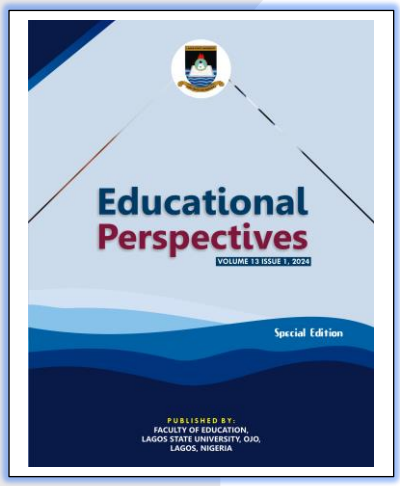

Efficacy of Aerobic Exercise on Blood Glucose Level Among Non-Diabetic Adolescent Females in Lagos

Ogunlade Olu and Adeogun J.O

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

KEYWORDS:

Aerobic, Blood glucose level, Diabetes, Efficacy, Exercise, Non-Diabetic

WORD COUNT:
87

CORRESPONDING EMAIL ADDRESS:

ORCID NUMBER:

ABSTRACT

This study investigated the efficacy of aerobic exercise on blood glucose level among non-diabetic adolescent females in Lagos. 40 female students whose ages ranged between 11 and 17 years were selected from Anglican Girls college, ketu-Ijanikin, Lagos State as participants for the study. Participants were tested and measured in the variable of blood glucose level. They were subjected to aerobic exercise (brisk walk). Data collected were analysed using ANOVA test. The findings of the study showed that aerobic exercise produced a significant result among the experimental group.

HOW TO CITE

Ogunlade O & Adeogun J.O. (2025). Efficacy of Aerobic Exercise on Blood Glucose Level Among Non-Diabetic Adolescent Females in Lagos. *Educational Perspectives*, *13*(2B), 568-.572.

Introduction

Public attention in the developed world has recently focused on the increasing risk of high blood glucose level in children and young adults, the elderly from age 40 and above by recent discovery through research are not the only vulnerable age group to diabetes mellitus as believed by many (Morgan, 2015). With more than a third of diabetes cases in the world occurring in people over the age of 65, diabetes is often referred to as an age-related condition, but around 508,000 children and adolescents are estimated to have diabetes and this number is increasing. (Pletcher, 2018)In Nigeria however, where 65 million persons are illiterates according to the United Nations Educational Scientific and Cultural Organization (UNESCO, 2017) only 38% of the population know of the existence of blood glucose but not its maintenance at healthy level and the factors and types of exercises that regulate it. According to Akintan (2018) among this 38% are patients of diabetes who are educated or financially capable to afford proper medical treatment of the disease; and diabetic patients who are aware of the disease but cannot afford proper medical treatment as well as non-diabetics who are not aware of the healthy maintenance of blood glucose level. The remaining 62% do not even know about it at all or perhaps have only negligible knowledge and patronize traditional herbalist for care, who themselves are illiterates

Participation in exercise helps to keep blood glucose at normal level and exercise regulates blood glucose level by reducing it. Aerobic exercise is any physical activity that uses large muscle groups and causes the body to use more oxygen than it would while resting. It is an activity that ensures the homeostasis and proper balance of some physiological parameters such as blood glucose, blood pressure, salt and electrolyte levels, and body calories among others. The goal of aerobic exercise is to increase cardiovascular endurance. Aerobic exercise is an activity that can be sustained for more than just a few minutes which requires pumping of oxygenated blood by the heart to deliver oxygen to the working muscles, (Eric, 2017). Examples of aerobic exercise include running, cycling, swimming, brisk walk, skipping, rowing, hiking, playing tennis, continuous training, and long slow distance training.

According to Guyton and Hall (2015), aerobic exercise which is recognized by its low intensity, less involvement of muscles in power activity and longer duration of oxygen consumption is more likely to produce a good result in glucose reduction since oxygen supply during exercise facilitates depletion of energy sources in the body. It can therefore be said that the longer duration of oxygen consumption will cause the use up of a larger volume of blood glucose. This however is an arguable fact as the body muscles are involved in only a low intensity exercise which does not demand massive depletion of energy stores in the body.

In view of the arguments above in which no clear cut position can be established as regards the efficacy of aerobic exercise on blood glucose level, the problem of this study therefore was to study the efficacy of aerobic exercise on blood glucose level among non-diabetic adolescent females in lagos.

Methods

The population for the study were non-diabetic adolescent females in Lagos state. The sample consisted of 40 adolescent females (11-17 years) selected from the population. A twogroup pre-test, post-test research design was adopted for this study, a pre-test was conducted followed by a treatment on the experimental group while the control had no

treatment, the post test was administered on both groups.

	Pre-test	Treatment	Post-test
Group A	T1	X	T2
Group B	T1	-	T2

Group A – Experimental group
Group B – Control group

Each subject's initial and final blood glucose level (pre-test and post-test) were measured by pricking their thumb tips after sterilization with the use of 'Moko' methylated spirit and cotton wool. The strip containing the subject's blood was inserted into the omron(HEM 7120)glucometer for digital display of the blood glucose value. The value was recorded in milligram per deciliter (mg/dL). The exercise modality for the experimental group was the100 metre brisk walk. Analysis of Variance (ANOVA) was used for data analysis.

Results

Table 1: ANOVA result of the difference between the effects of aerobic exercises and control on blood glucose level of non-diabetic adolescent females in Lagos.

Test	Group	N	Mean	SD	Source	SS	DF	MS	F-calc	Sig
Pre-test	Aerobic	20	96.6000	17.64981	Between Groups	41.050	3	13.683		
	Control	20	97.4500	12.54665						
Post-test	Aerobic	20	71.4000	4.58143	Between Groups	15192.250	3	5064.083		
	Control	20	99.3500	13.67778						

From table 1 above, it could be observed that a non-significant F-value (F=0.054; P>0.05) was obtained at 0.05 level of significance in respect of the pre-test scores of participants. This shows that there was no significant difference in the basal glucose level of participants. Furthermore, the table revealed a significant F-value (F=68.185; P<0.05) at 0.05 level of significance in respect of the post-test scores of participants.

Table 2: Post-Hoc Test Result of mean differences between aerobic test and control using the Scheffe Test Procedure

Mean Pairs			Mean Difference	Std. Error	Sig.
Aerobic	vs	Control	-27.95000*	2.72525	0.000

Table 2 above shows the mean pairs differences tested at 0.05 level of significance. The result shows that differences in the pair means there was a significant difference. This implies that the participants in the experimental group recorded significantly lower blood glucose level after the administration of treatment than participants in the control group. Invariably, aerobic exercise

significantly reduced blood glucose level of non-diabetic adolescent females.

.

Discussion

This study revealed that exercise effectively reduced blood glucose level among non-diabetic adolescent females in Lagos State and agrees with previous studies that participation in exercise is potent in the reduction of blood glucose. Ford (2013) reported that over eighteen studies on blood glucose among adolescents in the United States within the past two years came out with a result that the blood glucose reduced after the exercise treatments. Brad (2015), explained that physical activities have been shown to be a protection for a variety of physiological conditions; hyperglycemia inclusive. The study further corroborated Eric (2017) that exercise is a potent treatment for high blood glucose levels. This finding also confirms the report on the physiology of exercise of Collins (2018), that glucose uptake is regulated by physical activity from the liver and muscle cells where it is stored as glycogen into the bloodstream to be used up by the muscles. Generally, the findings of this study agreed quite well with previous reports that participation in exercise is a key way to reduce blood glucose level as well as maintaining it at a healthy level.

The findings of the study also imply that aerobic exercise effectively reduced blood glucose among non-diabetic adolescent females in Lagos State. The finding corroborates that of Hallstrand (2018) which reported that aerobic training can increase the VO_2max which eventually increases the oxygen fuel capacity of the muscles to use up glucose. It also agrees with the studies of Eric (2017) that longer duration of oxygen consumption in aerobic exercise produced a better result in glucose reduction as oxygen supply during exercise facilitates depletion of energy sources in the body. Also, Willmore and Costill (2018) reported significant decrease in blood glucose of normal boys and girls whose ages are within the range of 7.5 to 20.5 years who walk or ride to schools than adults who engage in exercises irregularly. The females in Willmore and Costill's study were however observed to show a wider range between their pre-test and post-test values. A study has revealed that females starting from adolescent ages who engage in regular walking effectively reduce their blood glucose than those who have a heavy bout of exercise once in a long while (Anthonio, 2017).

Based on the findings, it is concluded that exercise is a potent treatment for the reduction of blood glucose and aerobic exercise is also effective in reducing blood glucose level. The following recommendations are therefore made;

- Daily walking exercises should be adopted by everybody no matter the age, sex or body mass. About a thousand and five-hundred walking steps should be taken daily so as to regulate their blood glucose level.
- Daily walking and jogging exercises should be adopted by patients of hyperglycemia than a short heavy bout whose motivational and strength demand for daily participation is too high to possess for many.
- Patients of type I and type II diabetes mellitus should set up a pace of exercise regularity aside administered drugs and this regularity should change as they advance in age and body mass.
- People should know their blood glucose level by undergoing proper tests at regular intervals and accompany the tests with mild aerobic exercises.
- Government should provide an effective bridge between the structured clinical treatments and exercise-based therapy for sicknesses as part of preventive, curative and

rehabilitative medicine. This can be achieved by:

- Including exercise programs in government-owned hospitals and as a necessity for approval of privately-owned medical institutions
- Making and supporting awareness for the masses about exercise therapy for health as they do clinical medicine and have a large population to their attention.
- Private exercise and fitness industries should be supported, approved and licensed to make exercise a medicinal approach to sicknesses such as hyperglycemia and diabetes.

Ethical Consideration

The nature of this exercise was clearly explained to the participants and only those who volunteered and signed the 'informed consent form' participated in the study.

References

Akintan, U.C. (2018). Epidermiology of diabetes in Nigeria: Causes and incidences. Journal of Preventive Medicine. 2(1), 7-12.

Anthonio, C.M. (2017). Hyperglycemia and diabetes: Measurements and common errors. Journal of Public Health, 5(1), 26-28.

Brad, C.O. (2015). Fitness Therapy: Exercise protection for physiological conditions. Ohio:Escado Press.

Collins, A.M. (2018). Endocrinology of exercise: Function of pancreas. AmericanFitness Review, 23(6), 12-34.

Eric, C.D. (2017). Exercise: A channel to fitness. Review of Physical activity, 23(34),12-25.

Ford, T.G. (11th Ed.).(2013). Fitness value in America: Exercise outcome in theUnited States. Philadelphia: Elsevier Inc.

Guyton, A.C. Hall, J.E. (12th Ed.) (2015). Medical physiology: Endocrinology ofthe pancreas.Philadelphia; Elsevier Inc.

Hallstrand, B.D. (2018). Respiratory patency and health. New York: McGraw-Hill. Pub.

Morgan, J.H. (2015). Diabetes epidermis: Prevalence of type II diabetes mellitus. Public Safety proceedings, 53(12), 40-45.

Pletcher, A.A. (2018). The teenage child: Teenage physiology and psychology.Oxford: New York, NY: Oxford University Press.

United Nations Educational Scientific and Cultural Organisation, illiteracy eradication in Africa, 18-20 August 2017, Geneva, Nigeria.

Willmore, B.N., Costill, G.H. (2018). Effect of exercise on adolescent health.Retrieved from http://www.medresearch.com/adolescence.