Effect of Aerobic Exercise on Cardio-Respiratory Fitness of Fatai Fitness Club Members in Gbagada Lagos, Nigeria

Emeka Boniface Okoro Uzor & Nnajinwa Arinze

Department of Human Kinetics and Health Education, University of Lagos, Nigeria

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ABSTRACT

This study was carried out to determine the effects of aerobic exercise on cardio-respiratory fitness of Fatai Fitness Club in Gbagada Lagos. To achieve the purpose of the study two research questions were asked and two hypotheses tested at 0.05 level of significance. The study adopted the pre-test, post-test control group design and used a purposively sampling technique to select 30 participants from the study population. The sample consists of apparently healthy men and women within the age range of 25-60 years of age. Data collected were analyzed using descriptive statistics of mean, standard deviation and inferential statistics of t-test to test the stated hypotheses. The results indicate significant difference in the cardio-respiratory fitness variables of the experimental group, whereas there was no significant difference in that of the control group after 7 weeks of aerobic exercise. This result means that there was improvement in the participants' resting heart and maximum oxygen uptake (vo2 max) after 7 weeks of aerobic exercise. It is recommended that aerobic exercise should be done at frequency of 3-5 sessions per week and 30-45 minutes duration for a minimum of 8 – 16 weeks to significantly improve resting heart rate and maximum oxygen uptake (VO2 max) in the apparently healthy population.

Keywords: Aerobic exercise, cardio-respiratory fitness, resting heart rate and maximum oxygen uptake

INTRODUCTION

Despite the overwhelming benefits of aerobic exercise in health promotion, human performance and longevity yet many people in Nigeria and around the world do not see the need to engage in regular aerobic activity. Aerobic exercise participation is the best antidote to the myriad of cardiovascular and metabolic issues claiming lives across the globe; these health problems includes; stroke, heart attack, diabetes, hypertension and others. In fact, according to WHO (2023), physical inactivity is the fourth leading risk factor for mortality worldwide. Approximately 3.2 million deaths each year are attributable to insufficient physical activity. It is becoming a trend and is rising rapidly in developing countries. According to Dr Babatunde Adegoke, in Nigeria alone no fewer than 240,000 Nigerians die annually as a result of physical inactivity, the prevalence of chronic diseases in this country have been attributed to failure of many Nigerians to engage in regular physical activities. Insufficient physical activity and sedentary lifestyle have been identified as one of the leading causes of chronic diseases. It is saddening to hear that about 15 percent of the 1.6 million chronic health conditions that are diagnosed every year are caused by physical inactivity alone. However, people who engage in moderate or vigorous-intensity aerobic physical activity have a significantly lower risk of cardiovascular disease than the inactive people. In the general population, active adults have lower rates of heart disease and stroke, lower blood pressure, better blood lipid profiles and fitness. Aerobic exercise is very important to the overall health of an individual (Vanguard News, 2013; Sept. 12)

From the foregoing, aerobic exercise refers to the type of repetitive, structured physical activity that requires the body's metabolic system to use oxygen to produce energy (Physiopedia, 2023). According to Mayo-Clinic (2023), regular aerobic exercises; such as walking, jogging, running, skipping, bicycling or

swimming, can help one live longer and healthier. More so, (myDr, 2023) insisted that aerobic exercise is an exercise that requires the consumption of substantially more oxygen than at rest. It is of a light to moderate intensity exercises, and can be undertaken for a prolonged duration without excessive fatigue. Examples of such aerobic exercise include walking, jogging, dancing, running, skipping, swimming or cycling at a steady pace.

Furthermore, Cameron and Douala (2000) reiterate that aside cardiovascular benefits of aerobic activities, various scientific research has indicated that there are strong correlations between physical activity and other aspect of life such as; aerobic impacts crime prevention, improves academic performance, increase life expectancy and quality of life, reduces the cost of healthcare, prevent obesity and helps in stress management.

Cardio-respiratory fitness (CRF) on the other hand is an important component of health?related fitness; CRF is the capacity of respiratory and cardiovascular systems to provide muscles with oxygen during sustained and/or intense exercise (Laukkanen, 2009). Cardio-respiratory fitness is the ability of the cardiovascular system and respiratory system to maintain oxygen supply to engaged muscles in duration of prolonged physical activity, as well as the ability of muscles to provide required energy in aerobic processes (Snell PG, et al. 2007). While maximum oxygen consumption (VO2max) is the best indicator of cardio-respiratory fitness or aerobic capabilities of the organism and functional ability of cardio-vascular system, respiratory system and tissue to use the available oxygen. Maximal oxygen consumption or maximum oxygen uptake (VO2 max), refers to the maximum amount of oxygen that an individual can utilize during intense or maximal exercise. This measurement is generally considered the best indicator of cardiovascular fitness and aerobic endurance. The more oxygen a person can use during high level exercise, the more energy a person can produce (Exercise Physiology Core Laboratory, 2023).

The impact of aerobic exercise on the general wellbeing of an individual cannot be over-emphasized. According to Matthew and Aruni (2018), regular physical activity is beneficial for cardiovascular health. They further argued that frequent aerobic exercise is robustly associated with a decrease in cardiovascular mortality as well as the risk of developing cardiovascular disease. Physically active individuals have lower blood pressure, higher insulin sensitivity, and a more favorable plasma lipoprotein profile than sedentary population. This is in line with myDr (2023) which maintained that regular aerobic exercise improves the cardiovascular fitness of an individual by increasing the capacity to use oxygen. It does this by increasing the heart's capacity to send blood and oxygen to the muscles, which is mainly achieved through an increase in the size of the heart's pumping chambers (ventricles), and this is evident by a lower resting heart rate, and a slower heart rate for the same exercise intensity.

It is against this backdrop that the study, effects of aerobic exercise on cardio-respiratory fitness of Fatai Fitness Club members in Gbagada Lagos Nigeria was conceived to educate the people and reduce the wide spread epidemics of non-communicable chronic diseases due to physical inactivity.

Purpose of the Study

The purpose of this study was to determine the effect of aerobic exercise on cardio-respiratory fitness of Fatai Fitness Club members in Gbagada Lagos.

Research Question

The following research questions were formulated:

1. Will there be significant difference in the participants' resting heart rate after 7 weeks of aerobic exercise?

2. Will there be significant difference in the participants' maximum oxygen uptake after 7 weeks of aerobic exercise?

Research Hypotheses

The following research hypotheses were tested in the study:

1. There will be no significant difference in the participants' resting heart rate after 7 weeks of aerobic exercise.
2. There will be no significant difference in the participants' maximum oxygen uptake (VO2 max) after 7 weeks of aerobic exercise.

METHOD

The pre-test, post-test control group design was used in this study. This involves two groups – the experimental and the control group. The cardio-respiratory fitness variables of resting heart rate and maximum oxygen uptake (VO2 max) were taken for all participants. Afterward, the experimental group only was exposed to seven (7) weeks of aerobic exercise while the control group was not exposed to any exercise. The pre-test was taken on the two groups, after 7 weeks of aerobics exercise the post-test were taken on both group. A purposive sampling technique was used to select 30 participants from the study population. Fifteen (15) participants from Fatai Fitness Club Gbagada as experimental group while fifteen (15) participants were purposively sampled from the Gbagada environs which represent the control group. The sample consists of apparently healthy men and women within the age range of 25-60 years of age. In the procedure for data collection, **t**he researcher sought for approval from the Departmental Research Ethics Committee to carry out this research. The researchers then proceeds with the study after approval were given. A consent form, explaining vividly what the research is all about, what the participants stand to gain or lose was given to the participants to read and understands, which was duly signed by participants before the exercise. Gbagada Youth Recreational Centre was used for the 7 weeks of aerobic exercise. All parameters were taken in the participants before and after the 7 weeks of aerobic exercise by the researchers with the help of a research assistant. Data collected were analyzed using descriptive statistics of mean, standard deviation and inferential statistics of t-test at 0.05 level of significance to test the stated hypotheses.

RESULTS

To determine the effects of aerobic exercise on cardio-respiratory fitness of Fatai Fitness Club Gbagada. Mean, Standard Deviation and paired samples T-test were the methods of data analyses used in this study. Fifteen (15) respondents were used in the experimental groups and fifteen (15) respondents were used in the control groups, making a total of thirty (30) respondents

Table 1: Descriptive Statistics of participants' resting heart rate after seven (7) weeks of aerobic exercise.

Participants' Resting Heart Rate	N	Measures	Mean	Standard Deviation
Experimental Group	15	1	86.27	9.758
		2	78.27	9.254
Control Group	15	1	72.87	14.162
		2	75.47	13.674

Measures: 1. Pre-test

2. Post-test

Table 1, shows that in the experimental group the mean (86.27) and standard deviation (9.758) of participants' resting heart rate before the aerobic exercise is higher than the resting heart rate after the aerobic exercise mean (78.27) and standard deviation (9.254). This reveals that the resting heart rate of participants' before the aerobic exercise is greater than the resting heart rate after the aerobic exercise.

In the control group the mean (72.87) of participants' resting heart rate before the aerobic exercise is lower than the mean (75.47) resting heart rate after the aerobic exercise and the standard deviation (14.162) of participants' resting heart rate before the aerobic exercise is higher than the standard deviation (13.674) resting heart rate after the aerobic exercise. This reveals that the resting heart rate of participants' after the aerobic exercise is greater than the resting heart rate before the aerobic exercise.

Table 2: Descriptive Statistics of participants' maximum oxygen uptake after seven (7) weeks of aerobic exercise.

Participants' Maximum Oxygen Uptake	N	Measures	Mean	Standard Deviation
Experimental Group	15	1	38.69	.197
		2	43.75	.458
Control Group	15	1	38.95	.534
		2	37.54	.375

Measures: 1. Pre-test

2. Post-test

Table 2, indicates that in the experimental group, the mean (38.69) and standard deviation (.197) of participants' maximum oxygen uptake before the aerobic exercise is lower than the maximum oxygen uptake after the aerobic exercise mean (43.75) and standard deviation (.458). This reveals that the maximum oxygen uptake of participants' after the aerobic exercise is more than the maximum oxygen uptake before the aerobic exercise.

In the control group, the mean (38.95) and standard deviation (.534) of maximum oxygen uptake before the aerobic exercise is higher than the maximum oxygen uptake after the aerobic exercise mean (37.54) and standard deviation (.375). This reveals that the maximum oxygen uptake of participants' before the aerobic exercise is more than the maximum oxygen uptake before after the aerobic exercise.

HYPOTHESES TESTING

- **Hypothesis One**

There will be no significant difference in the participants' resting heart rate after 7 weeks of aerobic exercise.

Table 3: T test analysis of participants' resting heart rate after 7 weeks of aerobic exercise.

Paired-Samples T Test

Participants' Resting Heart Rate	N	Meas.	Mean	Std. Dev.	df	t alc.	p value	Remark
Experimental Group	15	1	86.27	9.758	14	4.285	.001	Significant
		2	78.27	7.254				

Control Group	15	1	72.87	14.162	14	-.580	.571	Not Significant
		2	75.47	13.674				

Measures: 1. Pre-test

2. Post-test

The Paired-samples T test table shows that in the experimental group (t=4.285, df=14, p<0.05). This means that, there exists significant difference in the resting heart rate of participants' before and after the aerobic exercise. In the control group (t=-.580, df=14, p>0.05). This reveals that, there exists no significant difference in the resting heart rate of participants' before and after the aerobic exercise.

- **Hypothesis Two**

There will be no significant difference in the participants' maximum oxygen uptake (VO_2 max) after 7 weeks of aerobic exercise

Table 5: T test analysis of participants' maximum oxygen uptake (VO_2 max) after 7 weeks of aerobic exercise.

Paired-Samples T Test

Participants' Maximum Oxygen Uptake (VO_2 Max)	**N**	**Meas.**	**Mean**	**Std. Dev.**	**df**	**t calc.**	**p value**	**Remark**
Experimental Group	15	1	38.69	.197	14	-47.337	.000	Significant
		2	43.75	.458				
Control Group	15	1	38.95	.534	14	8.046	.000	Significant
		2	37.54	.375				

Measures: 1. Pre-test

3. Post-test

The Paired-samples T test table displays in the experimental group (t=-47.337, df=14, p<0.05). This means that, there exists significant difference in the maximum oxygen uptake (VO_2 max) of participants' before and after the aerobic exercise. In the control group (t=8.046, df=14, p<0.05). This discloses that, there exists significant difference in the maximum oxygen uptake (VO_2 max) of participants' before and after the aerobic exercise.

DISCUSSION OF THE FINDINGS

There exists significant difference in the resting heart rate of the participants before and after the aerobic exercise. This result illustrates a reduction in resting heart rate after 7 weeks of aerobic exercise. Excitingly, this is in agreement with available literatures stressing that regular exercise result in a lower resting heart

rate. According to Johns Hopkins Medicine (2023), participating in regular exercise lowers the resting heart rate. Aerobic Exercise works like beta-blocker medication to slow the heart rate and lower blood pressure (at rest and also when exercising). They maintained that a lower resting heart rate means that the heart's left ventricle has more time to fill with blood and more time to deliver oxygen and nutrients to the body and heart muscle. As a result, the heart becomes more efficient at meeting the body's needs for energy and oxygen. A lower resting heart rate (in conditioned athletes) indicates greater cardiovascular health or high level of fitness. Finally, the results reveal that there exists significant difference in the maximum oxygen uptake of the participants before and after the aerobic exercise. This indicates an appreciable improvement in the participants' maximum oxygen uptake after 7 weeks of aerobic exercise. This support available literature emphasizing that regular exercise improves maximum oxygen uptake. According to Matthew and Aruni (2018), regular physical activity is beneficial for cardiovascular health. They further argued that frequent aerobic exercise is robustly associated with a decrease in cardiovascular mortality as well as the risk of developing cardiovascular disease.

CONCLUSION

Based on the findings of this study, it was concluded that 7 weeks of moderate aerobic exercise of 40-60%, 3-5 sessions per week and a duration of 30-45 minutes can moderately improve resting heart rate, blood pressure and maximum oxygen uptake (VO2 max) in the apparently healthy population. However, 8 – 16 weeks of aerobic exercise at frequency of 3-5 sessions per week and 30-45 minutes duration is recommended to fully improve cardio-respiratory fitness.

RECOMMENDATION

On the basis of the findings of the study, the following recommendations were made:

1. It is recommended that aerobic exercise should be done at frequency of 3-5 sessions per week and 30-45 minutes duration for a minimum of 8 – 16 weeks to significantly improve resting heart rate, systolic blood pressure, diastolic blood pressure and maximum oxygen uptake (VO2 max) in the apparently healthy population.
2. For fitness and health, moderate aerobic exercise is recommended for individual, families and co-operate bodies as prevention and control measure against the rising trend in chronic diseases in the country
3. Cardio-respiratory is the basis of maximum power and endurance performance. Therefore, it is recommended for coaches, sports administrators and sports psychologist to understand what to look for in selecting athletes for competition and for improving sports performance.

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