

EFFECTS OF AEROBIC DANCE CIRCUIT TRAINING PROGRAMME ON BLOOD PRESSURE VARIABLES OF OBESE FEMALE COLLEGE STUDENTS IN OYO STATE, NIGERIA

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ABSTRACT

The blood pressure fitness of college female students has been implicated sedentary lifestyles. Therefore, this study was designed to determine the effects of Aerobic Dance Circuit Training Programme (ADCT) on blood pressure variables (Diastolic Blood Pressure (DBP), Systolic Blood Pressure (SBP). Participants' age was 21.10±2.46 years. There were significant mean differences in baseline and post-treatment values of blood pressure variables in terms of SBP (130.83±9.25; 133.64±13.95) and DBP (77.43±10.57; 79.78±17.08). Aerobic dance circuit training was effective in reducing blood pressure variables among obese female students. Therefore, obese female students should engage in regular aerobic dance circuit training exercise for improved health benefit

Keywords: Aerobic dance circuit training, Fitness lifestyles, obese college female students, systolic blood pressure, diastolic blood pressure.

1. INTRODUCTION

Obesity as an epidemic and its unbridled international spread is raising apprehension on the global scene. It is becoming more noticed among the youth in the entire world majorly identified as critical public health problem in the 21st century, as a consequence of surplus adiposity. global scene. Nigeria and other parts of the world are gradually being enmeshed in the problem of obesity due to lifestyle adopted consequent to improvement on the standard of individual's living.

Obesity has been classified based on body mass index (BMI), a method that measured an appropriate weight to height of an individual (WHO Expert Consultation, 2004). Apart from World Health Organization (WHO) (2000) ranges from class I to class III. Pre-obese BMI 25.0 to 29.9 pre-obese, BMI 30.0 to 34.9 class 1 obesity, BMI 35.0 to 39.9 class 2 obesity and BMI ≥40.0 class 3 obesity, while Japan (2013) Body Mass Index (BMI) cut-off point ranges from 25.0 to 30.0 class 1 obesity, 30.0-35.0 class 2 obesity, 35.0-40.0 class 3 obesity and 40.0 above class 4 obesity. This has equally been subdivided by Kromeyer-Hauschild and Zellner (2007) into mild obesity, super obesity and abdominal obesity. Several diseases

have been associated with obesity. Some of them are: type 2 diabetes mellitus, hypertension, cardiorespiratory diseases, cancer, sleep apnea and gallstones.

The report of WHO holds that 1.4 billion adults from 20 years of age and beyond are either overweight or obese. From the 1.4 billion stated, at least, 200 million men and 300 million women are likely to be obese. A projection has also been made that by 2030, the population of overweight and obese persons in the world would be 2.16 billion and 1.12 billion respectively (Kelly, Yang, Chen, Reynolds and He, 2008)

In Nigeria, screen watching (television), video game play, computer use and mobile phone games are the most popular leisure time activities for this group. Likewise, the emerging of fast foods as breakfast and lunch for them contribute to obesity. It could be concluded that these situations are offshoots of globalization, technological advances, and widespread economic development. Youths encounter several risks that affect their health and entire wellbeing in the process of their development to adulthood (Malnnis, 2004).

Persons suffering from obesity have developed tissues that are fat provoke vascular resistant, thereby increasing the rate at which their heart exerts force to pump blood circulating round the body (Jones, Davis and Green, 2005). Fat tissue accumulation impairs ventilatory function in adults and children (Lazarus, Sparrow and Weiss, 1997). Many interventions have been suggested on the ways to lower the prevalence of youth obesity but there is no consensus on the best way to prevent and manage it. The focus of this study was to investigate an activity which burn calories but not necessarily immediately seen as exercise. Obese persons need activities that are exciting, interesting and fun-packed.

Aerobic dance exercise and circuit training are among the aerobic exercises that depend primarily on the aerobic energy-generating processes. Circuit training is a series of exercises done in order of stations and at a fast pace with only a short break period between exercises and a bit longer rest between stations (Kumar, 2013). The combination of these two training methods is termed aerobic dance circuit training (ADCT). Thus, ADCT in this study is a training programme that consists of series of aerobic dance exercises performed to improve cardiorespiratory variables and to reduce fat. It is a form of physical exercise that combines rhythmic aerobic exercise to pre-set music with stretching and strength training routine in a circuit manner (circuit training).

1.1 Hypotheses

The following hypotheses were tested in the study:

- there will be no significant main effects of treatment on Diastolic Blood Pressure (DBP) of obese female college students in Oyo Town.
- there will be no significant main effects of treatment on Systolic Blood Pressure (SBP) of obese female college students in Oyo Town.

2. METHODS AND MATERIALS

2.1 Research Design and Population of the Study

The research design for this study was a pretest-posttest control group quasi experimental design using 2x2x4 factorial matrix. The population for this study was apparently entire obese female college students in Oyo State, Nigeria.

2.2 Sample and Sampling Technique

Seventy (70) obese female youths took part in this study. Purposive sampling technique was used to select the participants for the study; because of the peculiar characteristics required BMI ≥ 25.0 as the yardstick to qualify. Purposive sampling technique was used to select two institutions in Oyo town; Emmanuel Alayande College of Education, Oyo and Federal

College of Education (Special), Oyo. This restriction helped to minimize to the barest minimum the effect of nutrition on body composition variables in this study. The participants were randomly assigned into two (2) groups (35 participants per group), experimental group and control group. Experimental group went through the 12 weeks aerobic dance circuit training session while control group was placed on placebo (12 weeks lesson of lifestyle education).

2.3 Research Instruments

The instruments used for data collection includes:

- i. **Bathroom weighing scale:** The portable Hanson weighing scale made in Ireland; model B1801A was used to measure body weight to nearest 0.1 kilogram.
- ii. **Digital Sphygmomanometer:** Omron Intellisense M6 Comfort made in Japan. This was used to measure blood pressure both systolic and diastolic.
- iii. **Musical sound box:** Pacific DVD player musical instrument manufactured by Shenzhen Jiayuxiang Hi-fi electronic co. Ltd (Japan) was used to provide the variety of aerobic dance music.
- iv. **Cone:** a plastic cone was used to demarcate each exercise station.
- v. **Metronome:** Dr beat digital metronome. Model DB-90 made in Roland Corporation US was used to determine increment on the variety tempo of the aerobic dance music.
- vi. **Heart Rate wrist monitor:** Polar RS800 heart rate monitors made in Polar Electro, Kempele, Finland was used to monitor exercise intensity.

2.4 Procedure for Data Collection

The participants were asked to sign the informed consent form showing their interest to be part of this research work and their readiness to cooperate with the researcher after which the following data (information) were collected before (Pre) and after (Post) training programmes. The following measurements were taken by the researcher and research assistants.

Age: The participant's age as at last birthday was recorded in years to the nearest birthday.

Body Mass Index: This was used to determine the level of obesity of the participant. It was calculated by dividing the participant's weight (in kilograms) by the square of height (in meters) [Weight (kg)/height² (meters)].

Weight: Hanson scale Portable type was used to measure the participants weight to the nearest kilogram with participant's wearing very light sport wear and no shoes, arm relaxed by the side, measurement were recorded to the nearest 0.1kg.

Height: The participant heights were measured while standing erect looking straight ahead and bare footed against the modified stadiometer. A ruler was rested on the head of each participant horizontally. Their heights then read to the nearest centimeter.

Resting Blood Pressure (Systolic and Diastolic): blood pressure is the force the blood exerts against the walls of the vessels in which it is contained. The blood pressure was determined using digital Sphygmomanometer in sitting position. Each participant was allowed to rest for 5 minutes on arrival at the venue of study and thereafter, the cuff was applied to the left arm of the participant in sitting position and 2 readings were taken consecutively at 2 minutes interval and the last reading was used as the appropriate measurement This recorded in mmHg (Millimetre of mercury) systolic over diastolic pressure before and after the training programme as recommended by Hockey (1993).

2.5 Training Programme

Treatment group: This aerobic dance circuit training (ADCT) consisted of series of exercises inter spaced and performed at each station with minimal 60 seconds rest in between. Exercises were performed at a safe level of moderate intensity between 40% (week 1) and 70% (week 12) of age predicted MaxHR. Aerobic dance circuit training programme was performed by all participants for the entire twelve (12) weeks period. The instructors lead the exercise at each station. The body movements were simplified and made easy to involve the use of both upper and lower extremities and the back. The participants were distributed to six stations. The frequency was 3 times/week for twelve weeks; each session consisted of 3 minutes warm up, 3 minutes cool down and 30-60 minutes of aerobic dance with brief rest periods to move from one station to the next station. The choreography exercise consisted of arm, leg, waist-hip and progressive step-aerobic movements; performed with music.

2.6 Procedure for Data Analysis

Descriptive statistics of means, range, standard deviation, frequency, percentage, pie chart, bar chart analysis were used to for the physical characteristics of the participants. T-test was used to analyze stated hypotheses obtained at 0.05 alpha levels to determine the acceptance and rejection of the stated hypotheses. Adjusted marginal means was used to show the direction of differences in variables measured.

3. RESULTS

Figure 1: Pie chart showing the distribution of the respondents by age

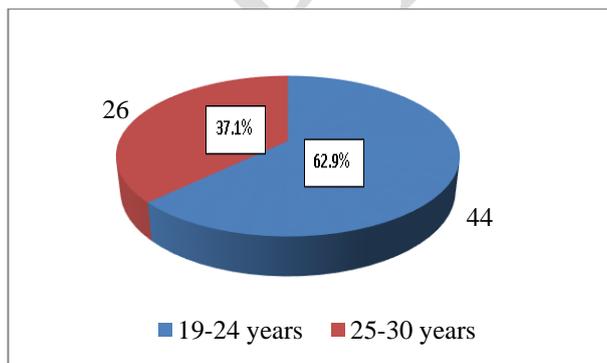


Figure 1 shows the descriptive statistics of the age of participants. 44(62.9%) of the participants are aged 19-24 years and 26(37.1%) are aged 25-30 years. It means that high degree of the participants were in the age range of 25-30 years.

Table 1: t-test analysis on systolic blood pressure following ADCT

Variables		N	Mean	Std.Dev	Crt	Cal t	df	p
Systolic Bp	Pretest	70	133.6429	13.9461	2.00	3.016	69	.003
	Posttest	70	130.8286	9.2470				

Table 2: The average SBP of obese female college students per week

SPB	Baseline	week 4	week 8	week 12
Experimental	136.4857	136.1143	132.5429	131.6571
Control	130.8156	130.2286	129.8286	130.5617

Table 2 shows the average SBP of both experimental and control group participant taken per week. The value shows that experimental participants SBP decrease from the week 4 to the week 12 of aerobic dance circuit training.

Fig 2: Line graph showing the mean scores of SBP of the respondent in Experimental and Control groups in the baseline, 4th week, 8th week and 12th week

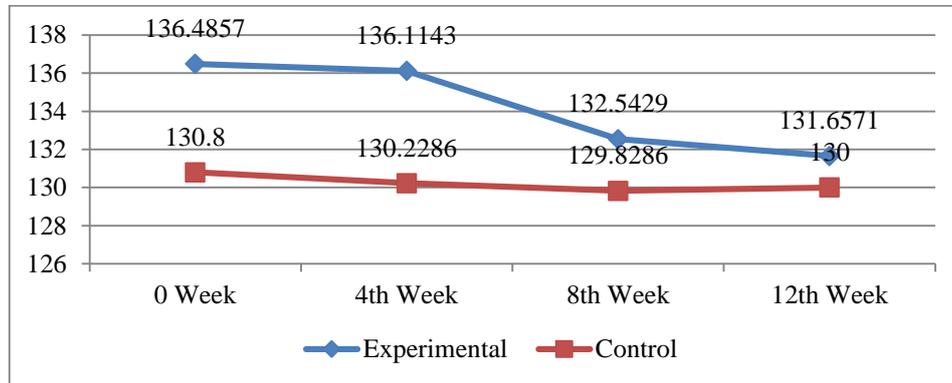


Figure shows the line graph of the SBP. This indicates that there was a reduction in experimental SBP participants between the week 4 and week 8 following the treatment.

Table 3: The t-test analysis on diastolic blood pressure following ADCT

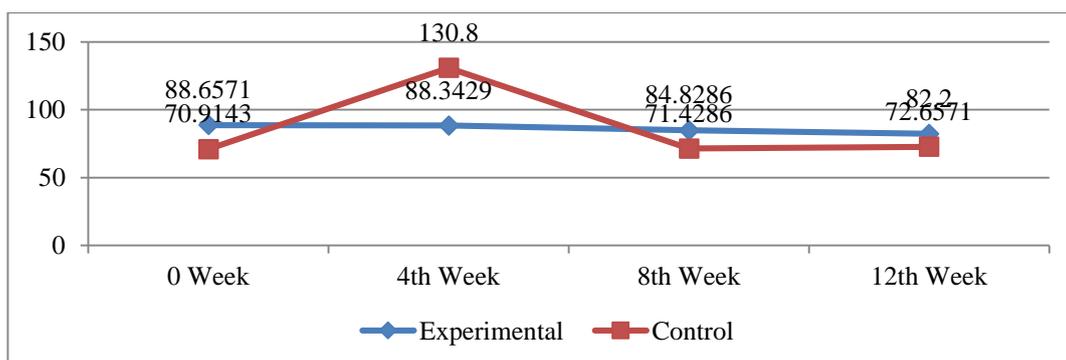
Variables		N	Mean	Std.Dev	Crt	Cal t	df	p
Diastolic Bp	Pretest	70	79.7857	17.0820	2.00	1.437	69	.155
	Posttest	70	77.4286	10.5865				

Table 4: The average DBP of obese female college students per week

DPB	Baseline	week 4	week 8	week 12
Experimental	88.6571	88.3429	84.8286	82.2124
Control	69.9143	130.8421	71.4286	72.6571

Table 4 shows the average DBP of both experimental and control group participant taken per week. The value shows that experimental group DBP decreases from the week 4 to the week 12 of aerobic dance circuit training. Control group values are better especially after week 4.

Figure 3: Line graph showing the mean scores of DBP of the respondent in Experimental and Control groups in the baseline, 4th week, 8th week and 12th week



The line graph reveals that there was slightly significant effect of treatment between the baseline, week 4, week 8 and week 12 of experimental group.

4. DISCUSSION

According to the results obtained in this study, it seems that combination training ADCT had a superior impact on cardiorespiratory fitness, aerobic fitness and body composition. These training are also more interesting and easier for women compared to other sports and exercise training methods. On the other hand, exercise training and modified physical activity on cardiorespiratory disease risk factors, but the influences of different types of exercises and combination of them on cardiorespiratory disease risk factors has rarely been investigated. There was no study executed considering uses of aerobic dance, in circuit training effects on cardiorespiratory disease risk factors. The treatment reduces the participants' diastolic blood pressure and increased heart rate reserved while the vital capacity, inspiratory reserved volume, peak expiratory flow rate and maximal oxygen consumption increased. High blood pressure (BP) is one of the most important modifiable risk factors for cardiorespiratory diseases, which accounts for one in every eight deaths worldwide in obesity. Total deaths due to cardiorespiratory diseases were 9.1 million in developing countries and 1.5 million in India. It has been predicted that by 2020, there would be 111 per cent increase in cardiorespiratory deaths in the world as a results of obesity (WHO Expert Consultation, 2004).

In this present review, it was analyzed that aerobic dance circuit training of 12 weeks duration on blood pressure (SBP and DBP) was effective but more effective in SBP than DBP. The results suggest that there was mean reduction of -5.02 mmHg in SBP and -3.142 mmHg in DBP in experimental group and also there was reduction of -3.015 mmHg in SBP and -1.415 mmHg in DBP in control group.

This review revealed that reduction in SBP which reached statistical significance in ADCT group may be because of favorable changes in vascular compliance, which might have occurred after exercise training. It was also revealed that the post training value of ADCT started dropping from the 4th week to 8th week and 12th week as a results of increment in the aerobic music tempo used to determine the participants' intensity from 40% - 69% of age predicted MaxHR. Experimental group might have extra benefits due to less myocardial oxygen consumption and load. This mean effect is similar to the findings of an earlier Meta-analysis focusing on aerobic training and resting blood pressure (Kelley, 2001). A previous prospective western study reported that a 2 mmHg reduction in SBP would result in 10% lower stroke mortality and 7% lower mortality from ischaemic heart disease or other vascular causes in middle age female obese (prospective studies collaboration, 2002) thus highlighting the clinical significance of even small changes in resting blood pressure.

5. CONCLUSION

From the results of this present study, it was observed that the treatment reduces the participant's systolic blood pressure. Therefore, it was recommended that Aerobic dance circuit training exercise can usually be accommodated with less stress by people of all ages and fitness level. This is one of the unique characteristics of Aerobic Dance Circuit Training, in that the same step can be modified by the participants to meet the needs of her individual workout.

6. REFERENCES

- Hockey, R. V. (1993). *Physical fitness: The pathway to healthful living* (8th ed.). St Louis, McGraw, Hill,
- Jones, B.A., Davis, P.J., & Green, B.A. (2005). Multilevel analysis of the Be Active Eat Well intervention: environmental and behavioural influences on reductions in child obesity risk. *International Journal of Obesity*, 2(25), 31-87.
- Kelley, G.A. (2001). Walking and resting blood pressure in adults: a meta-analysis. *Preview of Medical Research*, 33, 120-127.

Ajayi, O.A., Suleiman, U.O., Oladipo, I.O., & Achikasim, N.C.M. (September 2020). Effects of aerobic dance circuit training programme on blood pressure variables of obese female college students in Oyo state, Nigeria. *Journal of Physical Education Research*, Volume 7, Issue III, 32-38.

Kelly, T., Yang, W., Chen, C.S., Reynolds, K., & He, J. (2008). Global burden of obesity in 2005 and projections to 2030. *International Journal Obesity*, 32, 1431-1437.

Kromeyer-Hauschild, K., & Zellner, K. (2007). Trends in overweight and obesity and changes in the distribution of body mass index in schoolchildren of Jena, East Germany. *European Journal of Clinical Nutrition*, 61, 404-411.

Kumar, P.P.S. (2013). The effect of circuit training on cardiovascular endurance of high school boys global. *Journal of Human Social Science Arts, Humanities & Psychology*, 13,17.

Lazarus, R., Sparrow, D., & Weiss, S.T. (1997). Effects of obesity and fat distribution on ventilator function: the normative aging study. *Chest*, 111, 891-898.

Malnmis, K. J. 2004. Exercise for obese clients. *American College of Sport Medicine, Health and Fitness Journal* 49(1), 25-31.

WHO Expert Consultation (2004). Appropriate body mass index for Asian populations and its implication for policy and intervention strategies. *Lancet*. 363, 157-163

World Health Organization (2000). Obesity: preventing and managing the global epidemic. Geneva: WHO Technical Report Series, No. 894. Geneva, Switzerland.

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