

Influence of School-Based Aerobic Exercise Programme on the Obesity Indices of Female NCE Student Federal College of Education, Okene

Dr. Musa M.O & Mrs. Victoria Adewusi

Federal College of Education Okene, Kogi State

Physical and Health Education Department

musamuhammedogidi@yahoo.com

victoriaadewusi@gmail.com

Abstract

The need to make provision for College students with adequate and effective physical fitness programme targeted at improving their fitness level and reducing the incidence of obesity has been the focus of exercise scientists in recent times. The study was therefore conducted to assess the influence of school based Aerobic programme/training on the obesity indices of female NCE students in Federal College of Education Okene. One hundred and twenty college female students were randomly selected out of one thousand, two hundred and sixty NCE female students. Specially designed training programmes as dancing and 12 minutes brisk walking before the commencement of morning lectures while 20 minutes aerobic dance session after the 4pm lectures, 4 times a week was conducted for 6 weeks. The obese indices of Age, Height, weight, were measured. The Body mass index (BMI) was determined by using the weight by height squared using the formula $BMI = W/h^2$. The findings showed Age $f = 5.94 > 3.06$ (0.05) Height $f = 21.19 > 3.06$ (0.05) weight $f = 21.08 > 3.06$ (0.05). there was significant response by way of high reduction in such variables like percent body fat $f = 245.56 > 3.06$ (0.05) and the body mass index $f = 14.93 > 3.06$ (0.05) and blood pressure measurement systolic $f = 2.394 < 3.06$ (0.05) Diastolic $f = 4.58 > 3.06$ (0.05) and Resting heart rate $f = 13.50 > 3.06$ (0.05) after 6 weeks aerobic training programmes. As a result of the findings, the physical / physiological variables have a significant impact on aerobic training for sedentary female students. It was therefore recommended that regular physical activity (aerobic exercise) should be adopted for obese female students so as to derive maximum physical fitness benefit. More facilities should also be provided for the teaming student population visiting the college gymnasium.

Keywords: Aerobic, exercise, body mass, obesity,

Introduction

In the past obesity was not much of a medical problem in Nigerian. Over the past 3 decades there has been an unpredicted increase in the number of obese people around the world. It was to be the headache of the affluent societies where they get more calories than they need per day but with the technological advancement, people now live sedentary life style, and many have simultaneously increase their caloric intake and decrease their level of physical activities which result to an energy imbalance in the body default that resulted to weight gain.

Della Longman dictionary of contemporary English (2007) maintained that obesity means when someone is very fat in a way that is unhealthy. In this case obesity is a health or medical condition in which excess fat has been accumulated in the body to any extent that it

may have adverse effects on health leading to reduced life expectancy and increase health problem.

Lucas and Griles (2003) describe obesity as a condition in which excess body fat adversely affects the health and increase the risk of other diseases. Ayenigbara (2010) advanced that obesity is a health problem which has its root cause entrenched in the cultural appreciation, environment and social factors in Nigerian. Obesity indices referred to obesity variables such as body mass index (BMI), body density, waist circumference, waist to hip circumference ratio, and body composition. World Health Organization (WHO) maintained that body mass index is the individual body weight divided by the square of his or her height. National Institutes of health (2009) maintained that waist circumference (WC) is associated with an increased risk of type 2 diabetes, dyslipidaemia, hypertension and cardiovascular diseases. Aerobic exercise are physical activities that can be performed without using any form of sophisticated and expensive machine. Aerobic exercise such as jogging, cycling, swimming, walking, rowing, skipping, sit up, curl up, push up, stair climbing and aerobic dancing, which focus on increasing cardiovascular endurance (Wilmore & Kuntzgen, 2003). Aerobic exercise such as weight training, functional training or sprinting which include short term muscle strength (Arslan, 2011).

Problem, Statement and Justification

Exercise has been found to be effective for prevention of weight gain and maintenance of stable weight in humans. Despite the availability of facilities and equipment in the college gymnasium, most female students find it difficult to exercise and keep fit. They also give the nature of their classes or lecture, time factor and poor economic status as an excuse for being sedentary. The prevalence of diseases such as obesity, diabetes mellitus, coronary artery disease, hypertension, osteoarthritis, osteoporosis, upper respiratory track infection and low back pain can be traced to inactive lifestyle.

The physical activities and fitness level of FCE female students continue to decline over the past decades leading to the adoption of preventive services through Regenerative Health and Nutrition Program. The research is therefore aimed to empower the female students to adopt healthy lifestyle. Regular physical activities was recommended as a key intervention in the prevention and management of non – communicable diseases and serve as a tool for improving life expectancy across the general students' population. The study therefore led to the development of an aerobic training exercises plan for promoting aerobic activities among the female students in FCE, Okene and also to design, conduct and evaluate the fitness aerobic programme for the ladies.

Research Question

1. What is the difference in Obesity indices of Age, height, weight, body mass index % body mass and waist to hip ratio of pre-test and post- test and control group in FCE female students following the aerobic training programme

2. What is the difference in Obesity indices of systolic , diastolic and resting heart rate in the pre-test and post-test and control group in FCE female students following aerobic training programme ?

Research Hypotheses

Ho₁ : There is no significant difference pre test, post test and control group in obesity indices of Age, height, weight, body mass index and % body fat of FCE female students following the aerobic training programme.

Ho₂: There is no significant difference between the pre – test and post- test measure in obesity indices of systolic, diastolic and resting heart rate of FCE female students following the aerobic training programme.

Literature Review

Obesity

According to Della Longman Dictionary of Contemporary English (2007) obesity simply means when someone is very fat in a way that is unhealthy. Therefore, obesity is a health or medical condition in which excess fats have been accumulated in the body to extent that it may have adverse effect on health leading to reduced life expectancy and increase health problem. Ethel and Ardath (!978) and Hall (2006)_ also simply stated that obesity is an excessive amount of body fat i.e. a complex problem of too much body fat. Muluhi (1980) defined obesity as a nutritional disorder where an abnormal amount of fat is accumulated in the adipose tissue of human body. This definition suggest that nutritional disorder is responsible for obesity whereas people have been watchful fo whatever they eat or take in order not to have or expose themselves to the dangers being associated with obesity so as to promote good graceful physical and healthful living. Also cited with Sinh (2013), Obesity refer to an excessive proportion of total body fat i.e. obesity refers specifically to having an abnormal high proportion of body fat beyond what is considered as normal for one's age, sex and body type.

Hall, (2006) claims that obesity results from a greater energy input than energy expenditure. The excess input of food results in an increase in fat stores and a corresponding increase in body weight for each 9.3 calories of excess energy that enters the body 1 grain of fat is stored. Once a person become obese and a stable weight is obtained energy intake once again equals energy output. The author is of the view that the rate of calory intake and expense should have an equal and balance ratio and that any deviation from this ratio relating to caloric intake content will result in obesity. Hoeger (2011) said in their writing that to there is a clear difference between obesity and overweight they explained that while obesity is due to excess fat tissue, overweight may be due to excess mass of muscle and bones. They further pointed out that overweight individual may not necessarily be fat, in order to differentiate between obesity and over weight it was suggested that the body fat content should not be taken into consideration and in order to this Mulihi 1980), recommended the use of skinfold measure

with caliper in calculating the body content. This is because the skin fold caliper used is relatively cheaper and easy to get the measurement accurately.

In West Africa especially in Nigeria, Obesity cause diabetes which is a diseases commonly found among the rich and affluent people. Fawole, (1988) explains that it usually a common phenomenon among the rich because they spend more and include in those habit that encourage obesity. For example, they can afford to pay up for a very large meal that are very rich in fat and sugar. Their consumption of alcohol beverages is very high and more importantly they find it very difficult to engage themselves in physical activities which can help them in burning up excessive fat present in their body.

Body Composition

Body composition (typically, the level of the body fat, but a measure of fat – free body mass (FFB) is of equal clinical significance (Hewitt, 2007). Body composition is defined as the body's relative amount of fat – free mass (muscles, bone and water) to fat mass in the body (Coerbin, Welk, Corbin & Welk, 2005; Fahey, Insel & Roth, 2001). According to Aaron (2010) a healthy adult male's body should have between 6 and 24% fat and a female should have 14 – 31% and levels significantly above these amounts may indicates excess body fat. Health practitioners universally agree that too much body fat is a serious health risk and problems such as hypertension, elevated body lipids (Fats and cholesterols), diabetes mellitus, cardiovascular disease, respiratory dysfunction, fall bladder disease and some joint disease are all related to obesity (National Cancer Institute, 2010).

Some researchers reported that excessive accumulation of fat at specific body site may be an important health risk. Extra fat around the abdomen and waist has been associated with higher risk of diabetes heart disease and hyperlipidaemia while individuals who accumulate fat in the thighs and buttocks (pear – shaped) are better off than those who tend to accumulate a lot of fat around the waist (Wilmore, Buskirk, DiGirolamo & Lohman, 1986). The research for valid method of measuring body composition that are practical and inexpensive is an ongoing process of exercise scientist and nutritionist. Some practical methods of measuring body composition include skinfold, circumference (girth) measures, hydrostatic weighting bioelectrical impedance and near – infrared interactance. Other advanced method discussed in research journal include isotopes dilution, meta – analysis, magnetic resonance imaging and dual – energy x ray absorptiometry (Brodie, 1988). Body Mass Index (BMI), the most commonly used measure for body fat, is calculated by dividing a person's weight in kilograms by the square of his or her height in meters (National Cancer Institute, 2010). Perry, 2012 reported that losing body fat while retaining lean muscle will positively affect all other physical fitness metrics along with other general health markers. Therefore body composition of an individual may be positively enhanced through well planned and administered physical exercise programme for optimal fitness

Height and Weight

Overweight is a condition in the individual exceeds the desirable body weight for a given age, sex and skeletal frame by more than 10%¹⁰, while Obesity is an excessive amount of body fat for a given body weight (Sharkey, 1990). Costil, (2005) affirmed that excessive body weight and body fatness pose a threat to both the quality and quantity of one's life. As overweight individuals have a shorter life expectancy and obese persons have a greater risk of coronary heart diseases, hypertension, diabetes, pulmonary and renal (disorders, osteoarthritis and low – back problems. Early on – set and adult on set are the two types of obesity. The total number of fat cells that an individual has as an adult is determined during the growing years. Fat cell number increases rapidly during the first year of life and again during puberty. And the number remain relatively unchanged during adulthood (Nelson, 2006). Thus, an individual potential for obesity in terms of fat cell number is determined early in life in early on – set obesity, an abnormal number of fat cells is produced. While a normal person has about twenty-five to twenty billion fat cells, an obese person may have as many as forty – two to a hundred billion cells. Pollock, (2006) thus concluded that adult on – set obesity is produced by hypertrophy of the existing fat cell rather than the development of new fat cells. Because the size of the fat cells increases during the adolescent growth spurt and continue to grow when excess fat is stored and continue to grow when excess fat is stored in the form of triglycerides. Diet and exercise are effective in reducing the size but not the number of fat cells in adult the basic cause of excess weight and obesity is an energy imbalance in the body (Goldhaber, 2007).

Body Fat

The body fat percentage of a person is the total weight of fat divided by total weight; body fat includes essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage of essential body fat for women is greater than that for men due to the demand of child bearing and other hormonal functions. The percentage of essential fat is (3 -5 %) in men and (10 -15%) in women (Foley *et al.*, 2010) storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. The minimum recommended total body fat percentage exceeds the essential fat percentage value reported above. The body fat percentage is a measure of fitness level, since it is the only body measurement which directly calculates a person's relative body composition without regards to height or weight. The widely used body mass index (BMI) provides a measure that allows the comparison of the adiposity of individual for difference height and weight. While BMI largely increases as adiposity increases, due to difference in body composition, it is not necessarily an accurate indicator of body fat, for example, individual with greater muscle mass will have higher BMIs. The threshold between “normal” and overweight and between overweight and obese are sometimes disputed for this reason (Jackson, Stanforth, Gagnon, Rankinen, Leon, Rad, Skinner & Bouchard, 2002).

Body Mass Index (BMI)

Body mass index (BMI), the most commonly used measure for body fat, is calculated by dividing person's weight in kilograms by the square of his or her height in meters (National Cancer Institute, 2010). Perry (2012) reported that losing body fat while retaining lean muscles will positively affect all other physical performance metrics along with other general factors. Body mass index (BMI) and percentage of body fat may be linked to physical performance. However, the nature and extent of such association is not known. It is unknown whether BMI is a good reflection of body fat. Dunagporn et al., (2012) reported from his research work that increased BMI and body fat tended to inversely affect physical performance in both cardio respiratory fitness and muscular strength. Body fat seemed to have a strong correlation with impaired physical performance. It could not be fully replaced by BMI in determination of aerobic power and muscular strength. Ekblom et al., (2005) in his study with Swedish adolescent reported that, there was generally a better performance in boys than girls and increasing performance with age. BMI increased with age with only small difference between genders. Large variations were found within age and gender groups

Waist – to – hip ratio

World Health Organization (WHO) states that abdominal obesity is defined as waist – hip ratio above 0.90 for males and above 0.85 for females or a body mass index (BMI) above 30.0. Waist – to – hip ratio (WHR) has been found to be a more efficient predictor of mortality in older people than waist circumference or BMI if obesity is redefined using WHR instead of BMI, the proportion of people categorized as a risk of heart attack worldwide increase threefold. A WHR of 0.7 for women and 0.9 for men has shown to correlate strongly with general health and fertility. Women within the 0.7 range have optimal levels of estrogen and are less susceptible to major disease such as diseases, cardiovascular disorders and ovarian cancers. Women with high WHR (0.80 or higher) have significantly lower pregnancy rates than women with lower WHR (0.70 -0.79) independent of their BMIs). Men with WHRs around 0.9, similarly, have shown to be more healthy and fertile with less prostate cancer and testicular cancer. The National Institute of Diseases, Digestive and Kidney Diseases (NIDDK) states that women with waist to hip ratios of more than 0.8 are at increased health risk because of their fat distribution.

Aerobic Exercise/Training

Blood pressure (BP) is a measure of the force or pressure exerted by the blood on the arteries. The higher pressure (Systolic BP) reflects the pressure in the arteries during systole of the heart when myocardial contraction forces a large volume of blood into the arteries. Following systole, the arteries recoil and the pressure drops during diastolic or the filling phases of the heart – diastolic. BP is the lowest pressure in the artery during the cardiac cycle. Resting systolic BP usually varies between 110 and 140mm Hg and diastolic BP between 60 and 80mm Hg. Usually, a person is not classified as hypertensive unless the BP remain

elevated ($>140/90$ mm Hg) on two occasions. The difference between the systolic and diastolic blood pressure is known as the pulse pressure (Heyward, 2002).

Methodology

The research methods for this study was descriptive and quasi experimental research design. The pre-test post test quasi involve two experimental groups and one control group. The two groups went through pre training as well as post training evaluations. The experimental groups went through an exercise training programme for four weeks while the control group did not. The population for this study comprised all 1,260 female sedentary FCE students. For the health status evaluation, 10% of the population was used for the research Dunni, (2001) and Fraenkal and Wallen (2000). Simple Random sampling method was adopted to select all the (10%) of the student's population that participated representing the entire female population in all the Departments /Schools excluding physical and health Education Department.

Data was collected using pre-test post – test assessment of the status of the sampled groups using standardized equipment for physical/physiological measurement and questionnaire to collect sociometric variables of the sampled group. The data collected was coded and analysed using descriptive statistics of frequency, percentage, mean and standard deviation (inferential statistics) of the study group and MANOVA was used to test the formulated hypotheses at 0.05 alpha level of significance.

Study Population

Participants were the entire sedentary female students of FCE Okene who came to the fitness center (college gymnasium) to enrol for this fitness programme. A total of one hundred and twenty (120) sedentary female students out of over (123) who came for the exercise programme. All the participants had participated in the study voluntarily and written consent was taken before the measurement accordingly

Instrument Procedure

Anthropometric measurement, international society for the advancement of Kinanthropometry (ISAK) accredited level 4 criterion Antropometrist was involved in anthropometrical measurements and training was also given to the other associates who were also involved in the antropometrical measurements. Anthropometrical measurement were measured according to ISKA manual (2011) for Anthropometrical measurements.

Height and Weight

Height and weight were measured according to the ISAK manual for anthropometrical protocol. The perpendicular distance between the transverse plane of the vertex and the interior aspects of the feet was considered to measure the height and measure with the help of an Anthropometric rod. Similarly, body weight was measured in nearest gram using an electronic digital weighing machine.

Percentage (%) Body Fat

Body fat percent can be measure by various techniques. Bioelectrical impedance method is one of them to estimate body fat % by applying a small alternating current to the body. Different body tissue have different resistivity and depending on the resistivity body fat % can be estimated with this method. In the present study, whole body fat % was analysed with bioelectrical impedance Analyzer (Quantum II, RJL system, USA). Pre -testing protocol and other instructions given by the manufacturer company were followed to avoid error while measuring body fat % with the bio – impedance equipment.

Body Mass Index (BMI)

BMI was derived by dividing weight (kg) by height (m) squared. BMI categories were based on age specific cutoff in adolescent. World Health Organization based classification for global database on Body Mass Index (BMI) was used as cut points for BMI.

Cardiovascular Fitness

Waist circumference in centimetres was measured using a non – stretch metric tape to measure over the border of the iliac crest passing over the umbilicus. The methodology was based on described by NHASES III in America population. Diastolic (DBP) and Systolic (SBP) blood pressure was measured in mmHg, using a mercury sphygmamometer with an ad hoc sleeve, according to standard methodology.

Data Analysis Result

Research Question 1: What is the difference in obesity indices of age, ,height, weight, body-mass index, %body-mass and waist to hip ratio.

Table1: Means core of Age, Height and Weight of participants

Training Group	Variable	Sex	X	SD	Range
Pre -test group	Age	F	27.69	±4.84	18-25
Post test group	Age	F	29.24	±6.78	18-27
Control	Height	F	30.96	±5.33	17-26
Pre-test Group 1	Height	F	1.66	±0.07	18-25
Post- test Group 2	Height	F	7.34	±12.51	18-27
Control	Height	F	1.60	±0.7	18-25
Pre-test Group	Weight	F	66.49	±3.00	18-25
Post-test group	Weight	F	69.09	±3.27	18.27
Control	Weight	F	27.32	±3.18	17-26

Table 1: Showed the physical characteristics of the participants in the pre test (obese), post-test (non obese) and control group. The control group had the highest mean age (± 30.96 , SD ± 5.33 range 17 -26) while the pre-test group in the aerobic training had the lowest age (± 27.69 , ± 4.84 range 18-25), the non – obese female students in the post test group had the ($\pm$ height 7.34, SD ± 12.51 range 18-25) while the control group in the aerobic training had the lowest height ($\pm 1.60 \pm 0.7$ and range 18-25).The weight category shows that the control group weight had 66.49 ± 0.300 and range 18-27).

Research Question 2: What is the difference in obesity indices of systolic, diastolic and resting heart rate in the pre-test post- test and control group in FCE female following aerobic training programme?

Table 2: Physiological

Training Group	Variable	Sex	$\bar{x}$	SD	Range
	Statistic				
Pre -test group	Systolic	F	125.87	± 7.07	1e13-138
Post test group		F	129.98	± 20.12	112-170
Control		F	164.65	± 163.12	118-180
	Diastolic				
Pre- test Group		F	81.55	± 9.67	113-138
Post Test		F	78.09	± 9.61	67-105
Control		F	76.72	± 5.77	65-89
	Resting Heart rate				
Pre-test		F	74.70	± 2.72	71-79
Post Test		F	69.73	± 8.92	60-89
Control		F	74.67	± 2.13	70-78

The physiological characteristics of the group or participants showed that the control group of the aerobic training had $\pm$ score (164.65 ± 163.12 and range 118 – 180) while the pre- test group (non obese) had the lowest systolic $\pm$ score 125.87 ± 7.07 and range 13-138. The pre – test of the aerobic training group (non obese) had diastolic $\pm$ score 81.55 ± 9.67 and range 113 – 138. The control group had diastolic mean score (76.72 ± 5.17 and range 65 – 89). The control group of the aerobic training group had the highest resting heart rate mean score (74.70 ± 2.72) and range 71- 79 while the post test (obese) had the lowest resting heart rate mean score (69.73 ± 8.92) and range 70 – 78.

Null Hypothesis 1: There is no significant difference between the pre-test,post-test and control group in obesity indices of Age, Height, weight, Body mass index , % body fat and waist to hip ratio of FCE female students following the aerobic training programme

Table 3: Multivariate Analyss of Variance on Physical Physiological variable of the Obese and Non – Obese Female Students, FCE Okene

Physical	Dependent Variable	Sum of squares	D f	Mean square	F.cal. val.	Sig.
	Age	382.24	2	191.12	5.94	S
	Height	.17	2	0.09	5.94	S
	Weight	2731.14	2	1365.57	21.08	S
	BMI	240.34	2	120.17	14.93	S
	% Body fat	478.52	2	239.26	245.56	S

Table 3 showed that the pre – test (obese), post test (non obese) and control group were significantly different in physical and physiological variables of age, height, weight, BMI, %

body fat and waist to – hip ratio. The findings was also confirmed by the result of the post hoc analysis as attached of the groups which were significantly different in height and waist to hip ratio while the control group were different in weight.

Null Hypothesis 2: There is no significant difference between the systolic, diastolic and resting heart rate of FCE female students following the aerobic training programme.

Table 4: pre- test (obese) and post test (non obese) of the difference between the systolic, diastolic and resting heart rate of FCE female students following the aerobic training programme

Physiological	Dependent Variable	Sum squares	of D f	Mean square	F.cal. val.	Sig.
	Systolic	47642.5	2	23821.29	2.394	S
	Diastolic	629.56	2	314.78	4.58	S
	R.H.R	807.934	2	403.967	13.50	NS

Table 4, revealed the pre- test (obese) and post test (non obese) group were significantly different in diastolic and resting heart rate but not different in systolic pressure as seen in the post hoc Table on table 5.

Table 5: Scheffe Post-hoc Analysis Showing MANOVA on Physical and physiological variable of the Female.

Age	Group	N	Subset for alpha = 0.05		
			1	2	3
Height	Pre - test	40	27.69	-	-
	Post-test	40	-	30.96	-
	Control	40	-	31.23	-
	Pre-test	40	160	-	-
	Post – test	40	-	1.66	-
	Control	40	-	1.69	-
Weight	Pre – test	40	66.49	-	-
	Post- test	40	69.09	-	-
	Control	40	-	76.34	-
Body Mass Index (BMI)	Pre – test	40	-	26.95	-
	Post – test	40	-	26.95	-
	Control	40	5.63	-	-
% body fat	Pre-test	40	5.63	-	-
	Post-test	40	-	-	27.32
	Control	40	-	-	6.52
Systolic	Pre-test	40	129.9783	-	-
	Post-test	40	125.8163	-	-
	Control	40	164.6543	-	-
Diastolic	Pre – test	40	-	81.5510	-



	Post -test	40	-	78.0870	
	Control	40	76.7272	-	-
RHR	Pre – test	40	125.8163	-	-
	Post- test	40	129.9781	-	-
	Control	40	164.654		

The Scheffe post- hoc result test analysis (table v) also confirm statistically, the significant difference and that there were greater similarities among the pre test, post test and control group which indicated that the post test group and control group were better than pretest group. The post and control group were taller while the pre -test were the shortest. The post hoc result in height also confirmed statically the difference of the pretest and with greater similarity in the post-test and control group. The control group had the highest weight which indicated they were heavier than the other group. The post hoc also showed statistically, the difference, body mass which were greater in pre-test and post test group. The post hoc in percent (%) body fat also confirm the that pretest and post were similar while the waist to hip ratio showed similarity in all the groups.

The scheffe post hoc result in systolic showed similarity in all the three groups as indicated in the (Table 5) above while the post hoc in diastolic showed similarity in pretest and post test while the control group is different. The scheffe post hoc in resting heart, were similar in all the groups as indicated above.

Table 6: Summary on Obese and Non – Obese female Students of FCE Okene

Variables	DF	F. cal value	
Age	147	5.94	S
Height	147	21.19	S
Weight	147	21.08	S
BMI	147	14.93	S
% Body Fat	147	245.56	S
Systolic	147	2.37	NS
Diastolic	147	4.58	S
Resting Heart rate	147	2.39	S

F.cal 0.05 = 3.06 S.= Significant, NS=Not Significant

The Table 6 showed clearly or vividly the significant differences in the obese indices of the various female student group following the aerobic training programmes.

Discussion of Findings

In this study, the findings have shown that increased age may be accompanied by increase (%) body fat which leads to an increase in total body weight. Heward, (2002) confirmed that as age increases other obese indices like weight, resting heart rate hence systolic, diastolic and % body fat increases and fat accumulate as one grows older because of inactivity or sedentary life styles. Fat is now becoming a limiting factor in keeping fit which

may lead to obesity. Other physical obese indices as height was statistically significant at 0.05, meaning that height is an advantage in fitness programme (Fahey2001).

Percentage of the body fat

The calculated F value 245.56 was statistically significant at 0.05 meaning, no significant difference exist within the groups. The total % body fat in the body goes a long way in determining the total body weight of the female students. A person is classified as obese when he or she exceeds the proportion norm, as determined on the basis of greatest height and frame size (Seidell, 2000). The result of the findings may be due to changes in the fitness and non fit participants as a result of life style and non-participation in fitness programme.

Systolic blood pressure

The mean systolic blood pressure and diastolic pressure for the pre-test, post-test and control group were SBP 129.98 ± 20.12 , 125.82 ± 7.07 , 164.65 ± 163.2 with a range of 112-170, 113 – 138 and 118-180 respectively. The f cal value 2.394 was statistically not significant as 0.05, leading to the rejection of the null hypotheses that there is no significant difference in the physiological obese indices among the two groups, while the control group had 164.65mmhg indicating stage 2 of moderate hypertension. As aerobic activity resulted in significant difference in systolic blood pressure, though the difference is small. By comparison, improved blood pressure has been verified in participants in various training or fitness programmes (William, 2007).

Diastolic

The mean of diastolic pressure for pre-test, post – test and control group were 78.09 ± 9.61 , 81.55 ± 9.67 , 76.72 ± 5.17 with a range of 67- 105, 67-106, 65-89 respectively. The f.cal value was statistically significant at 0.05. The null hypotheses that there is no significant difference in the physiological obese indices of diastolic blood pressure among the groups was rejected. The findings of this study are in line with the few of Olaitan (2001) that even though differences exist, systolic blood pressure of 100 to 120mmHg and diastolic pressure of 60 – 80mmHg is quite appropriate and normal. The result revealed that elevated blood pressure may not necessarily mean hypertension but a predisposing factor.

Resting Heart Rate

The mean resting heart rate of the post, pre and control group were 74.70 ± 2.72 , 69.73 ± 8.92 , 74.69 ± 2.13 with a range of 71- 79, 60 – 89 and 70 – 78 respectively. The cal f value of 13.50 was statistically significant at 0.05. The null hypotheses that there is no significant difference in the physiological obese indices of resting heart rate among the groups was rejected. This means that aerobic training can increase cardiac sympathetic moderation (Wardbutton, 2000). Optional exercises or training conversely increase cardiac vital capacity (Vusitalo, Tahvaninen and Vusitalo, 2000).

Conclusion

As a result of the findings of the study, the physical and physiological variables have a significant impact on the aerobic training for the secondary female students of FCE Okene and on health challenges of the sedentary life style of the students such as osteoporosis, obesity and other associative diseases.

Recommendations

Based on the findings, it is advisable for the female students irrespective of the age, weight and other variable to:

1. To actively engage themselves in fitness programmes in the college gymnasium viewing the hazard associated with sedentary life style.
2. Adequate and consistent keep fit programme should be promoted among the students.
3. Aerobic training of dances, and treadmill should be used for the development and improvement of corresponding endurance
4. The college should provide more facilities for the students teaming population visiting the college gymnasium after the enlightenment programme, on the effect of sedentary or non participation in college sports or sporting programme.

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