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An Experimental Analysis on the Impact of Aqua Aerobics Activities on Cardiorespiratory Endurance and Vo2max in School Students

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Abstract

The goal of the current study was to determine how aqua aerobics activities improved school students cardio respiratory endurance and vo2max. Twenty (20) male school students, aged 15 to 17, were chosen at random from Christhuraja Higher Secondary School, Palayamkottai, Tirunelveli, Tamil Nadu, India. The chosen participants were randomly assigned to one of two equal categories: the Control Group (CG; N=10) and the Aqua aerobics activities Group (AAAG; N=10). An eight-week aqua aerobics activities regimen has been designed to test the impact of the offered training regimen on school student's cardio respiratory endurance and vo2max. Before and after the six-week aqua aerobics activities programme, the cardio respiratory endurance and vo2max were assessed using the "Cooper 9mins run & walk test and Queen's college step test." We examined and compared the pre-test and post-test scores using the paired sample -'t' test, and to determine the difference between both groups, we employed "ANCOVA" as a statistical analysis. According to the results of this research, school student's cardiorespiratory endurance and Vo2max increased considerably following six weeks of aqua aerobics workouts. However, the control group showed no significant improvement since they did not participate in any particular activities.

Keywords: Aqua Aerobics Activities, Cardio Respiratory Endurance, Vo2max, School students

Introduction

Over the years, there has been a broad suggestion for all individuals to engage in regular physical exercise. Certain constraints, such as obesity, poor levels of physical fitness, mobility issues induced by ageing, orthopaedic or neurological disability, or pulmonary illness, may limit people's capacity to engage in exercise programmes. [1,2].

Given these challenges, health and sports experts have advised water-based workouts as an alternative to typical dry-land exercise, resulting in a large rise in aquatic physical activity [3]. The aquatic environment's features, which limit the influence of body weight on joints and compression forces, lowering the danger of injury or fall, along with the resistance of the water throughout all motions, make it ideal for entire body exercise and injury rehabilitation [4, 5].

Aqua aerobics exercises offer several benefits for male school students. Incorporating these exercises into their routine can promote physical fitness, social interaction, and overall well-being**.** Aqua aerobic exercise has been shown by many studies to be highly effective at reducing pain for patients with arthritis and disabled populations [6], as well as improving vo2max, strength, and balance disorders [7] and has a significant positive psychological effect [8]. Kim, (2008) reported that aqua therapy increases cardiovascular endurance, vo2max, muscle strength, muscle balance and reduces the percentage of body fat [9].

Cardiorespiratory endurance and vo2max plays a crucial role in the overall health and development of male school students. Cardiorespiratory endurance, often simply referred to as "cardio endurance," is a component of physical fitness that relates to the ability of the cardiovascular and respiratory systems to supply oxygen to the muscles during sustained physical activity. It measures how well your heart, lungs, and circulatory system work

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together to provide the necessary oxygen and energy to support physical activities over an extended period of time [10]. VO2 max, or maximal oxygen uptake, is a measure of the maximum amount of oxygen that an individual can utilize during intense exercise. VO2 max is typically expressed in millilitres of oxygen per kilogram of body weight per minute (ml/kg/min) [11].

Purpose of the Study

The study's objective was to determine how the effect of aqua aerobic activities on the cardiovascular endurance and vo2max among the school students.

Methods and Materials

Despite the fact that it employs a quasi-experimental research approach, this study is classified as quantitative research. Based on data analysis using quantitative analysis, the intervention group was assessed by providing them exercise in the form of aqua aerobics activities to increase the ability of the cardio respiratory endurance and vo2max among school students. Twenty (20) male school students, aged 15 to 17, were chosen at random from Christhuraja Higher Secondary School, Palayamkottai, Tirunelveli, Tamil Nadu, India. The chosen participants were randomly assigned to one of two equal groups: the Control Group (CG; N=10) and the Aqua aerobics activities Group (AAAG; N=10). An eight-week aqua aerobics activities regimen has been designed to test the impact of the offered training regimen on school student's cardio respiratory endurance and vo2max. Before and after the six-week aqua aerobics activities programme, the cardio respiratory endurance and vo2max were assessed using the "Cooper 9mins run & walk test and Queen's college step test."

Aqua Aerobics Activities Protocol

The 8-weeks aqua aerobics fitness programme was held. Three days a week for 60 minutes each, the subjects engaged in the session routines. Each session began with a 10-minute warm-up that included exercises like jogging, stretching, walking, and lateral movements. The adaption phase was then followed by 10 minutes of full-body stimulation aerobic exercise (e.g., general exercises for upper and lower limbs simultaneously performed). The major activity, which was separated into two categories and performed for 30 minutes in shallow water (knee to waist level) and deeper water (knee to chest level), was then performed. Typically, the session lasted for 8-minutes of active recuperation. Water aerobics were performed in a swimming pool that was 1.50 m deep and around 29 °C in temperature. The following exercises were given to subjects such as aquatic adaptation & swimming aquatic adaptation, blowing–breathing exercise, floating (working in pairs, curling up, jumping), basic swimming, free style, dumbbell training, movement of the trunk and upper extremities, box training and noodle training.

Statistical Analysis

Significant positive changes occurs in cardio respiratory endurance and vo2max has been found by analysing and comparing the pre-test and post-test score through paired sample 't' test and to find out the difference exists between both groups were analysed through one way ANCOVA at the level of significance at 0.05. The collected data were statistically analysing with use of SPSS 20.1 trail version.

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Analysis of Data

Table-1
Means and Paired Sample-'t' Test for the Pre and Post Tests on Cardio respiratory endurance and Vo2max of Experimental and Control Groups

Criterion variables	Test	Experimental Group	Control Group
Cardio Respiratory Endurance (meters)	Pre test	1504.66	1534.21
	Post test	1783.19	1561.54
	't'-test	**8.24***	1.14
Vo2max (ml/kg/min)	Pre test	24.41	24.82
	Post test	29.28	25.96
	't'-test	**12.11***	0.39

***Significant at .05 level. (Table value required for significance at .05 level for't'-test with df 9 is 2.26)

The table-1 shows that the pre-test mean value of experimental and control groups on cardio respiratory endurance and vo2max were 1504.66 & 1534.21 and 24.41 & 24.82 respectively. The post test mean value of experimental and control groups on cardio respiratory endurance and vo2max were 1783.19 & 1561.54 and 29.28 & 25.96 respectively. The obtained paired sample t-ratio values between the pre and post-test means of experimental and control groups were 8.24 & 1.14 and 12.11 & 0.39 respectively. The required table value for significant difference with df 9 at 0.05 level is 2.26. From the above table the paired sample t-test value of cardio respiratory endurance and vo2max between pre and post-tests means of experimental group was greater than the table value 2.26 with df 9 at .05 level of confidence, it was concluded that the AAAG had significant improvement in the cardio respiratory endurance and vo2max when compared to control group.

Table-2
Computation of Mean and Analysis of Covariance Cardio Respiratory Endurance and Vo2max of Experimental and Control Groups

Adjusted Post Mean	Experimental Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Square	F
Cardio Respiratory Endurance	1801.26	1583.09	BG	395.37	1	395.37	46.08*
			WG	145.86	17	8.58	
Vo2max	30.51	26.14	BG	79.02	1	79.02	19.51*
			WG	68.85	17	4.05	

* Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table-2 shows that the adjusted post-test means values on cardio respiratory endurance and vo2max of experimental and control groups are 1801.26 & 1583.09 and 30.51 & 26.14. The obtained f- ratio of adjusted post-test mean value was 46.08 & 19.51 which was greater than the required table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicated that there was a significant mean difference exist between the adjusted post-test means of experimental and control groups on cardio respiratory endurance and vo2max.

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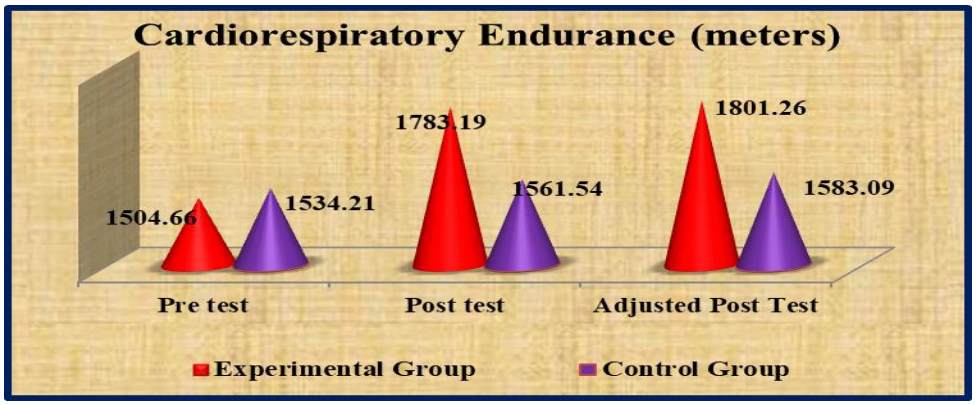

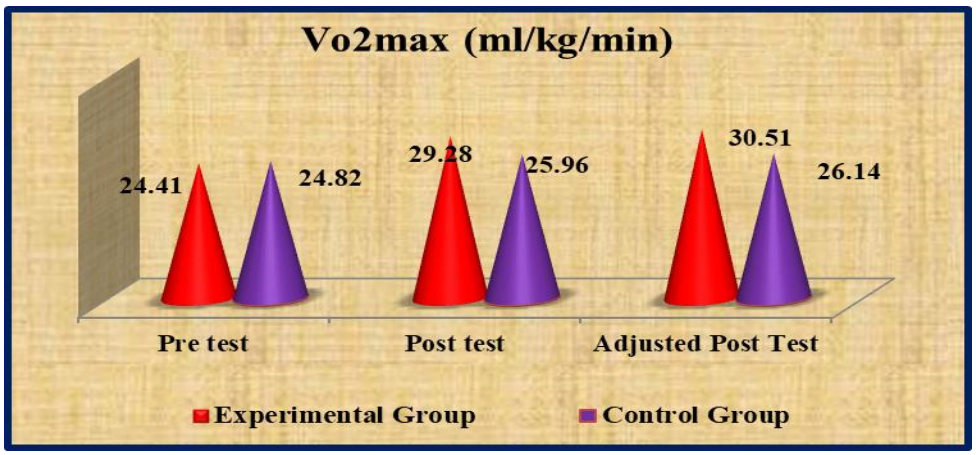

Figure-1 shows that the mean values of pre, post and adjusted post tests on cardio respiratory endurance and vo2max of experimental and control groups.

Discussion on Findings

The goal of the current study was to discover a statistically significant increase in cardio respiratory endurance and vo2max, demonstrating the benefits of aqua aerobics activities for school students. The results below are the same as those in my study by El-Deeb (2017), who looked at the impact of Bulgarian bag exercises on specific physical traits and basketball pivot players' levels of performance. In order for teachers to better comprehend and incorporate these notions for technical consequences of training, these outcomes must be taken into consideration. The impact of Aqua aerobics activities on a few physical characteristics among handball players was studied by Vairavasundaram & Palanisamy (2015). According to the study's findings, the Aqua aerobics activities group and control group had substantial variances from one another. Comparing the Aqua aerobics activities group to the control group, it was clear that they had significantly improved their degree of muscle strength, vo2max, and leg explosive power. The effects of Aqua aerobics activities on selected physical physiological variables, including vital capacity, maximum strength, and balance in intercollegiate handball players, were examined by Vairavasundaram & Palanisamy (2015). The study's findings demonstrated that there were notable level differences between the control group and the Aqua aerobics activities group. When compared to the control group, the Aqua aerobics activities group significantly improved in cardio respiratory endurance and vo2max.

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Conclusions

Due to the impact of school student's aqua aerobics activities practices, there was a significant development in their cardio respiratory endurance and vo2max. On cardio respiratory endurance and vo2max, there were notable variations between AAAG and CG. The control group, however, had not significantly improved on any of the chosen factors.

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