

Effect of Endurance and Strength on Academic Achievement of Physical Education Students in Federal College of Education, Obudu, Cross River State, Nigeria

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Abstract

This study investigates the effect of endurance and strength on academic achievement of physical education students in federal college of education, obudu, Cross River State, Nigeria. To achieve the objectives of this study, two hypotheses were formulated to guide the study. Literature was reviewed according to the hypotheses directing the study. The survey research design was adopted for the study. Total samples of two hundred (200) respondents were randomly selected for the study. The selection was done through the simple random collection. A questionnaire instrument was constructed by the researchers with the help of some measurement experts that gave it face and content validity. To test the hypotheses and to ascertain whether to accept or reject them, Pearson Product Moment Correlation Analysis was considered appropriate because of the nature of each of the variables involved. The .05 level of significance was used for the statistical testing of each hypothesis with critical values and degrees of freedom. The results showed that, there is significant effect of muscular endurance and muscular strength on academic achievement of federal college of education students in physical education. Based on the findings of the study, appropriate conclusions and recommendations were made.

Keywords: Endurance, Strength, Academic Achievement and Physical Education.

Introduction

Physical education is an integral part of educational programme design to promote the optimum development of an individual physically, socially, emotionally, mentally and spiritually through total body movement in the performance of properly selected physical activities. Physical education is the process by which changes in the individual are brought about through movements' experiences. Physical education aims not only at physical development but also concerned with education of the whole person through physical activities (Ntui, 2001).

Physical education develops the skills, knowledge, values and attitudes needed for establishing and enjoying an active and healthy lifestyle, as well as building student confidence and competence in facing challenges as individuals and groups or teams, through a wide range of learning activities (World Health Organization, 2002). WHO (2002) further stated that, physical education emphasizes the connection between theory and practical skills and is designed to develop the interest and potentials of students in the area of physical education and sports. WHO (2002) again stated that physical education help students gain a deeper understanding of theories and applications in the fields of human movement and health, and it promote the well-being of individuals and society.

The researchers in their own opinion viewed physical education as the process of developing an individual physically, mentally, socially and morally through participation in well arranged, organized and carefully selected physical activities. According to Oduyale & Amuchie (1991) physical education is the process of social, mental and physical development through the medium of selected physical activities. They further stated that physical education therefore also aims at the total development of individuals and is thus an important aspect of general education.

According to Oduyale & Amuchie (1991), physical fitness is the ability of the body to perform its daily activities very efficiently and yet have enough energy reserves for any emergency. They stated that a physically fit person plays and works without feeling tired. They again stated that, through physical activities, various physical fitness components such as cardiovascular endurance, muscular endurance, muscular strength, flexibility, agility, speed and co-ordination are developed. Ntui (2001) submitted that, an athletes, participants or students who avail themselves in physical activities or training programmes that are vital, perform excellently in physical education activities.

Literature Review

Muscular Endurance and Academic Achievement

According to Bryan (2013) muscular endurance is important in soccer and other sports for several reasons. Primarily, muscular endurance is a major component of overall fitness and athleticism, which are necessary in

order to excel in sports. Secondly, stronger muscles are often equated to larger, heavier frames that help prevent getting pushed around on the field. Muscular endurance is another specific requirement which has been defined and described in various ways by different authors. Hickson (1980) defined endurance (also called sufferance, stamina, Resilience) as the ability of an organism to exert itself and remain active for a long period of time, as well as its ability to resist, withstand, recover from, and have immunity to trauma, wounds, or fatigue. In humans, it is usually used in aerobic or anaerobic exercise. He went further and stated that, the definition or 'long' varies according to the type of exertion- minutes for high intensity anaerobic exercises, hours or days for low intensity aerobic exercise. He concluded that, training for endurance can have a negative impact on the ability to exert strength unless an individual also undertakes resistance training to counteract this effect. For Quinn (2012) muscular endurance is the ability of a muscle or group of muscles to sustain repeated contractions against a resistance for an extended period of time.

According to Canadian Fitness and Lifestyle Research Institute (2002) muscular endurance is very important. For people playing sports and who have to sustain an activity for long periods of time, muscular endurance they said is determined by how well your slow twitch muscle fibres are developed. They further stated that, there are generally two types of muscle fibres in the body, slow twitch and fast twitch. Slow twitch muscle fibres they said cannot exert muscle force as fast twitch, but can sustain an effort over a much greater period of time, while fast twitch muscle fibres can exert a greater amount of force but for a very limited amount of time. Thus, they said slow twitch equals endurance, while fast twitch equals strength. They also suggested that it is important to pay attention to muscular endurance if you play any sort of sports, or are involved in any sort of physical activity that's lasts for quite a while, examples, hockey, football, tennis, etc. Another activity they said that is very dependent on muscular endurance is cross country running, and concluded that it is probably the best example of muscular endurance, as it involves very little muscular strength or flexibility.

According to Takanami, Iwane, Kawai and Shiemonitsu (2000) endurance is one of the basic components of physical fitness. As a result, most athlete students have to possess some degree of muscular and cardiorespiratory endurance to perform in their respective sports. They stated that, muscular endurance is the ability of a muscle or group of muscles to repeatedly develop or maintain force without fatiguing.

Though a high relationship has been established between muscular strength and absolute endurance, Quinn (2012) still believes that muscular endurance is best increased through muscle training that emphasizes high repetitions and relatively low resistance. American College of Sports Medicine (2000) concluded that, high resistance with low repetition exercise will build powerful muscles while low resistance with high repetition exercise will build the endurance qualities of muscles. For physical education students, an adequate level of both muscular and cardiovascular endurance is necessary for effective performance, thus should form an integral part of students training.

Muscular strength and academic achievement

Muscular strength, for some time now, has been considered as basic in most of human performance as other qualities such as endurance, speed, power, agility etc depend on it. According to Canadian Fitness and Lifestyle Research Institute (2002) muscular strength is much different from muscular endurance. Strength is a measure of how much force your muscles can exert, while endurance is the measure of how many times your muscles can repeat a specific exertion of force. Unlike muscular endurance which is controlled by slow twitch fibres, strength is determined by fast twitch fibres which focus more on quick bursts of energy rather than long, drawn out ones. They also stated that, it is a much different procedure when it comes to improving strength. The most widely used method they said is lifting a weight that is 70% of your maximum 10-12 times.

Quinn (2012) defines strength as the ability of the body or its segments to apply force thus making it a specific quality of muscles. He is of the opinion that there are two types of muscular strength static and dynamic with the dynamic type being more regularly utilized in physical performance. He opined that strength involves a combination of three factors namely the combined contractile forces of the muscles causing the movement (agonists) the ability to co-ordinate the agonistic muscles, with the antagonistic muscles, the neutralizers and the stabilizers and finally the mechanical ratios of the lever (bone) arrangements involved. He then stressed the importance of strength in performance by saying that though nearly all movements are performed against some resistance, athletes perform against much greater resistance than usual. Examples which could be cited to buttress this point are events like shot put, discus throw more generally muscular players (and non-players) are healthier, which he said is beneficial as sportsmen. Bryan (2013) further stated that, athletes used their muscles in a variety of ways during play/exercise. Strong legs he said are often considered the most important, because most athletes will run several miles during an exercise. The legs he said are used not only for running, but for maintaining balance, stopping and changing direction. An athletes or students with weak muscles are not able to do any of these things very well and may get tired easily.

Apart from the performance based contribution of strength, muscular strength plays an important role in protecting athletes from injury. Strong muscles enable an athlete to move quickly and avoid accidents especially

to the joint stability. Since muscular strength is so important to performance and for injury protection, it is necessary that it is adequately developed in athletes. Sports scientist and coaches are of the opinion that to increase strength rapidly, muscles must be contracted against heavy resistance and that the resistance must be increased as the muscles become stronger (Bryan, 2013).

Methodology

In this study, the researchers made use of the survey research design which is meant to describe and interpret existing conditions of the physical education students. The population of this study consists of all physical education students in college of education, Obudu, Cross River State. A sample size of 200 students was randomly selected from all the sessions in federal college of education, Obudu. The sample technique employed in selecting the sample size was the stratified random sampling technique. The main instrument used for data collection was the questionnaire. The closed ended questionnaire was constructed and administered to the respondents to enable them choose the alternatives that best describe their opinions. The questionnaire contained two parts. The part 1 is focused on the demographic data of the respondents, while part 2 contained data on muscular endurance and muscular strength on academic achievement of the students in physical education. The instrument used for data collection was validated using factors to contain validation. Each of the items in the questionnaire was formulated to relate to the topic under investigation. To determine the reliability of the instrument used for this study, test-retest reliability was conducted on a smaller sample size using Pearson Product Moment Correlation Coefficient (r) and the result yielded 0.70. This shows a high level of reliability.

Hypothesis one

There is no significant effect of muscular endurance on academic achievement of physical education students in federal college of education, Obudu. The result of the analysis is presented in table 1.

Pearson Product Moment Correlation Analysis of effect of muscular endurance on academic achievement physical education students. (N=200)

Variables	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-value
Muscular endurance	3398	11546404	6745	0.64
Academic Achievement	3347	11202409		

Significant at .05 level, df=198, critical r=.138

The result of the statistical analysis as presented in table 1 indicates that the calculated r- value of 0.64 is greater than the critical r- value of .138 at .05 level of significance with 198 degree of freedom. This result is significant and the null hypothesis was rejected. This means that there is a significant effect of muscular endurance on academic achievement of physical education students in federal college of education, Obudu.

Hypothesis two

There is no significant effect of muscular strength on academic achievement of physical education students in federal college of education, Obudu. The result of the analysis is presented in table 2.

Pearson Product Moment Correlation Analysis of effect of muscular strength on academic achievement of physical education students. (N=200)

Variables	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-value
Muscular strength	3375	11390625	6722	0.59
Academic Achievement	3347	11202409		

Significant at .05 level, df=198, critical r=.138

The result of the statistical analysis as presented in table 1 indicates that the calculated r- value of 0.59 is greater than the critical r- value of .138 at .05 level of significance with 198 degree of freedom. This result is significant and the null hypothesis was rejected. This means that there is a significant effect of muscular strength on academic achievement of physical education students in federal college of education, Obudu.

Discussion of findings

This section deals with the discussion of findings of the hypotheses directing the study. The result of the first

hypothesis reveals that there is a significant effect of muscular endurance on academic achievement of physical education students in federal college of education, Obudu. This is in line with Ntui (2001) who said that, one of the cardinal objectives of any good educational system from time immemorial has been the development and maintenance of a functional or dynamic physical and mental fitness of pupils and students for all intensive physical and intellectual work through graded regular physical education programme. He further stated that, a fit person must enjoy an alert and inquiring mind, emotional stability, a robust health and a proficiency in basic skills of movement.

The result of the second hypothesis reveals that there is a significant effect of muscular strength on academic achievement of physical education students in federal college of education, Obudu. This is in line with Ntui (2005) who said that, exercise is very important in maintaining as well as developing physical and mental fitness. He stated that, physical fitness of the children is the basis of physical fitness of the community. He further said that, appropriate physical activity in childhood develops the muscles, promotes good posture, improves neuro-muscular co-ordination and increases the capacity of the circulatory and respiratory systems to deal with the demands of muscular and intellectual exercises. He concluded that physical fitness has become a basic requirement for certain employment in many countries. Examples are Recruitment into Armed forces, Police, Youth and Sports Centres, FIFA Referees, etc.

Conclusion and Recommendations

Based on the findings of this study, the following conclusions were made:

- 1) There is a significant effect of muscular endurance on academic achievement of physical education students in federal college of education, Obudu.
- 2) There is a significant effect of muscular strength on academic achievement of physical education students in federal college of education, Obudu.

Based on the findings and conclusions of the study, the following recommendations are made;

- 1) The students should be encouraged to participate in physical activities especially muscular endurance activities because lack of muscular endurance may account for muscular fatigue.
- 2) Adequate and regular muscular strength activities should be encouraged because the stronger an individual is, the greater the amount of force that can be generated during physical activities and this has implications for daily activities.
- 3) The school authority should provide adequate facilities and equipment for the teaching and learning of physical education in colleges.
- 4) Adequate and professional physical education lecturers should be engaged in colleges to help teach students physical education properly.
- 5) Adequate, regular and meaningful physical activities or exercise contributes to good health and well-being of an individual, therefore, physical education students should be allowed to take active parts in physical exercises.

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