

Body Composition as a Measure of Physical Fitness Level of Nigerian Para-Military Personnel

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Abstract

The purpose of this study was to assess the body composition of Nigerian Para-military personnel by assessing the height and weights of the personnel. One shot research design was adopted in this study. One hundred and thirty-three (133) personnel were sampled for the study which comprises of 90 male and 43 female personnel. 35 male and 20 female of NSCDC, 30 males and 13 females of FRSC personnel and 25 male and 10 female of NIS personnel were randomly selected using stratified and simple random sampling techniques. The Body Mass Index (BMI) was computed using stadiometer and bathroom weighing scale to obtain the height and weight of the personnel. The data collected were statistically analysed using SPSS version 20, and ANOVA was used to compare the difference in the body composition of the personnel at significant level of 0.05. The findings of this study revealed that there was a significant difference in the body composition of the Para-military personnel. On the basis of this finding, the study recommended that the three selected Para-military Services should strengthen the body composition fitness training programmes of their personnel.

Keywords: Body, composition, Mass, Index, Physical, fitness, Para-Military

Introduction

The primary purpose of fitness and body composition standards in the Para-military or Public Security services (Police Officers, Immigration, Firefighters, Correctional Officers, Civil defence etc.) and security personnel has always been to select security officers best suited to the physical demands of security services, based on the assumption that proper body weight supports good health, physical readiness, and appropriate security appearance. There are also termed “tactical personnel”, which need to be constantly able physically, mentally, and technically to deal with these situations and thus, ensure or restore the social order (Marins, Cabistany, Farias, Dawes & Del Vecchio, 2020). In this sense, international studies have been conducted to measure and evaluate the level of physical fitness in public security officers (Dawes, Orr, Flores, Lockie, Kornhauser & Holmes, 2017; Marins & Del Vecchio, 2017; Maupin, Robinson, Wills, Irving, Schram & Orr, 2018), because knowing the personnel or officers’ level of physical fitness can help to identify strengths and weaknesses, as well as re-orientate the corporal practices of this professional group (Alvar, Sell & Deuster, 2017). The idea of a strong, trim military soldier is certainly not a new concept. However, the likelihood of over-nutrition leading to overweight and obesity and increases in inactivity have raised new concerns about the impact of fatness on health and security personnel’s performance.

An increasing number of Para-military agency personnel are considered to be overweight and physically unfit because they do not meet strength and endurance standards (Smith, Marriott, & Dotson, 2012; Cawley & Maclean, 2012). The prevalence of active-duty security officer who are overweight or obese increased from 50.6% in 1995 to 60.8% in 2008 (Reyes-Guzman, Bray, Forman-Hoffman & Williams, 2015).

Among the components of physical fitness, body composition is an important parameter of health and has implications for exercise perceptions among paramilitary officers (Lisman et al., 2017). Within the paramilitary personnel, physical fitness is relevant as it contributes to their performance in discharging their duties, such as pursuits on foot, fighting against offenders and removal of victims in case of accidents or emergencies (Beck et al., 2015). Physical fitness is useful for officers who desire to reduce overweight or underweight risk factors and improve their ability to perform specific tasks with no excessive fatigue (Thomas et al., 2018).

Maintaining desirable weight and body composition is an integral part of maintaining physical fitness, general health and military appearance (Nolte et al., 2002). The effects of excessive body weight are widespread and raise a variety of concerns relevant to the health and performance of members of the military (Nolte et al., 2002).

Body composition and physical fitness are associated with greater physical performance and a lower risk of health problems. Military activities are characterized as having a high physical and psychological load; physical fitness and body composition have an adverse effect on military performance (Plavina & Umbrasko, 2016). Previous studies reported that military physical training promotes positive biological adaptations in increasing power and muscular endurance thereby reducing body fat of the personnel (Military) while increasing cardio-respiratory fitness adaptation (Lemes, Vieira, Silva, Costa, Bocalini & Serra, 2014; Vaara, Kokko, Isoranta & Kyröläinen, 2015). Naghii (2006) opined that fat-free muscle mass is an important variable related to operational physical performance in different military tasks.

Body dimensions and body composition are known to influence the capacity for physical performance. Taller stature, for example, is associated with longer muscle length, which in turn is associated with proportionally greater muscle cross-sectional area and muscle mass (Astrand & Rodahl, 1986). The greater muscle area and mass of the taller individual is related to proportionally greater force development; for example, strength and aerobic capacity are proportional to the cube of height, with aerobic capacity also proportional to the two-third power of body weight (Astrand & Rodahl, 1986; Hebbelnick & Ross, 1974; Malina, 1975).

Body composition associations with exercise capacity are less well defined mathematically but nevertheless are quite evident. For example, it is apparent that there is a relationship between marathon running performance and a body type characterized by leanness and modest muscle mass, or between football defensive linemen and a large muscle mass and modest-to-high levels of body fat (BF). Thus, in athletic performance, particularly in elite athletes, the influence of body dimensions and compositions are readily evident (McArdle, Katch & Katch, 1985).

Body composition is often considered as a component of fitness. It refers to the makeup of the body in terms of lean mass (Muscle, bone, vital tissues and organs) and fat mass. An optimal ratio of fat to lean muscle mass is an indication of fitness, and the right types of exercise will help one decrease body fat and increase or maintain muscle mass (Matthew, Bowers & Thomas, 2011). Body composition refers to what the bodies are made of, such as muscle and bone, organs and fat and other matter, such as connective tissue. The bodies are composed of lean tissue (Pate, Pratt & Blair, 1995). The authors further opined that body composition is divided into fatness (% body fat) and lean body mass (% lean body mass) (Marins et al., 2020).

Body composition is largely dependent on dietary and exercise habits, sex and genetic factors, (Edgerton, 1976). Maintaining the same view, Getchell (1976) stated that sex

and genetic background do determine the distribution of fat deposit in the body. The constituents of what made up the body such as the muscle and bone, organs and fat, and other matters, such as connective tissue is often referred to as Body Composition. According to Skinner et al. (1990) physical activities promote favourable body composition. The author observed that male and female humans do not put on fat in the same place and in the same percent. The author further stressed that exercise is an important means for the control of body fat and the overall body build. This suggests that physical exercise could redistribute the body weight by making the muscle firmer and aiding the loss of excess body fat through physical activities as the case of Para-military personnel.

Statement of Problem

The security agent is primarily tasked to save lives and properties whilst maintaining safety, and they are always combat ready for any emergency. In various emergencies, security agencies wear personal protective equipment and are the first group of personnel to arrive and perform physically demanding activities (Atikah, Nihayah, Leonard, Omar & Ibrahim, 2015). Security personnel should possess good physical fitness, which includes good cardio-respiratory capacity, muscle strength or resistance and Body Composition (BC).

The amount of body fat accumulation leads to personnel overweight or underweight. There are increasing numbers of para-military agency personnel who are overweight and considered physically unfit because they do not meet strength and endurance standards. The prevalence of active-duty security officers who are overweight or obese are on a high increase in Nigeria today. Hence, the need for assessing body fat composition and physical fitness will help reduce body fat and increase or maintain muscle mass of the personnel, as the body composition has an adverse effect on security personnel's performance (Plavina & Umbrasko, 2016). Physical training reduces body fat and increases cardio-respiratory fitness and fat-free muscles is an important variable in performing different military task and to be physically fit.

Body composition as a component of physical fitness was considered in this study. It was selected based on the fact that it is commonly used as a means of testing the physical fitness level (Obese or overweight and underweight) of most para-military personnel all over the world including Nigeria.

Research questions

The following research questions were raised for the study:

1. What is the difference in the mean age, height and weight of the male and female personnel of the three selected paramilitary services?

2. What are the differences in the mean scores of body composition of the three selected paramilitary services?

Hypothesis

Ho1: There are no significant differences among the selected Nigerian Paramilitary services in the body composition of their personnel.

Methodology

One shot research design was adopted in this study. Three Nigerian Para-military services (Nigeria Security and Civil Defence Corps, Federal Road Safety Corps and Nigeria Immigration Service) were tested for their Body composition fitness levels, without the administration of any treatment. A total population of 1,330 male and female officers were used in this study. The population consisted of Nigerian Security and Civil Defence Corps (NSCDC), Federal Road Safety Corps (FRSC) and Nigeria Immigration Service (NIS) personnel respectively who are sports men and women.

Stratified random sampling technique was used for selecting the sample in this study. This technique, identified tri-service population by grouping the personnel into male and female groups. The sample was selected using simple random sampling technique, in which ten percent of the total number of male and female subjects from each of the three selected Para-military organizations was picked blindfolded. 350 pieces of paper were prepared, 35 of them were numbered from 1-35 for the male personnel and the others were left blank while another 200 pieces of paper were prepared for the female personnel and 20 were numbered from 1 to 20 while the rest were left blank. The NSCDC personnel were asked to pick from the papers and those that picked 1-35 and 1 to 20 were selected for the study. Similarly for the FRSC personnel, 300 pieces of paper were prepared for the male personnel, and 30 pieces of it were numbered from 1-30 and the rest were left blank. While 130 pieces of paper were prepared for the females, 13 of them were numbered from 1-13 and the rest were left blank. The FRSC personnel that picked from number 1 to 30 and 1 to 13 were selected as the subjects for the study. Also, same procedures was carried out for the NIS personnel with 250 pieces of paper prepared for the male group, 25 of them were numbered and the rest were left blank while 100 pieces of the paper were prepared for the NIS female personnel. They were numbered from 1 to 10 and the rest were left blank. The NIS personnel that picked from 1 to 25 male group and 1 to 13 female group were selected as the subjects for the study. Thus, 35 male and 20 female NSCDC personnel, 30 male and 13 female FRSC personnel, and 25 male and 10 female NIS personnel were selected. The sample therefore comprised of 90 male and 43 female Para-military personnel, which gave a total sample size of 133. The number of subjects selected for each of the para-military was ten percent (10%) of its population. This 10% of the total

population is statistically accepted in sampling technique (Thomas & Nelson, 1996; Kerlinger, 1986).

The Data collection technique involved the measurement of the Height and weight of the Para-military personnel to determine their Body Mass Index. Stadiometer was used to determine the height while bathroom weighing scale was used to measure the weight of the para-military personnel. The Height and Weight were measured in light indoor clothing, without shoes, braids or handsets. The subjects were made to stand on a stadiometer two meters high from the platform with adjustable flat set-square placed above the head to reduce parallax error, and a bathroom weighing scale (Hanson Model 89 DK Blue) both within precision measurement to the nearest 0.1cm and 0.1kg respectively (Hlaing, Prineas, Zhu & Leaverton, 2001; Wang, Ge & Popkin, 2000; Shukla, Mehta & Herbert, 2007; Gallo & Schell, 2005; Venkateswarlu, 2009). The formula for calculating body mass index is:

$$\text{BMI} = \frac{wt (kg)}{ht^2 (m)}$$

Descriptive statistics (Mean and standard deviation) were calculated for body composition, and used to answering the research questions while One-way analysis of variance (ANOVA) was used to compare the differences in the body composition of the selected Nigeria Para-military officers. Statistical significance was set at 0.05 and all analyses were performed using SPSS version 20.

Presentation of results

Research Question 1: What is the difference in the mean age, height and weight of the male and female personnel of the three selected paramilitary services?

Table 1: Mean age, height and weight characteristics of some selected Nigerian Para-military services

Variables	NSCDC			FRSC			NIS		
	Male N=35	Female N=20	Total N=55	Male N=30	Female N=13	Total N=43	Male N=25	Female N=10	Total N=35
Age (Years)	31	28	30	32	27	30	30	28	29
Height (metre)	1.66	1.64	1.65	1.65	1.65	1.65	1.65	1.65	1.65
Weight (kg)	66.29	60.50	63.40	63.27	62.23	62.75	63.40	62.30	62.85

Table 1 shows that the mean age of the Nigerian Civil Defence Corps (NSCDC), Federal Road Safety Corps (FRSC) and Nigeria Immigration Service (NIS) was 30, 30 and 29 years respectively. The mean age of the NSCDC male and female subjects was 31 and 28 years respectively. The mean age of FRSC male and female subjects was 32 and 27 years respectively; whereas the mean age for Nigerian Immigration male and female subjects was 30 and 28 years respectively. On the whole, the FRSC subjects were older than subjects from the other two Para-military services, whereas subjects from NIS were younger than the subjects from the other two Para-military services. Among the male subjects, NIS subjects were younger than subjects from FRSC. Among the female subjects, FRSC subjects were younger than the subjects from the other two Para-military services.

Table 1 shows that the mean height of each of the three Para-military personnel was 1.65 meters; the male subjects of the NSCDC were taller than their counterparts from FRSC and the NIS. The Nigerian Security and Civil Defence Corps (NSCDC) personnel were heavier than their counterparts from Federal Road Safety Corps (FRSC) and the Nigerian Immigration Service (NIS). Among the male subjects, the NSCDC personnel were heavier than the subjects from the FRSC and NIS, whereas females from NSCDC were lighter than the subjects from the other two Para-military personnel.

Research question 2: What are the differences in the mean scores of body composition of the three selected paramilitary services?

Table 2: Mean scores of body composition of Nigeria Security and Civil Defence Corps (NSCDC), Federal Road Safety Corps (FRSC) and Nigeria Immigration Service (NIS) Personnel

Variables (Body Composition)	NSCDC			FRSC			NIS		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Body Mass Index (Kgm ²)	14.55	14.95	14.75	15.71	16.33	16.02	14.36	16.10	15.23

Table 2 above shows that the FRSC officers had greater body composition than their counterparts from NSCDC and NIS. From the results, it is also evident that the female officers of NSCDC, FRSC and NIS had greater body composition than their male counterparts as shown by their scores obtained from the Body Mass Index (BMI) test. The table also shows that the NIS male had better body composition than the NSCDC and FRSC male officers; whereas NSCDC female personnel's had better body composition than the other two female Para-military personnel.

Ho1: There are no significant differences among the selected Nigerian Para-military services in the body composition of their personnel.

The Hypothesis was tested using one way analysis of variance, the results of which are shown in table 3.

Table 3: One Way analysis of Variance for differences in body composition among the selected Nigerian Para-military services

Source	Sum of Squares	df	Mean of square	f	p
Between Groups	38.249	2	19.124	3.449	0.002
Within Groups	1015.006	130	1.808		
Total	1053.255	132			

$$F(2, 130) = 3.349 > 3.00 < 0.05$$

The hypothesis results showed significant differences among the selected Nigerian Para-military services in the body composition of their personnel. This implies that the null hypothesis which stated that there are no significant differences among the selected Nigerian Para-military services in the body composition of their personnel is hereby rejected.

Discussion of the findings

The primary purpose of this study was to determine the Body composition and fitness of NSCDC, FRSC and NIS officers. The major findings were measured on the heights, weight and body composition of the officers. Over all, the mean values from the findings are within the normality of the general para-military personnel population especially the body mass index (BMI) of the personnel (within 14.36-16.33 kgm⁻²). The findings indicated significant difference in the body composition of the selected paramilitary personnel under review. The results revealed that the NSCDC male personnel have a greater weight of 66.29kg as compared to other paramilitary personnel. Also, the mean weight of the result showed that the NSCDC personnel had a greater body weight of 63.40 kg compared to the other security personnel from FRSC and NIS with a corresponding body weight increase of 62.75 kg and 62.85 kg respectively.

There was an increase in the Body Mass Index (BMI) of the NSCDC, FRSC and NIS female personnel with 14.95, 16.33 and 16.10 kgm⁻² respectively. The results show that the female security personnel have a greater BMI as compared to their male counterparts. This could be attributed to lack of physical exercise of the female personnel to keep fit. This finding conforms with studies conducted by Beck et al. (2015) and Thomas et al. (2018) whose studies suggested that body composition is an important parameter of health and has implications for exercise prescription among the para-military officers. Their studies also, proves that the weight of the security officers is relevant because it contributes to the performance of them discharging off their duties such as pursuits on foot, fighting against offenders, physical violence, accidents, robberies and armed clashes. This may be justified on the basis of the fact that the three selected Nigerian Para-military services are always involved in physical activities, which suggests that physical exercise could redistribute the body weight by making the muscle firmer and aiding the loss of excess body fat (Marins & Del Vecchio, 2017).

Conclusion

From the results obtained, the male personnel of Nigeria Immigration Service (NIS) had better body composition than those from the Nigerian Security and Civil Defence Corps (NSCDC) and Federal Road Safety Corps (FRSC). The female personnel of the NSCDC were however better in body composition than their counterparts from the NIS and FRSC. Paramilitary personnel's activity is considered of great risk as it is marked by hazardous situations that are stressful and physically demanding such as riots, physical violence, robberies and armed clashes. Thus, professionals need effectiveness and accuracy in the execution of tasks and different physical abilities (such as body compositions, weight, muscle strength and endurance, power, speed, and agility). It also highlights the importance of para-military officers being in a good

physical condition to perform their competencies because poor motor fitness limits performance, endangering individual and collective safety. However, the para-military personnel should reinforce the importance of engaging in physical fitness test to improve the health practices of the whole paramilitary personnel. From the result obtained in this finding, body composition is useful for para-military officers who desire to reduce overweight or obese and underweight risk factors and improve their ability to perform specific tasks with no excessive fatigue.

Recommendations

From the findings of this study, the results show that generally, the physical fitness level of personnel of the Federal Road Safety Corps (FRSC) was not as good as those of the Nigerian Security and Civil Defence Corps (NSCDC) and Nigerian Immigration Service (NIS) Therefore, there is need for the FRSC to strengthen the physical fitness level of its personnel by increasing its frequency, intensity and duration of exercise to improve the body composition of its personnel.

Since physiological profile reveals moderate aerobic cardiac adaptations to training and personnel training are relative to the standard of their duties, the personnel should increase their physiological parameters to be able to cope with the demands imposed by the job.

The research also recommends that although physical fitness and body composition tests can provide useful indicators of overall health, there may be need to be tailored to active-duty personnel annually or quarterly to help reduce the level of obesity or overweight personnel in the Para-military.

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