On 30 December 1985, the APFT (AR 350-15) was revised and published for the second time with emphasis on its use, and the role of commanders to "make every effort to design and tailor programs according to what their soldiers may be expected to do in combat and to reward with the Army Physical Fitness Badge, APFT scores on Officer Evaluation Reports (OERs) and Non-commissioned Officer Evaluation Reports (NCOER) during training period who scored between 275 and 300 on the APFT 140 to boost morale and increase efficiency (Department of the Army, 1982). In case of the AR 350-41 (APFT), this assessment tool is used by mission commanders to establish baseline levels on muscular strength, development, and maintenance of soldier's readiness (East, 2013).

Methods

Study design and sample selection

For this purpose, this was a systematic study of authors studies conducted in Poland, Sweden, Netherlands, Burundi, and Nigeria, using a convenience sample. Variables of interest and clear indications for comparison were drawn from the database related to physical activity and fitness.

Search strategy

A literature search was conducted using the electronic databases on search platforms MEDLINE, SCOPUS, and PUBMED. Five categories of search terms were identified: military, physical activity, physical fitness, tactical, and deployment. The electronic searching strategy by Kim and Chung (2017) in combination with Boolean operations of 'And' and 'OR': (military* OR physical fitness*) AND military OR physical activity) AND (Fitness OR deployments* OR fitness). This strategy was applied to collate studies from various regions identified to assess

each region's level of physical fitness, and their fitness assessment method.

Current Physical Strength Status of Soldiers in Poland, Netherlands, Sweden, Burundi, and Nigeria

Tomczak (2012) investigated the physical activity levels of administration (58 male) and special units (45 male) in Polish military. Based on findings, average age of the participants of military administration soldiers was 45.2 ± 5.54 years and special unit soldiers 31.4 ± 4.40 years collected through International Physical Activity Questionnaire (IPAQ). The soldiers were grouped into two categories who were assigned with tasks with an adequate level of physical activity 23.4% and 29.3% were assigned to tasks with inadequate levels to compare difference levels and assess. Their study concluded the importance of definite steps for the promotion of health levels and physical activity among Polish Armed Forces soldiers.

Bradbury et al. (2017) used a cross-sectional analysis of participants data collected from UK Biobankin database from 2006 - 2010, including 119,230 males and 140,578 females aged 40 - 69 years. They measured metabolic equivalent (MET) hour of participants and assessed physical activity of walking from moderate to vigorous levels. Results revealed that BMI and body fat percentage were highly correlated ($r = 0.85$ females; $r = 0.79$ males) were inversely associated with physical activity. By indication, when compared with the baseline ≥ 100 excess MET-hours/week about 1.1 kg/m^2 lower BMI (27.1 vs. 28.2 kg/m^2) and 2.8 percentage points lower body fat (23.4% vs. 26.3%) were discovered in males, and 2.2 kg/m^2 lower BMI (25.6 vs. 27.7 kg/m^2) and 4.0 percentage points lower body fat (33.9% vs. 37.9%) in females. the participant's physical activity inversely associated with Body Mass Index (BMI) and body fat percentage than those with same BMI.

Klymovych et al. (2020) conducted on three-month physical fitness and combat training program on two groups of servicemen from different unit (tank and mechanized units) to investigate the effects of individual's physical ability on professional military activities (e.g., speed and accuracy of gun fighting). The two groups ($n=32$ physically-trained and $n=34$ less-trained servicemen). Their study revealed that prepared servicemen showed significant differences when compared with less physically-prepared soldiers on evidence of overcoming obstacles were lower by 28 seconds ($p < 0.001$) by less-prepared soldiers, while in the more-prepared group, the results declined by only 2 seconds ($p > 0.05$) indicating that professional military activity performance level is closely linked to the level of their physical

fitness of military servicemen.

Akila and Alu (2021) studied the effects of basic military training (12 weeks) on the muscular strength of men and women recruits that were randomly assigned to two experimental groups of trade and non-trade recruits at the Depot Nigerian Army, Zaria, Nigeria. It revealed that basic military training had a significant effect on the muscular strength of recruits. It also revealed that there was no significant difference in effects of the training between trade and non-trade recruits. They suggested that the importance of basic military training programs as an effective method in promote positive short-term adaptations of muscular strength, mobility, nutrition required for servicemen.

Suleiman et al. (2018) emphasized the importance of physical fitness in the armed forces because it makes the forces battle ready. Their study compared the physical fitness of the Nigerian Army, Navy, and Air Force personnel. Their study sample volunteered 80 Army, 85 Navy, and 70 Air Force personnel placed on sit and reach exercise. Their study revealed that Army personnel were more flexible ($M=23.189\pm 5.176$) on sit and reach assessment, than the Navy and Air Force personnel. They recommended the importance of promoting physical fitness programme from low-intensity to high duration of exercise for improving flexibility and overall fitness, and prevent musculoskeletal injuries in Nigerian Armed Forces.

Aandstad, Sandberg, Hageberg, and Kolle (2020) investigated the changes in anthropometrics and physical fitness in volunteered 260 male and 29 female Norwegian military medicine cadets during 3 years of military academy education. It revealed that the cadets' body weight, fat free mass, body mass index, and percent body fat, significantly increased by 1 - 5% from among Army and Airforce. Muscular power assessment through ball throw, vertical jump, pull-ups and push-ups increased by 3 - 20% in male cadets, while female cadets significantly increase on the ball and throw (10%). Strong evidence from the study revealed that relative maximal oxygen uptake decreased by 4% in both sexes and their anthropometrics and physical fitness were relatively stable among Norwegian male and female Army, Navy and Air Force cadets during 3 years of military academy education. In summary, the Norwegian cadets showed relatively good physical fitness profiles compared to sex-matched cadets than previously studied.

Papay and Simonek (2017) examined the physical preparation of professional soldiers focusing on the development of aerobic endurance within practical physical preparation lessons at Military units. They used natural pedagogical aerobic over the period of six weeks with two groups (experimental and reference couples) in Slovak Armed Forces. It suggested the positive influence of suitable physical activities (swimming, cycling, ski running, and sport games) on

soldiers' mission tasks like obstacle track, terrain running, shuttle runs, and jumping and acrobatic exercises. That is, level of aerobic endurance through physical fitness may be a most effective means for physical preparation of soldiers.

According to Manirakiza (2014), they assessed the level of physical training and education for military personnel of the Burundi National Defense Forces. Based on findings, they discovered Burundi National forces level of training substantially lessened during the civil war. The main reason is as result of the troops deployment along the Burundi–Democratic Republic of Congo border in preventing hostile's forces away from the country. Their study also revealed that a shortage of training facilities for Burundi defense forces remains a challenge and greatly influences the soldier's physical capabilities and non-provision of adequate training grounds, deployment for peace keeping missions, and sporting equipment's in military barrack on the development of soldiers' fitness. In conclusion, they suggested the need for soldiers to allocated time to engage in daily physical exercises and sports for healthy living and physically active to respond to any challenging threats.

Based on the literature review, it found that soldiers must demonstrate a high physical activity level required for adequate physical preparation and execution of official duties, both internally (at home) and externally (in military missions and security tasks). Although physical activity has both physical and mental benefits, there has been a decrease in physical activity in both low-medium- and high-income countries (Harvey, Hotopf, Øverland, & Mykletun, 2010; Knuth, Bacchieri, Victora, & Hallal, 2010). It has been attributed to several factors, including a lack of leisure time, stress of daily living, introduction of new technology, and changes in work processes (Wemme & Rosvall, 2005). Although some of the occupational activities at sea still have elements of hard physical labor, as with many occupations over the last decade, there has been a decrease in the energy expenditure among seafarers (Brownson, Boehmer, & Luke, 2005; Sargent, Gebruers, & O'Mahony, 2017).

The importance of physical fitness affects modern professional military activity, accompanied by relatively low loads. As military personnel perform occupational task which required a higher level in professional military training than a lower level of physical preparation, one can conclude that servicemen in excellent physical shape retain the speed and accuracy of fighting techniques for a longer time and perform better on higher space and faster even under the influence of physical pressure and mental stress. Thus, the present study lays the foundation of active participation to reduce mental disorders including depressions, social isolations (Sargent, Gebruers, & O'Mahony, 2017). In light of the results and studies mentioned above, this paper

lays greater emphasis on the promotion of a healthy lifestyle within the Armed Forces, globally through the introduction of special physical fitness programs promoting physical activity and a healthy lifestyle.

Discussion

The current study systematically reviewed previous studies that measured physical fitness in military and security forces in selected regions. The reviews revealed the physical training program has proven to be very effective tool using different ranges of obstacle track, terrain running in combination with fast road marches, various types of shuttle runs, and jumping and acrobatic exercises in developed countries. It also proved that military personnel must learn motor skills to clarify tasks and deploy effective tactics to respond and survive during missions ranging from strength training, strength drills, physical readiness training (PRT) on muscle endurance and balance. Consequently, the continual participation in physical fitness programs for military personnel have led to reduce psychological stress levels of soldiers and improve good cardio respiratory fitness against diseases. Therefore, the use of modern training equipment from swimming, cycling sport games can be recommended as suitable complementary activities to improve soldiers' physical levels for mission success.

Conclusion and Recommendations for Future Directions

Physical preparation and participation in aerobic, endurance, and muscular-strength training programs is a crucial toolkit for actively-serving soldiers in the military to meet the psychological resistance, endurance, and agility requirements for the fulfilment of tasks of combat. Armed forces should be well trained, to maintain their ability to move and negotiate battle conditions in terrain that may be vast and challenging. The Nigerian Army mission is to train and maintain adequate fitness levels of soldiers across the nation, through the use of functional sporting facilities, certified instructors, and mission commander, to protect the land and borders of the nation. The Defense Industries Corporation of Nigeria (DICON) must also deploy customized military hardware and equipment's for the Nigeria armed forces in securing of Nigerian borders, and tackling of insurgency and other forms of internal and external insecurity.

Recommendations for the Way Forward

1. Commanders and mission commanders in charge of physical training programs should use indicators and administer mandatory physical fitness tests for all soldiers, to determine their fitness levels and appropriately deploy actively fit personnel to attain success in their missions.
2. Defense Headquarters in collaboration with Conseil International du Sport Militaire (CISM) and Defense Industries Corporation of Nigeria (DICON) should provide adequate funding for the procurement and acquisition of sports activity equipment for training army personnel at various training centers like Army Schools of Physical Training. This can ensure that army personnel are trained with first-class equipment in order to compete with their counterparts across the globe in discharging their duties during combat and tactical missions.
3. Soldiers should be trained and retrained by physical trainers, instructors, coaches, and commanders, using modern standard training manuals, and military education in line with different training modes to avoid fatigue and injury. Different modes must be considered for different missions, to help soldiers adapt to different terrains.
4. The Ministry of Defense and the Security Council should review and implement the policy of physical training and continuous physical activity to maintain the resilience and readiness of its troops to respond at the right time to demanding circumstances, and with the necessary equipment to secure the lands.
5. Commanders, instructors, and trainers must establish standardized physical training tests and toolkits that are systematically developed, revised, and implemented in physical training programs that will enhance soldiers' abilities to complete tasks that support the unit's mission and success.
6. The Nigerian government, in collaboration with the Ministry of Defense, must construct physical training facilities in order to encourage both military personnel and civilians to engage in exercise that improve their wellbeing. Nigerian Army commanders should be required to make use of standardized training systems, fitness test programs, and refresher courses in all training institutes for every soldier's regular education. Regular equipment serviceability checks on various sport equipment must be carried out with the provision of replacements for dilapidated equipment, emphasizing report on use and reviews.
7. The Defense Headquarters and DICON should organize training workshops for engineers,

and the continuous engagement of bi-annual inter-games sport competitions by CISM among security agencies in the country to promote patriotism.

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Author contributions

Conceptualization: AJ, DKSJ and OSU; Resources and Data curation: DKSJ, OSU; Investigation: AJ, DKSJ and OSU; Methodology: DKSJ and OSU; Writing (Original Draft): DKSJ; Writing (Review and Editing): AJ, DKSJ and OSU; Project administration and Supervision: AJ, DKSJ and OSU

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