



Effect of selected aerobic exercises on the improvement of cardiovascular endurance for performance of athlete: The case of demote preparatory school, West Gojam Zone, Amhara Ethiopia

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Abstract

Cardiovascular endurance is a component of physical fitness which plays great role during exercises. The primary purpose of this study was to evaluate the effects of selected types of aerobic exercise on enhancing cardiovascular endurance of students. The study was conducted to improve cardiovascular endurance performances on 30 male athletes of Dermot preparatory school of Grade 11 students. These thirty male students were assigned as one experimental group and their age ranges 18 and 19 years. All subjects participated in selected aerobic exercises for 8 weeks i.e., three days per week and 60 minutes duration per day. Pre-test, during training test and post training test were conducted on physical fitness variables such as step test and 12 minutes run. The data collected from subjects were analyzed by paired simple t-test to determine the differences between pre-test and post-test mean value results of the participants of the study. According to the findings of the study, step test 26.6 beats per minute mean differences. In twelve minutes run 271.16 meters increments data were observed. Therefore, the results obtained from the study indicate that there were significant improvements within 12 minutes run. However, in the case of steps test, a test result was decreased because of improvement in the performance. So, the findings of the study reveals different responsible bodies like coaches, sport commission office, education office, school principals and sport Science teachers should take considerable actions for the improvement of the Athletics proficiencies of the students as well as others youth.

Keywords: cardiovascular endurance, physical fitness, aerobic exercises and performance

Introduction

Background of the Study

Fundamental movements of man, which they have achieved from their pre-human ancestors, are walking, running, jumping, climbing, throwing, pulling, pushing, etc. By permutation and combination of these basic fundamental movements, man has been developing various secondary movements essential for the day-to-day living and for the use in games and sports. Physical fitness is important for all human beings, irrespective of their age and sex. A given work may not be carried out if the required physical strength is not available. Fitness is the first and foremost thing to enjoy the life fully with effective exercises Reddy (2012) [20].

Physical activity and training are important for initiating and sustaining cardiovascular health. As such, encouragement from childhood and the possibility to participate in sports activity is a major health issue which must be sustained. At the adolescence age, however, increasing expectations and competitive demands have gradually emerged as an important aspect of recreational sports in the young (Armstrong and McManus, 2010). Regular aerobic exercise will produce beneficial effects for any age group providing the exercise is specific and appropriate to the level of fitness of the individual. Progressive exercises correctly performed would increase the level of fitness and improve health. It will also create a sense of well-being, produce greater energy and reduce the risk of developing many diseases. Exercise makes demands on the body systems over and above normal every day activities and, as result, the systems adapt anatomically and

physiologically. Available experience and scientific evidence show that regular physical activity provides people, both male and female, including people with disabilities with a wide range of physical, social and mental health benefits. Physical activity interacts positively strategies to improve diet, discourage the use of tobacco alcohol and drugs, which in turn helps reduce violence, enhances functional capacity and promotes social interaction and integration within among peoples (WHO, 2003) [25]. Aerobic exercise stimulates heart, lungs and all working group of muscles and produces valuable changes in body and mind. Many physiological changes are determined by daily aerobic exercises (Shahana *et al.*, 2010) [22].

Many of the researchers sighted in the above, have studied that physical exercises are important for the development of all physical fitness. Nevertheless, limited researches were done in the area of how much aerobic exercises are effective for the improvement of cardiovascular endurance. Hence, this study is going to examine effective aerobic exercises for the improvement of cardiovascular endurance of athlete students at Damot Preparatory School.

As Shemelis (2010) [23] studies, Aerobic activities should be used to develop cardio-respiratory endurance. Basically, aerobic activities are those in which a sufficient amount of oxygen is available to meet the body's demands. Popular aerobic activities including running, walking, rowing, swimming, cycling, aerobic dancing, jogging, tread mill and somewhat continuous in nature the intensity of work load can be easily regulated by controlling

the pace for the performance of elevated level for an extended period. Nowadays, ineffective aerobic exercises training for the developments of cardiovascular endurance seen as a gap for this study in our country in general and in this study area in particular and, therefore, effective selected aerobic exercises were used as causes for the improvement of cardiovascular endurance of male athlete students of FPS.

Statement of the Problem

Regular physical activity, fitness, and exercise are critically important for health and wellbeing of all people, whether they participate in vigorous exercise or some type of moderate health-enhancing physical activities. Even among frail and very old adults, mobility and functioning can be improved by way of physical activity (Butler *et al.*, 1998).

According to ACSM (2000) ^[1, 2], physical activity is defined as bodily movement produced by the contraction of striated muscle that substantially increases energy expenditure. This definition includes exercise, which is planned, structured, and repetitive physical activity aimed at improving maintaining physical fitness, organized sports or games (football, basketball), transport (walking, cycling), occupational physical activity (manual labor, household chores) and non-organized, recreational physical activities (Okely, Patterson & Boothet, 1998; ACSM, 2000) ^[1, 2]. Furthermore, these days, physical exercise is a non-pharmacological treatment of modern and busy lifestyle around the world.

Although, many studies believe that regular physical activity can have immediate health benefits by positively affecting body composition and musculoskeletal development for male and female but the reality in our country as well as at Damot Preparatory School shows the value of exercise has been known theoretically not practically. So this, it need academicals" investigation of effective type of aerobic exercise for the development of cardiovascular endurance. Hence, in this study area there were rare applications of walking, jogging and rope jumping aerobic exercise for the development of cardiovascular endurance. The merely application of the above aerobic exercises catch the attention of researcher to conduct current study for the development of cardiovascular endurance improvement of beginner male athlete of Damot Preparatory school.

Research Questions

This research attempted to answer the following questions with the conceptual idea of:

1. What significant changes could be seen on the cardiovascular endurance of selected male athlete students" of Damot Preparatory School?
2. What are the main elements of important aerobic exercises for the improvement of cardiovascular endurance of male Athletes at Damot Preparatory School?
3. What would be the results of cardiovascular endurance and status of FPS male Athletes achieved after selected aerobic exercises has conducted.

Objectives of the Study

- a. To investigate the significant change of cardiovascular endurance performance of selected male athlete students at Damot Preparatory School;

- b. To identify effective aerobic exercises for the improvement of cardiovascular endurance on selected grade11 male athlete students at Damot Preparatory School, and
- c. To identify how selected aerobic exercises influences cardiovascular endurance performance of selected male athlete students at Damot preparatory School.

Significance of the Study

The findings of this study were to investigate the effects of aerobic exercise in improving cardiovascular endurance performance of selected male students at Damot Preparatory School in Damot town of the West Gojam Zone. The outcome of the study has reduced the problems that occur at Dermot preparatory School of selected male students in relation to their abilities to cardiovascular endurance performance. But that does not mean the outcome of this research is limited to the area under study. Moreover, it helped to know the type of training for aerobic exercise given to trainees in order to improve aerobic capacity in cardiovascular endurance abilities of the students. After the findings of the problems the writer would recommend responsible stake holders of the study.

Scope of the Study

This study was applied at Damot town, Damot preparatory School grade 11 male athlete student in West Gojamzone at AMHARA. It was employed on aerobic exercise which can improve cardiovascular endurance performance of the athlete students.

Limitation of the study

The outcome of this study would be very interesting to conduct the study on selected aerobic exercise on the cardiovascular endurance performance of athlete however; study was limited in one preparatory school site because of the shortage of time and budget. The experimental research was complex and considering usually as private domain. As a result data collection materials and manpower was very difficult to carry out the study.

Organization of the Study

This thesis is organized in five chapters. The first chapter of this research discusses the introduction part. In the second chapter, review of related literature from different sources was stated. In this chapter, based on the literature review conceptual framework is designed on components of physical fitness variables comparing enhancing qualities of karate trainees. Chapter three deals with all methodology used for this research. In this part, description of the study area, source of data collection, research design, study population and sampling techniques, instrumentation, inclusion and exclusion criteria, method and procedure of data collection, exercise training protocol, data quality control, method of data analysis, ethical issue and code of conduct. On chapter four the overall collected data were analyzed and presented using tabulation and explicit explanation. Last chapter presents summary of the results, conclusions, and recommendations based on research findings.

Research Design and Methodology

This chapter deals with experimental site, target population, sampling techniques and sample size, study design, experimental materials, sources of data, methods and procedures of data

collection, inclusion and exclusion criteria, methods of data analysis, data quality control and protocol and ethical consideration of the study participants of research was explained as follows.

Target Population of the Study

The study population was at Damot Preparatory School of grade 11 male students between the ages of 18 and 19 years, at Damot Town of West Gojam Zone in Amhara. Damot Preparatory School includes grade 11 and 12 students. The writer of this study has got 30 students from total of 300 grade 11 male students.

Sampling Techniques and Sample Size

To this specific study the writer was followed purposive sampling technique. In this research instances, the writer preferred to use small number of participants on the basis of participant knowledge, its elements and purpose of the study may be members of subjects were easily identified from its larger population (Babbie, 2007) [5]. The selection of population (target group) depends on their grade level, age, health status and on their interest to participate in aerobic exercises training for the improvement of cardiovascular endurance performance for maximizing technical or tactical skills for athletics ability. The sample size of this study was contained 30 selected male athlete students between the ages of 18 and 19 years within among 300 grade 11 male students at Damot Preparatory School of Damot town, West Gojam zone, Amhara through purposive selection.

Design of the Study

In this study, the researcher employed a single experimental group and standard norms. There was no a control group in this study. A single experimental group was used for providing pre-test and post-test in order to identify the effect of selected aerobic exercises on improvement of cardiovascular endurance. The training schedule was given three days per week i.e., Monday, Wednesday, and Friday and hence, a total of 24 days was given in a two-month time (December, and January 2016/17) for training sessions in which 60 minutes were allotted for each session.

Table 1: The study design layout

Treatment	Aerobic exercise program
Frequency	3 days/week
Total duration	2 months (8 weeks)
Duration /session	60min
Intensity	moderate (55-69) MHR
Exercise days	Monday, Wednesday and Friday
Time of training	1st day Afternoon, 2nd day Morning, 3rd day Morning

Data Analysis and Interpretation

This chapter dealt with the analysis of data collected from the samples under this study. The purpose of the study was to examine the effects of Aerobic exercises in improving cardiovascular endurance performance of selected Athletes in

Damot preparatory school of grade 11 male students. To achieve the purpose of the study 30 male students from Damot preparatory school were selected as subjects and their age was 18-19 years. They were assigned in one group and the selected exercises were given for 8 weeks. The variables which were selected for this study were Step test and 12 minutes run. In addition to this (resting heart rate and exercise heart rate) were measured. Pre, during and post tests were conducted for all 30 study subjects and the test results were recorded. The collected data were analyzed by paired sample t-test using SPSS version twenty (V.20). The results for each variable were discussed below.

Mean and SD Values of Step Test Performance (min)

Table 2: Mean and Standard deviation of step test (Pre-test, during-test and Post-Tests)

Variable	N	PT	DTT	PoT
ST	30	148.46±4.38	136.1±8.01	121.86±8.05

Values are in the form of mean ± SD = standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, ST = step test.

Protocol and Ethical Consideration

The study was designed in such a way that ethical issues have properly addressed. Privacy of the subjects and confidentiality was strictly observed and maintained throughout the study. The study was conducted under school rules and code of conduct in governing research activities and ethical issues. The written consent/ agreement form was given and informed to the concerned bodies.

The above table 2 showed that there was significant change in pre-post test results. The improvement was seen on step test mean differences values due to the eight weeks aerobic exercise training, in which the subjects were engaged in. The mean value for step test before training was 148.46 ± 4.38 beats/minutes, during training test results was 136.1 ± 8.01 beats per minutes and post training results mean value of step test was 121.86 ± 8.05 beats/minutes after eight weeks training program. The mean differences value was decreased by 26.6 beats per minutes. This finding showed that there was a significant improvement on cardiovascular fitness performance of the study subjects after 8 weeks training. The step test result was compared with an international step test norms among similar age groups that range from 18 and 19 years (www.topendsport.com). The international step test norms is 148- 121 for this age groups while the step test mean value result of this study was 121.86. Hence, the study result has fallen in above average standard (norms found on the table 3 below)

Table 3: Normative data for the step test

Age	Excellent	Above average	Average	Below average	Poor
16 to 19					
Male	< 121	148-121	156-149	162-157	>162
Female	< 129	158-129	166-159	170-167	>170

Pair Sample T-Test Result of Step Test

Table 4: Paired Samples Test

		Paired Differences					T	DF	Sig. (2- tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test - During-test	12.067	4.472	.816	10.397	13.736	14.780	29	.000
Pair 2	Pre-test - Post-test	26.600	5.123	.935	24.687	28.513	28.438	29	.000
Pair 3	During-test - Post-test	14.533	3.560	.650	13.204	15.863	22.362	29	.000

The above table 4 showed that paired sample t-test result of step test and paired differences pre- test, during -training and post-test.

Mean and Standard deviation of Twelve Minutes run Performance (m)

Table 5: Mean value + SD of Twelve minutes Run (meter) of the participants' (pre, during and post-tests)

Quasi Experimental group				
Variable	N	PT	DTT	PoT
TMR	30	2572.3±171.3	2723.9±150.32	2843.46±68.7

Values are in the form of mean \pm SD, SD = are standard deviation, PT, = pre training test, DTT= during training test, PoT= post training test, min = minute and TMR = twelve minutes run.

As depicted on the above table 5 and Figure 3 that there was a significant improvement observed in twelve minutes run (in meter) pre-post training tests mean values score of 8 weeks exercise. The mean value of pre training tests results of twelve minutes run was 2572.3 ± 171.3 , during training test mean value result was 2723.9 ± 150.32 and post training test mean value result of twelve minutes run were 2843.46 ± 68.7 . From these results the researcher were observed the significant improvements in their performance of the subjects due to aerobic exercises. When we compare 12 minutes run of pre and post test result of the participants after 8 weeks of exercises program. It showed the significant increments on the performance of the subjects within 271.16 meters mean differences. This result showed there was significant improvement in the performance of the participants' cardiovascular abilities.

The standard norms for 12 minutes run test for male athletes whose age ranges from 17 to 19 was compared with the study result. Standard norms for this test ranges from 2700 – 3000 meters (Cooper, 1968) [8] while the study result was found to be 2843.46 meters in 12 minutes run. Hence, the result of this finding is above average standard (Norms found in the table 6.below).

Table 6: Norms for 12 Minute run tests of male athletes

Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2700m	2400-2700m	2200-2399m	2100-2199m	<2100m
15-16	>2800m	2500-2800m	2300-2499m	2200-2299m	<2200m
17-19	>3000m	2700-3000m	2500-2699m	2300-2499m	<2300m
20-29	>2800	2400-2800m	2200-2399m	1600-2199m	<1600m
30-39	>2700	2300-2700m	1900-2299m	1500-1999m	<1500m
40-49	>2500	2100-2500m	1700-2099m	1400-1699m	<1400m
>50	>2400	2000-2400m	1600-1999m	1300-1599m	<1300m

Sources: (Cooper, 1968).

Conclusions

Based on the major findings of the study to examine aerobic exercises in improving cardiovascular endurance performance of Athletes the following points were stated as conclusions as follows. It was observed that an intimate difference between pre and post physical fitness performances of the subjects of the study. Thus, the finding of this study showed that, there were improvements on cardio respiratory endurance performance of the participants after 8 weeks exercises of 12 minutes run. There was the decrement that had on the heart beats of the subjects after 8 weeks exercise program on endurance, when we compared the heart beats of pre and post test of the subjects. From the results of the research findings it was shown that decreased on the resting heart rate and increased on exercise heart rate of the participants after 8 weeks exercises. When we compared 12 minutes run of pre and post test results of the participants after 8 weeks exercise program, it was found significant increments on the performance of the subjects within 271.16meters mean differences. The result showed that significant improvement in the performance of participants' had cardiovascular endurance

Recommendations

Considering the major findings and conclusions of the study, it is important to put (state) the following points as recommendations for investigate more effects of selected aerobic exercise training in improving cardiovascular endurance performance of Athletes. To empower the cardiovascular endurance performance of Athletes, it was good if the responsible bodies provide financial, material, motivational and physical fitness support to those students. As effects of aerobic exercises on cardiovascular endurance performance of Athletes was crucial; any football, athletics and other sport coaches or concerned bodies may consider exercise as a part of main work for all Athletes. Responsible bodies like education office have to collaborate with Woreda Sport Commission Office Athletics Project so that develop Athletes proficiencies of Damot preparatory school as well as other youth's center offices. Further researches may follow the methodology in more sophisticated manner; while this study used as a spring-board for the improvement of cardiovascular performance of Athletes by using longer training period.

Further researchers may conduct their studies on more different types of strength and endurance exercises that could improve Athletes' performances.

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