EFFECTS OF BRICKWALKING ON ANTHROPMETRICS VARIABLES OF OBESE ADULTS IN ILORIN METROPOLIS, KWARA STATE

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Abstract
This study investigated effect of brisk walking on Anthropometric variables of obese Adult in Ilorin Metropolis, Kwara State. The research design of one group protest post-test experimental design was adopted for the study. The population comprised all obese adults within the study area. A multistage sampling procedure of stratified and purposive sampling techniques were used to select 70 respondents for the study. Anthropometric adapted data sheet and standardized research instrument for measurement were used for the study. The instrument was validated by experts in the department of Human Kinetics Education Kwara State University Malete and University of Ilorin. The reliability level of the instrument was established through split half method using cronbach alpha. A reliability coefficient of 0.96 was obtained. The administration of the instrument was done by the researcher and five (5) trained research assistants. The data collected were analysed using descriptive statistics of mean and standards deviation to analysed the demographic data while inferential statistics of analysis of co-variance (ANCOVA) was used to test the hypotheses set for the study at 0.05 alpha level. The result revealed that there was significant effect of brisk walking on body weight of obese adults, there was significant effect of brisk walking on body mass index and lean body weight of obese adult in Ilorin metropolis. Based on the findings of this study, the study recommends that there is need for collaborative effort among exercise scientist and fitness experts to educate all classes of people on the importance of engaging in physical exercise especially brisk walking and to adopt a active lifestyle that would promote healthy living and reduce obese among adult in the community.

Keywords: *Anthropometrics, Brisk walking, obese, Adults and Body mass index.*

Introduction

Anthropometry is a science of measuring human body part or segment in

order to ascertain the average dimensions of the human body form at different ages and in different division of races, classes among others (Dominic, Adeoye & Abubakar, 2017). Ross and Marfell- Jones, (2004); Abubakar, et.al, (2017) refer to Anthropometry as the measurement made of various parameters of the human body such as physical characteristics, body composition and circumference of various body parts. Anthropometric characteristics are traits that describe body dimensions, such as body weight, girth, height and body fat composition. The physical therapist uses test and measurements to quantify anthropometric traits and compare an individual current data with his or her previous data or with relevant predictive norms (Duncan&woodfield, 2006; Abubakar, Abubakar & Adeoye, 2019).

The core elements of anthropometry are; height, weight, Body Mass Index (BMI), body circumference (waist, hip) and skinfold thickness, these measurements are important because they represent diagnostic criteria for Obesity, additionally anthropometric measurements can be used as a base line measure for physical fitness and to monitor the progress of fitness (Sebo, Herrmann & Haller, 2017).

A large number of disease caused by obesity and a higher percentage of fat which accompanies obesity represent a significant problem that has caught the attention of nutritionists and sports professionals, this has made them to be more interested in dealing with the issue of reducing fat percentage in the body and determining the effects of training on the changes in the body composition. BMI is considered to be the most popular of all the indices of anthropometric measurements and is calculated by dividing a person's weight in kilograms (kg) by the person's height in meters squared (m^2). The World Health Organization (WHO, 2016) used BMI to classify individuals as underweight (BMI less than 18.5), normal weight (BMI) of 18.5 - 25.0 kg/m^2, overweight (BMI) of 25.0 – 29.9 kg/m^2 or obese as (BMI) of equals or greater than 30 kg/m^2. Although technology may eventually advance to replace anthropometry on some level, however, Hiremath, Ibrahim, Prasanthi, Reddy, Shah and Haritha, (2017) found that the anthropometric measures of waist circumference (WC) and hip circumference (HC) are superior to ultrasound to assess for regional adiposity, as regional adiposity is critical in the definition of metabolic syndrome.

Obesity has assumed an alarming rate globally and has become a global health problem. The problem is now growing fast in many middle and low-income countries and Nigeria is not left out. Obesityrates have quadrupled in adults and doubled in children in the past 30 years (Ogden, Carroll, Kit, & Flegal, 2014). According to the World Health Organization (WHO, 2016) was defined as a condition in which excess body fat has accumulated to such an extent that health may be adversely affected. Obesity can be measured using simple parameters such as Body Mass Index (BMI) and Waist Circumference (WC); these parameters also had association with health risk indicators (Booth & Lee, 2006). Excess body fat produces severe adverse consequences on health, such as high blood pressure and changes in lipid profile, when these factors are combined, predisposes to chronic non-communicable diseases such as type 2 diabetes mellitus, osteoarthritis, some form of cancers and cardiovascular disease (Lunard & Petroski, 2008).

Walking is considered the most common form of physical activity among adult which is easily adoptable, convenient and relatively safe among other forms of exercise. Furthermore, briskwalking is a preferred mode of exercise for the elderly, it is ideal because it does not require any special equipment, since it can be done any time and any where. Ayushveda (2008) affirmed that walking is one of the most relaxing, refreshing and enlivening form of exercise which reaps numerous physical, emotional and psychologically benefits. The author further asserted that to stay fit and healthy, one does not need to spend fortune on gymnasium facilities as the natural way of remaining healthy can be achieved by indulging in the healthy practice of briskwalking. Briskwalking has been well researched in literature, the identified health benefits range from keeping one's heart in a healthy shape, to helping in the process of weight management.

Furthermore, walking helps in refreshing and rejuvenating the mind as well as reducing stress and fatigue. Briskwalking implies picking up a pace which is faster than normal leisure speed but it something that is not exhausting. Thus, for an individual to reap the numerous benefits of briskwalking, such a person should pick up a pace which is fast, involving the workout of the entire body but that pace should be within comfortable range and should not result in exhaustion over a short distance.

Frequently cited barriers to exercise have been identified to include lack of time and the belief by individuals that they are not the sporty type. Indeed, walking has been described as the nearest activity to perfect exercise. Brisk walking is a popular and convenient form of exercise that plays an important role in weight loss and weight management. It is often recommended for obese individuals because; it increases energy expenditure (Browning & Kram, 2005). Brisk walking is considered by many fitness experts to be 100 steps per minute or 3 - 4 miles per hour. A brisk pace is relative since it refers to level of exertion which depends on individual fitness level.

The focus of the present study, therefore, is to evaluate the effectiveness of brisk walking on the anthropometric variables among obese adults in Ilorin metropolis, Kwara State. Traditionally in Kwara State, obesity is culturally and socially acceptable and not usually recognized as a medical problem (Iloh, et al., 2011). Based on general perception, obesity is viewed as assign of wealth and power in many parts of Kwara State. In some cultures in Nigeria, prospective brides are kept in 'fattening' rooms for months to make them fat enough and more appealing to their prospective grooms.

Statement of the Problem

The problems of obesity are caused by a chronic imbalance between energy food intake and actual energy food needs of the body. According to World Bank report, 2020 on Obesity; Health and Economic consequences of an impending global challenge, it was reported that 2 billion people are affected globally as of 2016, and 70% of the affected 2 billion Obese are found in low- or middle-income countries. World Health Organization (WHO) 2016, report that Obesity account for four million

deaths worldwide with increasing prevalence in low and middle income countries particularly in urban settings and Sub-Saharan Africa.

Many researches have been conducted on the effect of dietary intakes especially too much energy given food and fats as a factor that promote overweight and obesity in individual and recommendations suggested that people should watch their dietary intakes to reduce the incidence of obesity but despite the adherence to these recommendations, obesity still account for higher death rates worldwide. This therefore create gap which this research tend to fill and prompted the researcher to evaluate the effectiveness of brisk walking on anthropometric of obese adults in Ilorin metropolis as a means of reducing the incidence in our society.

Previous researches have looked into ways by which vigorous intensity exercise can reduce excess fat in obesity, as well as single parameters of the physical and physiological characteristics of obesity, However, there are paucity of documented researches that examined the effect of moderate intensity of physical activity on anthropometric variables of the obese individuals in Ilorin metropolis. This is the gap this research intended to fill by trying to look at the effect of brisk walking on the anthropometric indices and physiological parameters of obese adults in Ilorin metropolis.

Objectives of the Study

The general objectives of the study was to determine the effect of brisk walking on Anthropometric variables of obese adults in Ilorin metropolis**.**

1. To find out the effect of brisk walking on the anthropometric variables of body weight, body mass index, body density and percentage body fat of obese adult in Ilorin metropolis, Kwara state.
2.

Research Hypotheses

The following hypothesis was formulated to guide this study;

Ho1. There is no significant effect of brisk walking on the anthropometric variables of body weight, body mass index, lean body weight, body density and percentage body fat of obese adults in Ilorin metropolis.

Methodology

The research design for the study was one group pre-test post-test experimental design. That means there was initial and final measurement of anthropometric indices and physiological characteristics of the obese participants after 8 weeks of exposure to brisk walking.

The population of this study comprised the obese adults within the three (3) Local Government Areas in Ilorin Metropolis (namely; Ilorin East, Ilorin South and Ilorin West. The population was 70, drawn from among those that fall between the ages of 25 to 49 years, male and female inclusive. The sample for the study was 70 participants drawn across the three (3) Local Government areas under study. Purposive sampling technique was adopted to select the participants based on the

inclusion criteria. Two (2) research instruments were used for data collection namely; Anthropometric parameters adapted data sheet, Instrument and equipment for parameter measurement.

The data sheet was divided into two sections, the first section is on bio-data which comprises of; Age, Sex, Occupation, Marital Status, Educational Qualification, while the anthropometric variables that was measured comprises of the; height, weight, BMI, lean body weight, body density, biceps, triceps and subscapular girth. The instrument and equipment that was used for measurement are; Stadiometer, Weighing scale machine, Tape (meter) rule, Skinfold calliper, Sphygmomanometer, Stethoscope, Stop watch.

The anthropometric parameters data sheet that was adapted by the researcher for data collection was validated by experts in the department of Human Kinetics Education Kwara State University, Maleteand University of Ilorin. Standardised instrument were used for the measurements. These instruments include; tape (meter) rule, stethoscope, stop watch, sphygmomanometer, weighing scale. The researcher with the help of the supervisor and five trained research assistants revalidated the used instruments by checking for recalibration to ensure they are in good state.

According to Safrix & Woods, (2002) the weighing scale has a reliability coefficient of 0.96 and Willet, (2001) also said stadiometer has a reliability coefficient of 0.96. A pilot study was carried out using 10 participants from Malete who were not part of the actual study. This help to ascertain the reliability of the test instruments and to also acquaint the researcher and the trained research assistants with the test instrument and testing procedure. All participants were given pre-programme orientation as all the activities performed was demonstrated before commencement of the training sessions. Also, the research assistants helped in monitoring and supervising activities performed by the participants to ensure they were properly carried out. Brisk walking session was on 3 alternate days each week, that is, Mondays, Wednesdays and Fridays, after all the required baseline measurements must have been taken.

The exercise programme lasted for 70 minutes per session three times weekly (totalling 210 minutes weekly) for 8 weeks, each session included 10-min warm up and 10-min cool down with 50-min brisk walking of 3-4.5 mph on the field. All activities was carried out at a safe level of moderate-intensity between 40% and 70% of age predicted maximum heart rate (220 - age of the participants.). The moderate-intensity training was commenced at 40%-50% HRR during week 1-4, increasing to 50%-70% HRR during week 4-8.The data collected from participants was analysed using statistical package for social science (SPSS) 25.0, descriptive statistics of mean, standard deviation was used to analyse the demographic data while parametric statistic of Analysis of Co-variance (ANCOVA) was used to test the hypotheses at 0.05 alpha level.

Results

Ho1. There is no significant effect of brisk walking on body weight of obese adults in Ilorin metropolis.

Table 1: Univariate Analysis of Co-Variance showing effect of brisk walking on body weight of obese adults
Dependent Variable: Weight

Source	Type III sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	*9360.676*[a]	30	312.023	117.754	.000
Intercept	37.639	1	37.639	14.204	.001
Weight Pre-test* Weight post-test	9360.676	30	312.023	117.754	.000
Error	103.341	39	2.650		
Total	643591.250	70			
Correct Total	9464.018	67			

a. R Squared = .989 (Adjusted R Squared = .981), Covariates appearing in the model are evaluated at the following values: Weight 8th Week = 93.69.

Table one presents ANCOVA result on the effect of brisk walking on body weight of obese adults in Ilorin metropolis. The main effects of the training was statistically significant at 0.05 level of significance [(f 1, 69)] = 117.754, P<0.05. There was significant effect of training on the weight of the participants; hence the hypothesis is not accepted. The mean square =312.023;. R Squared = .989; Adjusted R Squared = .981 and mean weight =93.69. This implies that brisk walking had a significant main effect on the weight of the participants.

Ho2. There would be no significant effect of brisk walking on body mass index of obese adults in Ilorin metropolis.

Table 2: Univariate Analysis of Co-Variance showing effect of brisk walking on body mass index (BMI) of obese adults
Dependent Variable: BMI

Source	Type III sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	*902.198*[a]	58	15.555	47.107	.000
Intercept	1.976	1	1.976	5.985	.032
BMI Pre-test* BMI post-test	902.198	58	15.555	47.107	.000
Error	3.632	11	.333		
Total	79908.169	70			
Correct Total	905.831	69			

a. R Squared = .996 (Adjusted R Squared = .975), Covariates appearing in the model are evaluated at the following values: BMI 8th Week = 33.0610.

Table two presents ANCOVA result on the effect of effect of brisk walking on body mass index of obese adults in Ilorin metropolis. The main effects of the training was statistically significant at 0.05 level of significance [(f 1,69)] = 47.107, P<0.05. There was significant effect of training on the body mass index of the participants; hence the hypothesis is not accepted. The mean square = 15.555; R Squared = .996; Adjusted R Squared = .975 and mean weight =33.0610. This implies that brisk walking had a significant main effect on the body mass index of the participants.

Ho3. There would be no significant effect of brisk walking on body density of obese adults in Ilorin metropolis.

Table 3: Univariate Analysis of Co-Variance on effect of brisk walking on body density of obese adults in Ilorin metropolis.
Dependent variables: Body density

Source	Type III sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	*4299.136*[a]	30	143.305	48.807	.000
Intercept	10.497	1	10.497	3.575	.066
Body density Pre-test*	4299.136	30	143.305	48.807	.000
Body density post-test					
Error	114.511	39	2.936		
Total	144951.250	70			
Correct Total	4413.646	69			

a. R Squared = .974 (Adjusted R Squared = .954), Covariates appearing in the model are evaluated at the following values: body density Pre-test = 47.04.

b.

Table three presents ANCOVA result on the effect of effect of brisk walking on body density of obese adults in Ilorin metropolis. The main effects of the training was statistically significant at 0.05 level of significance [(f 1,69)] = 48.807, P<0.05. There was significant effect of training on the body density of the participants; hence the hypothesis is not accepted. The mean square = 143.305; R Squared = .974; Adjusted R Squared = .954 and mean weight =47.04. This implies that brisk walking had a significant main effect on the body density of the participants.

Ho4. There would be no significant effect of brisk walking on the percentage of body fat of obese adults in Ilorin metropolis.

Table 4: Univariate Analysis of Co-Variance on effect of brisk walking on the percentage of body fat of obese adults in Ilorin metropolis
Dependent variable: Percentage of body fat (Biceps, Triceps & Subscapular)

Source		Type III sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	(Biceps)	*2733.781*[a]	21	130.180	.898	.594
	(triceps)	*2375.548*[a]	25	95.022	32.036	.000
	(Subscapular)	*3405.383*[a]	21	162.161	51.588	.000
Intercept Percentage of body Fat (pre-test)	(Biceps)	183.595	1	183.597	1.267	.266
	(triceps)	183.597	1	5.274	1.778	.189
Intercept	(Subscapular)	78.349	1	78.349	24.925	.000
Percentage of body Fat (post-test)	(Biceps)	2733.781	21	130.180	.898	.594
	(triceps)	2375.548	25	95.022	32.036	.000
	(Subscapular)	3405.383	21	162.161	51.588	.000
Error	(Biceps)	6957.137	48	144.940		
	(triceps)	130.510	44	2.966		
	(Subscapular)	150.883	40	3.143		
Total	(Biceps)	21653.890	70			
	(triceps)	14273.740	70			
	(Subscapular)	18259.270	70			
Correct Total	(Biceps)	9690.918	69			
	(triceps)	2506.058	69			
	(Subscapular)	3556.266	69			

(Biceps)
R Squared = .282 (Adjusted R Squared = -.032), Covariates appearing in the model are evaluated at the following values: percentage of body fat-Biceps 8th Week = 11.226.

Table four presents ANCOVA result on the effect of brisk walking on the percentage of body fat of obese adults in Ilorin metropolis. The main effects of the training was not statistically significant at 0.05 level of significance [(f 1,69)] = .898, P>0.05. There was no significant effect of training on the percentage of body fat of the participants; hence the hypothesis is accepted. The mean square = 130.180; R Squared = .282; Adjusted R Squared = .032 and mean weight =11.226. This implies that brisk walking had no significant main effect on the percentage of body fat of the participants.

(Triceps)
R Squared = .948 (Adjusted R Squared = .918), Covariates appearing in the model are evaluated at the following values: percentage of body fat-Triceps 8th Week = 12.690.
Table four presents ANCOVA result on the effect of brisk walking on the percentage of body fat of obese adults in Ilorin metropolis. The main effects of the training was

statistically significant at 0.05 level of significance [(f 1,69)] =32 .036, P<0.05. There was significant effect of training on the percentage of body fat of the participants; hence the hypothesis is accepted. The mean square = 95.022; R Squared = .948; Adjusted R Squared = .918 and mean weight =12.690. This implies that brisk walking had significant main effect on the percentage of body fat of the participants.

(Subscapular)

a. R Squared = .958 (Adjusted R Squared = .939), Covariates appearing in the model are evaluated at the following values: percentage of body fat-Subscapular 8th Week = 16.344.

Table four presents ANCOVA result on the effect of brisk walking on the percentage of body fat of obese adults in Ilorin metropolis. The main effects of the training was statistically significant at 0.05 level of significance [(f 1,69)] =51 .588, P<0.05. There was significant effect of training on the percentage of body fat of the participants; hence the hypothesis is accepted. The mean square = 162.161; R Squared = .958; Adjusted R Squared = .939 and mean weight =16.344. This implies that brisk walking had significant main effect on the percentage of body fat of the participants.

Discussion of Findings

The finding of this study revealed that there was significant effect of brisk walking on body weight among obese adults; it is generally believed that physical training can alter body composition. Many believed that physical activity has little or no influence on changing body composition and that even vigorous exercise burns too few calories to lead to substantial body fat reductions. According to Kenney, Wilmore and Costill (2012), research has demonstrated the effectiveness of exercise training in promoting moderate changes in the body composition. The authors further stated that most weight management trainers use aerobic exercise such as brisk walking, 200-meter race, quarter milled race amongst others.

There was significant effect of brisk walking on body mass index (BMI) from this study. This findings conforms with that of Chen, Ismail, Abdulaziz (2016), there was a positive improvement in terms of lower BMI in the exercise intervention group after 8 weeks exposure to brisk walking in his study. Hanson and Jones (2015), also highlighted in their research study that group walking is effective and safe and it brought about wide ranging health benefits including lowering of BMI, total cholesterol and increased Vo_{2max}. Chaudhary et al (2010) have also reported that both aerobic training at 60-70% of maximum heart rate and resistance training 3 times per week for 6 weeks resulted in a significantly lower BMI and body fat percentage.

This study also reported significant effect of brisk walking on body density, this was also supported by Azeem (2011) who also reported similar findings of a significant reduction in body density, lean body weight and BMI in obese males following a 12 week brisk walking programme at a frequency of 5 times per week, 45 mins per session. There was significant effect of brisk walking on skinfold thickness, this agrees with a previous report from Nigeria (Akinpelu, Akinola, & Gbiri 2009). It has also been previously reported that triceps skinfold thickness has a better correlation with body mass index in women than in men. The implication is that the findings of this study will add to the building knowledge base on triceps

skinfold thickness and obesity. Furthermore, it is imperative to notet hat triceps skinfold thickness has better sensitivity and specificity in detecting obesity in both the male and female participants.

Conclusions

Based on the findings, this study concludes as follows:

There was significant effect of brisk walking on body weight of obese adults in Ilorin metropolis. There was significant effect of brisk walking on body mass index of obese adults in Ilorin metropolis. There was significant effect of brisk walking on lean body weight of obese adults in Ilorin metropolis.

There was significant effect of brisk walking on body density of obese adults in Ilorin metropolis. There was no significant effect of brisk walking on the percentage of body fat (Biceps), while there were significant differences in the percentage of body fat (Triceps and Subscapular) of obese adults in Ilorin metropolis, Kwara state.

Recommendations

The following recommendations were made based on the findings of this study:

1. There is need for Physical Education teachers, Health personnel and Fitness experts to develop a brisk walking programme for the adults and by extension different age groups so as to reduce the rate of obese among adults in Ilorin metropolis, Kwara state.
2. There is need for a collaborative effort among Exercise experts, Fitness instructors and other sports professionals to educate all classes of people (rural and urban), on the importance of involvement in physical exercise especially brisk walking and to adopt active lifestyle that would lead to a healthy living so as to reduced the rate of obese among adults in Ilorin metropolis, Kwara state.

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