



## Original Article

## Assessment of Aerobic Fitness Associated with Moderate Intensity Exercise

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## ABSTRACT

Sound health is considered a basic need of every individual. It allows a person to enjoy routine activities. **Objective:** To examine the impact of moderate intensity exercise on aerobic fitness.

**Methods:** Participants of the study were voluntarily selected from the department of sports science and Physical Education, Gomal University, Dera Ismail Khan, KPK, Pakistan. In addition, the participants of the study were categorized as; control group (CG =20) and experimental groups (EG-20). A self-made exercise protocol of twelve weeks was applied on the selected subjects and thus for the assessment of aerobic fitness, Harvard Step Test, developed by Brouha *et al.*, (1943) was used. The collected data were tabulated and were analyzed by using appropriate statistical tools *i.e.* Percentage, Means, Standard Deviation, Paired Sample t-Test and ANOVA. **Results:** The study found significant difference were found between pre & post cardiovascular fitness of male subject *i.e.*  $t(9) = -21.433$ ,  $sig. = .000 < \alpha = .05$ . Similarly, significant difference was found between pre & post cardiovascular fitness of female subject *i.e.*  $t(9) = -25.249$ ,  $sig. = .000 < \alpha = .05$ . According to the results of this research study, it may be recommended that the Physical education and exercise must be a necessary subject for all college, school and university level students or the student is necessary to take the subject of physical education and exercise for each year so that their cardiovascular fitness is maintained.

**Conclusions:** The study concluded that moderate intensity exercise has significant impact on aerobic fitness of respondents.

## INTRODUCTION

Sound health is considered a basic need of every individual. It allows a person to enjoy routine activities [1, 2]. Cardiovascular health plays an important role in promoting and staying healthy. Exercise with moderate volume and intensity promote and maintain the functional capacity of cardiovascular system (CVS) [3]. Cardiovascular health refers to the state of all the allied organs of heart which function properly without any problem. Sometime the term aerobic fitness also used for cardiovascular health. Aerobic activities play an important role in overall development of

cardiovascular health [4]. More oxygen is required for aerobic exercise [5, 6]. Regular exercise promotes cardiovascular health. A person with regular exercise having more strong heart. Different studies indicate active individual with regular exercise has little chances of heart problems [7, 8]. Various allied organs of cardiovascular system and respiratory system collectively called cardiovascular system. Blood receive oxygen from lungs resultant to air that we breathe. Muscles need oxygen to stay healthy. In addition, blood removes all the waste

products given off by active muscles cells. This blood is returned back to heart by veins for further purification [8, 9]. Resting heart in ranged from 70 to 80 beats per minutes. Findings of previous research studies indicate that a person with sound fitness level usually having RHR of 50 which is considered million times better than a person with poor fitness level [10-12]. Exercise promote immune system that enable a person to stay healthy and to avoid health complications. Healthy heart easily purifies blood and provide oxygen to all organs of the body. Poor heart function may cause different health problems; therefore, regular exercise may help us to strengthen the functional capacity of heart [13]. Both CVS and respiratory system helps in provision of oxygen and nutrients and also helps to relives the carbon dioxide (CO<sub>2</sub>) and wastes products of metabolic system. In addition, it also helps in temperature preservation and acid-base balance, and carrying of hormones from the endocrine glands to their target organs [12-15]. The authors further suggested that 4 to 5 kilometers daily walk can improve the function of CVS or aerobic system. Even if aerobic exercise remains the preferred exercise for elderly because it is safer and it conditions directly the cardiovascular component, while strength exercise is more dangerous, because it causes sudden changes in the system that are hard to be held by an inefficient heart but the improvement in muscle mass can also benefit the cardio circulatory component to greater efficiency of the muscular pump function [13]. As a result of critical analysis of the above discussion now it is well defined that exercise and cardiovascular health or aerobic fitness are interrelated to each other. How much exercise play its role in the development and maintenance of cardiovascular health? To discover the fact, the researcher decided to carry a research study under the title "Assessment of aerobic fitness associated with moderate intensity exercise.

## METHODS

The researcher adopted the following procedures for reaching at certain findings and conclusion. Male and female students from the Department of Sports Science and Physical Education, Gomal University were included as the population of the study. Participants were randomly categorized into two groups i.e. control group (CG) and experimental group (EG). Each group was comprised of 20 subjects. A self-made exercise protocol of twelve weeks was applied on the selected subjects and thus for the assessment of aerobic fitness, Harvard Step Test, developed by Brouha et al., (1943) was used. Ethical approval was taken from the ethical research and review board of Gomal University, Dera Isamil Khan, KPK, Pakistan. Consent was taken from all the participants before

participation in the study. Risks and benefits of participation in the study were also ensured. The placid data were administered through statistical package of social sciences (SPSS, version-26) and thus apt statistical tools were applied for the analysis of data.

## RESULTS

The results of paired sample t-test among the sampled male respondents in cardiovascular fitness. Before the exercise the cardiovascular mean was 24.331, Standard deviation was 6.164 and after the exercise the cardiovascular fitness of male respondents was increased and reached at mean 87.054, standard deviation 9.921. The relationship between pre and post cardiovascular fitness was positively 42%. The table 1 indicates that there is significant difference between pre cardiovascular fitness of male and post cardiovascular of male  $t(9) = -21.433$ , sig. = .000 <  $\alpha = .05$ . Hence according to the hypothesis there is significant difference between the cardiovascular fitness of the male before and after the applying aerobic exercise protocol is hereby accepted.

Testing Variable	Mean±SD	N	R (Pre & Post)	T	Df	Sig.
Cardiovascular Fitness of Male pre Training	24.3310±6.16462	10	.415	-21.43	9	.000
Cardiovascular Fitness of Male post Training	87.0540±9.92101	10				

**Table 1:** showing the comparison of male pre and male post training cardiovascular fitness

The results of paired sample t-test among the sampled female respondents in cardiovascular fitness. Before the exercise the cardiovascular mean was 20.45, Standard deviation was 3.15 and after the exercise the cardiovascular fitness of female respondents was increased and reached at mean 85.69, standard deviation 9.20. The relationship between pre and post cardiovascular fitness was positively 48%. The above table indicates that there is significant difference between pre cardiovascular fitness of female and post cardiovascular of female  $t(9) = -25.249$ , sig. = .000 <  $\alpha = .05$ . Hence the hypothesis there is significant difference between the cardiovascular fitness of the female before and after the applying aerobic exercise protocol is hereby accepted.

Testing Variable	Mean±SD	N	R (Pre & Post)	T	Df	Sig.
Cardiovascular Fitness of Female pre Training	20.4570±3.15124	10	.415	-21.43	9	.000
Cardiovascular Fitness of Female post Training	85.6900±9.20962	10				

**Table 2:** showing the comparison of female pre and female post training cardiovascular fitness

The result of one factor ANOVA regarding deference of cardiovascular fitness with reference to the body types (ectomorph, mesomorphs, endomorphs) of male and female students in the department of sports sciences and

Physical Education of Gomal University D.I. Khan. The above figures in the table depicts that Ectomorphs (M=22.848, SD=6.145, n= 7), Mesomorphs (M=21.940, SD= 4.802, n=11) Endomorphs (M=23.300. SD=6.618, n=02), F (2,17)=.091, sig=.914>.05. The data indicates that there is no significant difference in pre training of cardiovascular fitness in respect of body types.

Body Types	N	Mean±SD	Df	F	Sig.
Ectomorphs	7	22.848±6.145	(2,17)	.091	.914
Mesomorphs	11	21.940±4.802			
Endomorphs	2	23.300±6.618			

**Table 3:** showing the pre training difference of cardiovascular fitness of respondents in respect of their body types

The result of one factor ANOVA regarding deference of cardiovascular fitness with reference to the body types (Ectomorph, Mesomorphs, and Endomorphs) of respondents. The Table also indicate that ectomorphs (M=22.848, SD=6.145, n= 7), Mesomorphs (M=21.940, SD=4.802, n=11) Endomorphs (M=23.300. SD=6.618, n=02), F (2,17)=.091, sig=.914>.05. The data indicates that there is no significant difference in pre training of cardiovascular fitness in respect of body types (Ectomorph, Mesomorphs, and Endomorphs) of respondents.

Body Types	N	Mean±SD	Df	F	Sig.
Ectomorphs	7	22.848±6.14529	(2,17)	.091	.914
Mesomorphs	11	21.940±4.80299			
Endomorphs	2	23.300±6.61852			

**Table 4:** showing post training difference of cardiovascular fitness of respondents in respect of their body types

## DISCUSSION

After careful analysis, the researcher found that the percentage of ectomorphs were (35%), mesomorphs were (55%) and endomorphs were recorded (10%). Therefore, majority of subjects were found in good physical status by having BMI ranged from 18 to 24. This finding is supported by that the physical activity or exercise in the youth bring positive change in BMI [16, 17, 19]. In 1958 British birth cohort, BMI increased gradually throughout adulthood. In this study the researcher investigated that proper exercise can brings positive change in body, mass, index (BMI). Exercise helps in maintenance body weight. The author further stated that exercise and body mass index is closely related with exercise. This finding is looked like the finding of the present study. The study concluded that majority of the both male and female subjects during pre-test were found in poor category in term of cardiovascular fitness. The study indicated that majority of the male subjects during post-test were found in average category in term of cardiovascular fitness. This emerging concept is supported [19-21] by concluding that increased level of physical activity level led to rise directly measured highest

aerobic fitness in moderate obese subjects participating in the 6-week exercise. The study found significant difference were found between pre & post cardiovascular fitness of male subject i.e. t (9) = -21.433, sig. = .000 < a = .05. Similarly, significant difference was found between pre & post cardiovascular fitness of female subject i.e. t (9) = -25.249, sig = .000 < a = .05. According to the results of this research study, it may be recommended that the Physical education and exercise must be a necessary subject for all college, school and university level students or the student is necessary to take the subject of physical education and exercise for each year so that their cardiovascular fitness is maintained. The study conducted by [22, 23] found that students of urban have lower levels of cardiovascular fitness as compared with students of rural. Cardiovascular fitness is familiar as a significant component of health and it may be essential for the performance of functional activities. Therefore, this finding is also seemed inline of the present study findings. Demographic perspective of respondents also effects by the exercise adaptation of the subjects. Similarly, body status means body types is very positive influenced by the exercise [20,23].

## CONCLUSIONS

On the bases of analysis and findings the researcher arrived at conclusion that cardiovascular fitness of both male and female students were poor during pre-test and during post-test and found at average category. The body mass index of both male and female may change as a result of exercise and similarly as result of exercise, many of the subjects' changed its body category from endomorph to mesomorph. In addition, the researcher also concluded that exercise effect the heart rate of a person and similarly during pre-test and post-tests of both gender's (male and female) pulse rate were found significantly change, it means that exercise effects the pulse rate of a person.

## Conflicts of Interest

The authors declare no conflict of interest.

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