

# An Analytical Study on Breath Hold Capacity and Respiratory Rate in Performing Floor, Skipping and Combined Aerobic Exercise Program of Female High School Students in Wukro City, Ethiopia

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## Abstract

The purpose of this study was to investigate the analyze of floor, skipping and combined aerobic exercise on physiological variables of wukro high school students and to forward possible solutions. In this study complete experimental design was employed. To select the subjects of the study, simple random sampling technique was used. The study Subjects (n=80) female students in age range from 15-16 were included. The selected samples by simple random sampling technique; the samples were grouped in to four of(n=20)G-1 floor aerobic group,(n=20)G-2 skip aerobic group, G-3 combined aerobic group and (n= 20)G-4 control group. Special training or treatment was provided for groups G-1 and G-2 and G-3 for twelve consecutive weeks and G-4(control group) did not get any special treatment. The selected physiological variables are RHR, and breathe hold. The study period was twelve week and three times per week. The statistical technique used in this study was ANCOVA; post hoc multiple comparisons and Scheffe's Confidence Interval post hoc test at the significant level of 0.05. Beside this to compare the post test results mean difference between the four groups were employed. Result indicated following the treatment of combined aerobic exercise group on physiological variables significantly improved than skip aerobic, floor aerobic group and control group and the mean arterial blood pressure had shown not significant improvement. The result concluded that combined exercise program method shows a better improvement on selected variables due to twelve weeks training program of wukro female students. Finally, based on the findings and conclusions recommendations were forwarded to high school students, physical education teachers, fitness trainers and coaches.

**Keywords:** Aerobic, training, floor, skip, combined. Statistical technique.

## Introduction

<sup>[1]</sup>The word aerobic meaning with oxygen to represent idea Even so the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods

that eat. Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process.

Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time. <sup>[2]</sup> To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise involving large muscle groups, and a cooling down period at the end. <sup>[3]</sup> Aerobic exercise help Proper growth and maintenance of good health, participation in daily physical activities is an essential one: To perform the daily activities in a more efficient manner,

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a condition of muscles, their strength and endurance are essential to man. A muscle must be overloaded in order to be strengthened.

[4] Since different games make different demands up on the organism with respect of neurological, respiratory, circulatory and temperature regulating functions physiological fitness is specific to the activity. Physiological systems are highly adaptable to exercise.

In order to find out the influence of floor aerobic, skip aerobic and combined aerobic exercise on physiological variables, the researcher selected variables resting heart rate, mean arterial blood pressure, breath holding time and respiratory rate.

### Objectives of the Study:

- To assess the effect of floor, skipping and the combined exercise program on the selected breathe holding time
- Compare the fitness level among the three experimental groups and control group based on resting heart rate breathe holding time

### Hypothesis of the research:

**H<sub>1</sub>** It is hypothesized there might be significant differences between the experimental groups and control groups on the resting heart rate and breathe holding time.

## Methodology

**Design of the Study:** The study was formulated as a complete group design consisting of a pre-test and posttest. The subjects (n=80) was randomly assign to four equal groups of twenty female students. The groups were assigned as experimental group I – (floor aerobic exercises), Experimental Group II (skip aerobic exercises) experimental Group III (in both floor aerobic and skip aerobic) and control group respectively. Pre tests were conducted for all the 80 subjects on selected physiological variables. After the experimental period of twelve weeks posttest were conducted and the scores as recorded. The subjects were given respective training three days a week from 6.30 to 7.30 p.m.

**Area of the Study:** Wukro city is located in Tigray Regional of Northern Ethiopia it is found about 826 K.M from Addis Ababa, capital city of Ethiopia and 43 k.m from the capital city of tigray Under the study area there are III high schools (Wukro 2<sup>ry</sup> school, Megabit 30 high schools and Awlaelo 2<sup>ry</sup> school).

**Sample and sampling technique:** According to Tigray educational office in Tigray there are 150 high schools and 53 are in Easter zone from this high school three of them are in wukro city around 4500 regular students found in the schools. The total numbers of female students are 1480. The selection of school was made using purposive sampling technique. Disproportionate stratified sampling technique is employed to allocate subject numbers to each school. The selection of samples was conducted using simple random sampling method. Based on the above information 80 female high school students in the age group 15-16 years old were identified. [5] Sample size determination formula =  $50 + 8m = 74$ , where m=number of independent variables. 7% of the calculated sample is added for contingency for subjects who quite the intervention ( $0.07 \times 74 = 6$ ). Hence, the total sample size is 80.

**Selection of Subjects:** 80 untrained students and free form deformities and ailments were selected from three high schools in wukro. The subjects was from different family background and heterogeneous in their academic activities. The subjects were selected at simple random sampling and the schools selected in purposive method. They were in the age group of 15–16 years.

The subjects are randomly divided in to four groups and each group contains twenty subjects. Group one acted as experimental group one(floor), group two acted as experimental group-two(skip) and group-three acted as combined (floor and skip aerobic) and group four as control group for twelve weeks and the Control group was not exposed to any treatment.

**Analysis of results and discussion of findings:**

**Table 1: Analysis of covariance for pre test, post test and adjusted posttest on respiratory rate experimental groups and control group (scores in numbers per minute)**

Groups	F.A	S.A	COM\G	CONG	SV	Ss	Df	MS	'F' Ratio	Sig
Pre-test Mean SD	41.15	42.45	44.25	40.50	B	164.138	3	54.713	2.686	.001
					W	660.250	76	8.688		
	1.814	2.164	2.124	4.718	Total	824.388	79			
Post-test Mean SD	38.50	38.75	39.40	41.35	B	99.900	3	33.300	10.999*	.000
					W	230.100	76	3.028		
	1.573	1.482	1.698	2.134	Total	330.000	79	330.000		
Adjusted post-test Mean	38.816	38.628	38.672	41.884	B	138.618	3	46.206	22.316*	.000
					W	155.287	75	2.070		

SV- Source of variance, SS – sum of square, df- degree of freedom, MSS- mean sum of square, B=between Means Variance, W=Within Group Variance, \* Significant at 0.05 level of significance, F=Ratio needed for significance at 0.05 level of significance =  $df(3,76) = 2.73$ ,  $df(3, 75) = 2.73$

Table 1 shows that the pretest mean scores of respiratory rate of floor aerobics exercises group was 41.15, skip aerobics group was 42.25, combined aerobics exercises group was 44.25 and control group was 40.50.

The posttest means showed reduction over the pre test scores due to twelve weeks varied aerobic exercises and mean values recorded were 38.50, 38.75, 39.40 and 41.35 respectively. The obtained F value on pre test scores 2.686 was less than the required F value of 2.73 to be significant at 0.05 level. This proved that there was no significant difference among the groups at initial stage and the randomized assignment of the subjects into three groups were successful. [6] The post test scores analysis proved that there was significant difference among the groups, as they obtained F value 10.99 was greater than the required F value of 2.73. This proved that there was significant difference among the posttest means of the

subjects.

To find out the effect of varied aerobic exercises, ANCOVA was calculated. The adjusted mean scores taking into consideration the pre and post test scores among the groups were calculated and subjected to statistical treatment. The obtained F value of 22.361 was greater than the required table F value of 2.73.[7] This proved that there was significant differences among the means due to twelve weeks varied aerobic exercises on physiological variable respiratory rate. since significant improvements were recorded,[8] the results were subjected to post hoc analysis.

**Analysis of Breath Holding Time:** The pre and post test scores of the physiological variable, breath holding time was measured and subjected to statistical treatment. The results on the effect of twelve weeks varied aerobic exercises are presented in Table 2.

**Table: 2 Analysis of covariance for pre test, post test and adjusted post test on breath holding time experimental groups and control group (scores in seconds)**

Groups	F.A	S.A	Comg	Cong	Sv	Ss	Df	Ms	'F' Ratio	Sig
Pre-test Mean SD	56.20	57.55	57.75	57.55	B	30.637	3	10.212	1.737	.167
					W	446.850	76	5.880		
	3.750	1.849	1.773	1.701	Total	477.487	79			
Post-test Mean SD	61.25	63.55	64.05	57.35	B	559.600	3	186.533	20.131*	.000
					W	704.200	76	9.266		
	2.900	3.220	3.034	3.014	Total	1263.800	79			
Adjusted post-test Mean	62.007	63.345	63.703	57.145	B	549.331	3	183.110	28.767*	.000
					W	477.397	75	6.365		

SV- Source of variance, SS – sum of square, df- degree of freedom, MSS- mean sum of square, B=between Means Variance, W=Within Group Variance, \* Significant at 0.05 level of significance, F=Ratio needed for significance at 0.05 level of significance = df (3,76) = 2.73, df (3, 75) = 2.73

Table:2 shows that the pretest mean scores of breath holding time of floor aerobics exercises group was 56.20, skip aerobics group was 57.75, combined aerobics group was 57.75 and control group was 57.55.

The posttest means showed improvement over the pre test scores due to twelve weeks varied aerobic exercises and mean values recorded were 61.25, 63.55, 64.05 and 57.35 respectively.

The obtained F value on pre test scores 1.737 was less than the required F value of 2.73 to be significant at 0.05 level. [9] This proved that there was no significant difference among the groups at initial stage and the randomized assignment of the subjects into four groups were successful.

The post test scores analysis proved that there was significant difference among the groups, as they obtained F value 20.131 was greater than the required F value of 2.73. [9] This proved that there was significant difference among the post test means of the subjects.

To find out the effect of varied aerobic exercises, ANCOVA was calculated. The adjusted mean scores taking into consideration the pre and post test scores among the groups were calculated and subjected to statistical treatment. The obtained F value of 28.767 was greater than the required table F value of 2.73. [10,11] This proved that there was significant differences among the means due to twelve weeks varied aerobic exercises on physiological variable breath holding time. Since significant improvements were recorded

### Discussions on Hypothesis

it was hypothesized that there would be significant differences between the experimental groups and control groups on the selected physiological variables, resting pulse rate, respiratory rate and breathe holding time was accepted at 0.05 level.

### Conclusions

1. Floor aerobic, skip aerobic and combined aerobic exercises significantly influenced on physiological variables: resting pulse rate, respiratory rate and breath holding time except on mean arterial blood pressure.
2. There was no significant alteration by Floor aerobic, skip aerobic and combined aerobic exercises on physiological variable, mean arterial blood pressure.

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