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ASSESSMENT OF MUSCULAR STRENGTH OF THE STUDENTS OF AMINU KANO COLLEGE OF ISLAMIC AND LEGAL STUDIES, KANO STATE

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ABSTRACT

This study assessed the muscular strength of students of Aminu Kano College of Islamic and Legal Studies. To achieve the purpose of the study, two research questions and two hypotheses were formulated to guide the study. A descriptive design of survey type was adopted for the study. The population for this study was 12, 072 students and a sample of 380 students of Aminu Kano College of Islamic and Legal Studies Kano were drawn through a multi-staged sampling procedure. Simple frequency counts and percentages were used to organize and describe the demographic characteristics of the respondents. Inferential statistics of chi-square was used to test hypothesis one and independent t-test was used to determine the difference between the male and female students in hypothesis two. The results of the study revealed that students of Aminu Kano College of Islamic and Legal Studies have significant muscular strength ($\chi^2 = 48.6$, $p < 0.05$). Also, male students of Aminu Kano College of Islamic and Legal Studies do not significantly differ ($t_{cal} = 0.587$, $p > 0.05$) from their female counterparts in their muscular strength. Based on the findings of this study, it was recommended among others that students of Aminu Kano College of Islamic and Legal Studies should be encouraged as much as possible to further develop their physical fitness through daily physical activities because doing so will develop their physical fitness as well as free them from diseases, such as back pains, leg pains and hypertension.

Key words: Assessment, Muscular Strength, Students, Aminu Kano College of Islamic and Legal Studies.

INTRODUCTION

Physical fitness is the ability of an individual to perform his/her daily duties without undue stress or fatigue and is simply referred to as living actively. Being physically fit will boost an individual's immunity thus preventing infection of certain diseases. Physical fitness helps individuals to live healthy both mentally and physically throughout their lives. In short, they will be able to perform daily chores easily and able to prevent chronic diseases such as heart attack, high blood pressure, cancer, diabetes, and osteoporosis (Omar-Fauzeet, 2010). Physical fitness thus includes adequate degree of good posture, physique, body weight normality, proper functioning of vital organs, muscular strength, muscular endurance, flexibility, body control and most importantly, cardiovascular endurance and mental fitness (Emiola, 1982). How much of each components is required depends on the age and the individual's vocation. Although a person physically fit in all components does not exist. A person should be able to walk, run, carry some fairly heavy objects and be ready for an emergency. Some of the components can be referred to as motor fitness (agility, balance, coordination, power, speed and reaction time) while others fall into the group of health related (body

composition, aerobic capacity, muscular strength, muscular endurance and muscular flexibility) fitness components (Hallal et al., 2012). Physical fitness is a physiological state of well-being that allows one to meet the demands of daily living or that provides the basics for sport performance or both (Emiola, 2007). Physical fitness is the individual's ability to endure exertion and stressful physical activity beyond that required by his/her normal day to day occupation. Physical fitness is a set of attributes that are either health-related, skillrelated or both (Barlow, 2004). It is therefore, not only required by males for better performance but also by females for maintenance of a healthy body and healthy mind. Physical fitness is a crucial pillar contributing a lot to the health of an individual. It affects our ability to function and be physically active. The benefits of physical fitness programs include improved capability to perform specific physical tasks, improved ability to mobilize the body efficiently, improved tolerance to fatigue, reduced risk during physical tasks, better psychological preparation and reduced stress and associated health risks (Cooper Institute, 2016). Muscular fitness is the general health, strength and endurance of one's muscles. It is related to other fitness conditions such as muscular strength which describes the amount of resistance that one's muscle can counter and muscular endurance which is the amount of muscular work one can do over time. People work to improve their muscle to achieve a number of goals. Common goals include improving one's appearance, improving one's overall health and reducing stress. There are many possible benefits to improving muscular fitness. Ones muscles tend to grow stronger and larger as they gradually become able to lift heavier loads for longer period of time. The association between muscular fitness and quality of life is impressive. The benefits of muscular fitness development include increases in lean body tissue, bone mineral density, connective
tissue strength, anaerobic power, low-back health and selfesteem (Sharon & Denise, 2008). Muscular strength refers to the
ability of a muscle or muscle group to exert force against a resistance. It is usually measured as one maximal effort for dynamic resistance exercise. This is often called a one-repetition maximum (1-RMax), whereas for static exercise, it is referred to as a maximal voluntary contraction (MVC) (Sharon & Denise, 2008). There is no doubt that, in varying degrees, strength underlies all motor performances. In an isolated sense, strength may be thought of as the capacity of a muscle or group of muscles to exert maximum pressure, or force, against a given resistance in a limited period of time. A muscular force exerted against an immovable object, with no or very little change in the length of the exercised muscle, is called static or isometric. A muscular force exerted against a movable object, with a change in the length of the exercised muscle, is called dynamic or isotonic. Attempting to push down a wall is an example of static force; lifting a barbell is a dynamic force (Sharon & Denise, 2008). According to William (2004) many people start losing strength as they age or become inactive although the loss is not irreversible. In addition, women lose more strength than men do, especially from the upper body (perhaps because they may be less active when they are younger). Muscular strength allows you to perform many tasks at home and at work and more important it helps to reduce the stress on joints. Muscular strength is a major determinant of an older person's ability to maintain an active high-quality lifestyle. Nervous system control of a muscle and the condition of the muscle itself combine to

produce the muscular control and strength that various activities require. In fact, much of the initial gain from strength training is a fine-tuning of the amount of neural input that is required to contract a muscle. An example is the process by which toddlers learn to stand, through repeated attempts, their movements become smoother and they are able to stand for longer periods. The amount of muscle contraction necessary for the activity has been refined as is the strength in the muscle itself (Emiola, 2007). When there is pain around a joint such as the knee, the nervous system can also inhibit muscle contraction. Many patients have complained about a knee buckling unexpectedly. Usually, secondary to pain after starting a strengthening routine, they have less pain and fewer problems with their knees giving way. Post-surgery joint replacement patients also illustrate the inhibition of muscle contraction because of pain. In many patients, the day after surgery cannot lift their legs off the bed even though they had no problem doing so before the surgery. As the pain around the surgical site decreased and they practice movements, these patients will be able to lift the surgical leg again even though there was no real change in strength. Most strengthening programs produce both neural and muscular changes that improve one's muscular control and strength (American College of Sports Medicine (ACSM), 2005). Muscular strength in other words, is the ability to exert maximum force, lifting the heaviest weight one time (one rep max). It is possible to have muscular strength in one area, while lacking strength in another area or other areas. Sometimes, all imbalances of strength in muscles can cause physical injury. This is why it is important to train muscles according to opposite muscle groups (quads/hamstrings, biceps/triceps, chest/shoulders, back/abdominal). By doing this, it will help in avoiding injury (Mazzetti et al., 2000).

STATEMENT OF THE PROBLEM

According to Adegun (2005) daily activities become more difficult to perform with prolonged inactive life style over time, this lead to poor habits that can lead to reduced mobility of joints and compromised body posture. Staying active and stretching regularly, help to prevent loss of mobility, which ensures independence with age significantly reducing the chance of experiencing occasional and chronic back pain.

The population of young adults pursuing tertiary education is growing and with this comes the issues that need to be addressed in order to improve their quality of life. The teaching profession is today the major source of producing human resources for the nation and therefore the quality of teachers being produced would definitely affect the type and quality of future generations of human resources. Both male and female youths are pursuing different teacher training specializations in Aminu Kano College of Islamic Legal Studies who are expected to be absorbed into different education sectors of the state, to serve as teachers. As observed by the researchers, it seems that many of these youths are having low levels physiologic attributes of fitness required to carry out their daily activities due to the contemporary orientation of technological living, or due to inadequate spaces for sports and physical activities within their communities as well as the College.

It has been observed by the researchers that students of the College frequently report back pains at the school clinics and sometimes leg pains, which probably is as a result of inactivity. The end results of inactivity can alter or deter muscular fitness, made up of flexibility, muscular power, strength and muscular endurance which are all

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performance related components. It is against the stated problems that the study investigated the muscular strength as a components of muscular fitness of students of Aminu Kano College of Islamic and Legal studies. Primarily, the study was guided by the following research questions:

1. Do students of Aminu Kano College of Islamic and Legal Studies possess muscular strength?
2. Do students of Aminu Kano College of Islamic and Legal Studies differ in muscular strength based on gender?

HYPOTHESES

In order to achieve the purpose of the study, the following null hypotheses were form ulated and tested at 0.05 level of significance:

i. Students of Aminu Kano College of Islamic and Legal Studies do not have significant muscular strength. ii. There is no significant difference in the muscular strength of male and female students of Aminu Kano College of Islamic and Legal Studies.

PURPOSE OF THE STUDY

The main purpose of the study was to assess the muscular strength for fitness of students of Aminu Kano College of Islamic and Legal Studies, with the view to identify the source and proffer solution to the frequent complaints the students make during their clinic visits, of back pain and leg pains.

METHODOLOGY

Population of the Study

This study adopted descriptive design of survey type. Sunusi (2008), defined a survey as a means for gathering information about the characteristics, actions, or opinions of a large group of people. This design is found suitable for this study, because it assessed the muscular characteristic(muscular strength) of a population of students of Aminu Kano College of Islamic and Legal Studies. The population of this study comprised the entire students of Aminu Kano School of Islamic and Legal Studies, with a population of 12,072, (7,214 males and 4,858, females (Directorate of Academic Planning, Aminu Kano College of Islamic and Legal Studies. 2017/2018 academic session).

Sample and Sampling Techniques: A sample of 380 students of Aminu Kano College of Islamic and Legal Studies Kano State were used for this study. This is in conformity with the suggestion of Research Advisors (2006), that for any population of ten to twenty-four thousand the sample should not be less than three hundred and seventy (370). A multistage sampling procedure was used by the researchers to select the sample for the study. This is in line with the view of Njodi and Bwala (2010) who stated that multistage involves more than one sampling method. They further stated that in a large and diverse study population, sampling may be done in two or more stages. The following are the stages for sample selection in this study:

Stage 1: Simple random sampling technique was used to select two (2) schools from six (6) schools in Aminu Kano School of Islamic and Legal Studies, Kano State. The

procedure is as follows; name of each school was written on a piece of paper, the pieces of paper were folded, mixed and shaken vigorously inside a container. Two research assistants representing the institution picked one folded paper each. The first two schools picked form the sample schools for the study.

Stage 2: Simple random sampling technique was used to select two departments from each of the selected schools. That was School of Science (Computer/Mathematics and Mathematics) School of Languages (Islamic Arabic and Islamic Hausa) respectively.

Stage 3: Proportional sampling technique was used to select 10% of the total population of each selected department

Stage 4: Purposive sampling technique was used to identify participants from each department through those that fill the inform consent form and identify interest in the study from both Schools of Science and School of Languages

Inclusion Criteria Apparently healthy students based on the assessment of laboratory method and physical evaluation

Exclusion Criteria
Hypertensive students with high blood pressure exceeding 140Hg/90mm. Diabetic students with blood sugar level of 126mg/dL(7mmol/L) or above. Those active students who engaged in physical activities (School Athletes) and Physical and Health Education Students

Data Collection Procedure
An introduction letter was written and taken to Provost of Aminu Kano College of Islamic and Legal Studies to seek permission to carry out the study. Through the H.O.D's of the NCE Departments selected, the participants selected for the study were tested on the muscular fitness variables, as well as their demographic characteristics.

Data Collection Instruments
In this study, Hand Grip Dynanometer (X12Va Japan) was used to measure muscular strength of the students (participants). The purpose of this test was to measure the maximum isometric strength of the hand and forearm muscles. Handgrip strength is important for any sport in which the hands are used for catching, throwing or lifting. Also, as a general rule people with strong hands tend to be strong elsewhere, so this test is often used as a general test of strength. The subject held the dynamometer in the hand to be tested, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer was adjusted as required, the base should rest on first metacarpal (heel of palm), while the handle rests on middle of four fingers. When ready the subject squeezes the dynamometer with maximum isometric effort, which was maintained for about 5 seconds. No other body movement was allowed. The subject was strongly encouraged to give a maximum effort. The position of the arm and hand can vary in different grip strength protocols. Various positions include the elbow being held at right angles, the arm hanging by the side and the extended arm being swung

from above the head during the squeezing motion, the procedure for tests, best of three attempts with 30 seconds rest between. The best result from the several trials for each hand is recorded in Kg/Ibs as each subject's score (Robert,2008).Each student was scored between good or poor in line with the scoring table, according to International Society for the Advancement of Kinanthropomethry (ISAK) (2006) fitness score. Simple frequency counts, percentages, mean and standard deviation were used to organize and describe the demographic characteristics of the respondents. Inferential statistics of chi square was used to test hypothesis one to determine the muscular strength of the respondents, while t-test was used on hypothesis two to determine the level of differences between the male and female students on the muscular strength tests at 0.05 level of significance.

Results

Out of three hundred and eighty (380) participants, only three hundred and seventyfive (375) duly completed the tests.

Table 1: Demographic Characteristics of the Respondents

Variables	Classification	Frequency	Percentage (%)
Gender	Male	185	49.2
	Female	190	50.8
Total		**375**	**100.0**
Age (Yrs)	18-25	140	37.6
	26-33	189	50.4
	34 & above	46	12.0
Total		**375**	**100.0**
Departments	Comp/Maths	79	21.0
	Mathematics	80	21.3
	Islamic/Arabic	124	33.1
	Islamic/Hausa	92	24.6
Total		**375**	**100.0**

Table 1indicated that 140 participants, representing 37.6% were within the age range of 18-25 years; 189 participants, representing 50.4%, were within the age range of 2633 years with 46 participants, representing 12.3%, were within the age range of 34 years and above. The table also shows that185 participants, representing 49.2.0%, were males while 190 (50.8%) are females. As shown in the table, the school type indicated 79 participants, representing 21.0%, were from Computer/Mathematics while 80, representing 21.3% were from Mathematics. Also, 124 participants, representing 33.1%, were from Islamic/Arabic while 92, representing 24.6% were from Islamic/ Hausa departments.

Hypotheses Testing

Hypothesis 1: Students of Aminu Kano College of Islamic and Legal Studies do not possess significant muscular strength

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Table 2: Chi-square summary on students' Muscular Strength

Strength	FO	FE	df	χ^2	p
Good	255	187.5	1	48.6	0.001
Poor	120	187.5			
Total	**375**				

χ^2_{tab}= 3.84, df = 1, (p<0.05), Significant

Table 2shows that 255 (68%) students of Aminu Kano College of Islamic and Legal Studies have significant muscular strength. Chi-Square statistical computation indicatedχ^2 value of48.6 at df = 1, (p < 0.05), the p-value is less than 0.05 level of significance. Hence, the null hypothesis stated is therefore rejected. This impliesthat students of Aminu Kano College of Islamic and Legal Studies possess significant muscular strength.

Hypothesis 2: There is no significant difference in the muscular strength of male and female students of Aminu Kano College of Islamic and Legal Studies.

Table 3: t-test analysis on Muscular Strength between Gender

Strength	N	$\bar{X}$	SD	SE	df	t	p
Male	182	5.32	2.10	0.151	373	0.587	0.558
Female	193	5.20	1.99	0.146			
Total	**375**						

t_{crit}=1.96, df=373, (p>0.05), Not Significant

Table 3 reveals that there is no significant difference in the muscular strength of the male and female students of Aminu Kano College of Islamic and Legal Studies with a t_{cal} of 0.587 and a p-value of 0.558. The p-value is greater than 0.05 level of significance. Therefore, the null hypothesis tested is accepted. This means that male students in Aminu Kano College of Islamic and Legal Studies do not significantly differ from their female counterparts in their muscular strength.

Discussion

This study accessed the muscular strength of students of Aminu Kano College of Islamic and Legal Studies. The finding of hypothesis one of the study revealed that students of Aminu Kano College of Islamic and Legal Studies possess/have significant muscular strength. This finding is in line with the study of Van Mechelen et al. (2000), who conducted a survey on muscular fitness among young people. Their study revealed that a significant increase in muscular strength resulted in significant benefits for enhancing muscular strength performance, overall performance, competence and technique accessed via a specifically designed strength performance test.

Also, the outcomes of hypothesis two reveals that male students of Aminu Kano College of Islamic and Legal Studies do not significantly differ from their female counterparts in their muscular strength. The current finding is in disagreement with

Rossi (2011), who conducted a study on muscular fitness among American Punjabi boys and girls of similar ages. He reported that, Punjabi boys are found to possess higher average strength values at different age levels between 20 to 28 years than the girls. At the age of 20 and 28 years, the Punjabi boys are found to exhibit better upper body strength similar to their American male counterparts. The finding of this study is also in line with Adegboye et al. (2011) who conducted a study on the effect of physical training programme on flexibility of upper body and trunk of male and female in Borne. They reported that male students performed poorly compare to their female counterparts in their strength.

CONCLUSIONS

On the basis of the findings and discussions of the study, the following conclusions are made:

1. Students of Aminu Kano College of Islamic and Legal Studies have/possess muscular strength
2. Male students in Aminu Kano College of Islamic and Legal Studies do not differ from their female counterparts in their muscular strength

RECOMMENDATIONS

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

1. Students of Aminu Kano College of Islamic and Legal Studies should be encouraged as much as possible to further develop their muscular strength through daily participation in physical activities in which the end product is the control of hypo-kinetic diseases as well as control or reduction of knee and low back pain among them.
2. The management of Aminu Kano College of Islamic and Legal Studies in collaboration with the Department of Physical and Health Education should make available a fitness center where students (male and female) and staff can regularly visit to inculcate the habit of participating in physical fitness activities.

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