

## Effect of yogic intervention on cardio respiratory fitness of overweight school children

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### Abstract

The word “yoga” comes from a Sanskrit root “yuj” which means union, or yoke, to join, and to direct and concentrate one’s attention. Yoga is an ancient system of Indian philosophy. It has been practiced for health and well-being. Several researches have shown that regular practice of yoga improves health and well-being. The purpose of the present investigation was to look for the effect of yogic intervention on Cardio respiratory fitness of overweight school children. A total of sixty (N =60) subjects were involved for this study. The subjects were randomly selected from the two schools viz. Ghoshpara Saraswati Trust Estate Vidyapith and Ramnagar Milan Bagan Siksha Niketan of the district of Nadia, West Bengal. The age of the subjects for the study was ranged from (12 -15) years. All the subjects were divided into two equal groups, one was the experimental group (n= 30) and another was the control group (n= 30). Yogic training was intervened for 12 weeks on the experimental group from 12-1.30 pm (four days per weeks). But the control group was not involved in the treatment program. VO<sub>2max</sub> was measured by Rockport Walking Fitness Test. The Analysis of co-variance (ANCOVA) was used to analyze the data. The significance of means was tested at p<0.05 level of confidence. For statistical calculations Excel Spread Sheet of windows version 7 was used. Significant improvement was observed in VO<sub>2max</sub> due to the intervention of the structured yogic training program.

**Keywords:** yogic exercises, VO<sub>2max</sub>, rock port walking fitness test

### Introduction

The word “yoga” comes from a Sanskrit root “yuj” which means union, or yoke, to join, and to direct and concentrate one’s attention. Yoga is an ancient system of Indian philosophy. It has been practiced for health and well-being. Several researches have shown that regular practice of yoga improves health and well-being. Yoga employs stable postures or asana and breath control or pranayama. It has already proven its mettle in the improvement of oxidative stress as well as in improving the glycaemic status of diabetics through neuroendocrinal mechanism.

VO<sub>2max</sub> refers to the level of oxygen consumption beyond which no further increase in oxygen consumption occurs with further increase in the severity of exercise. It is expressed as ‘milliliters of oxygen used in one minute per kilogram of body weight’ (ml/kg/min). VO<sub>2 max</sub> is probably the best physiological indicator of a person’s capacity to continue severe work. In sports, where endurance is an important component in performance, such as cycling, rowing, cross-country skiing, swimming and running. Maximal oxygen consumption, or VO<sub>2max</sub>, is the maximal amount of oxygen an individual can bring in and utilize during exercise. Measuring maximal oxygen consumption (VO<sub>2max</sub>) via Rockport Walking Fitness Test is a popular procedure for testing an individual’s cardio respiratory fitness and providing subsequent information for the design of exercise prescription or exercises training. Rockport Walk Fitness Test is the maximal paced 1-mile walk test, which is an acceptable field test to measure CRF through the estimation of maximal

oxygen consumption (VO<sub>2max</sub>) for school aged individuals in large groups and is easy to administer with minimal requirements. Cardio respiratory fitness (CRF) or VO<sub>2max</sub> reflects the functional capabilities of the heart, blood vessels, blood, lungs, and relevant muscles during various types of exercise demands. CRF is related to the ability to perform large muscle, dynamic, moderate-to-high intensity exercise for prolonged periods. So the researcher tried to unveil the effect of yoga on cardio respiratory fitness in terms of VO<sub>2max</sub> through assessing by Rockport Walking Fitness Test.

### Materials and Methods

A total of sixty (N =60) subjects were selected for this study. The subjects were randomly chosen from the two schools viz. Ghoshpara Saraswati Trust Estate Vidyapith and Ramnagar Milon Bagan Siksha Niketan of the district of Nadia, West Bengal. They were divided into two equal groups, each group was consisted by thirty (n= 30) students, Experimental Group (G<sub>E</sub> = 30) & Control Group (G<sub>C</sub> = 30). The age of the subjects for the study was ranged from (12 -15) years. VO<sub>2max</sub> was measured by Rockport Walking Fitness Test. The formula for calculating VO<sub>2max</sub> was [VO<sub>2max</sub> = 132.853 - (0.0769 x weight in kg. /pounds) - (0.3877 x age) + (6.315) - (3.2649 x walking time) - (0.1565 x heart rate)]. The experimental group was intervened through a scientifically structured yogic training program (Shown below) for 12 weeks where as the control group was free from intervention of yogic training. Both groups were engaged in their regular academic program which was not under the control of the researcher. To find out

significant difference in  $VO_{2max}$  between the pre and post intervention of yogic treatment ANCOVA was used. The significance of means were tested at  $p < 0.05$  level of

confidence. For statistical calculations Excel Spread Sheet of windows version 7 was used.

**Table 1:** Training Program and Schedule

Sl. No.	Name	Duration
1.	Asanas	90 minutes
	(a) Suryanamaskar (b) Trikonasana (c) Twisting pose (d) Dhanurasana	
	(e) Salabhasana (f) Pawanmuktasana (g) Utkatasana (h) Paschimatanasana	
	(i) Ardha-matsyendrasana (j) Halasana (k) Naukasana (l) Bhujangasana	
2.	Pranayama	
	(a) Kapalavhati (b) Anulom-Vilom (c) Bhastrika (d) Bhramari	

**Results**

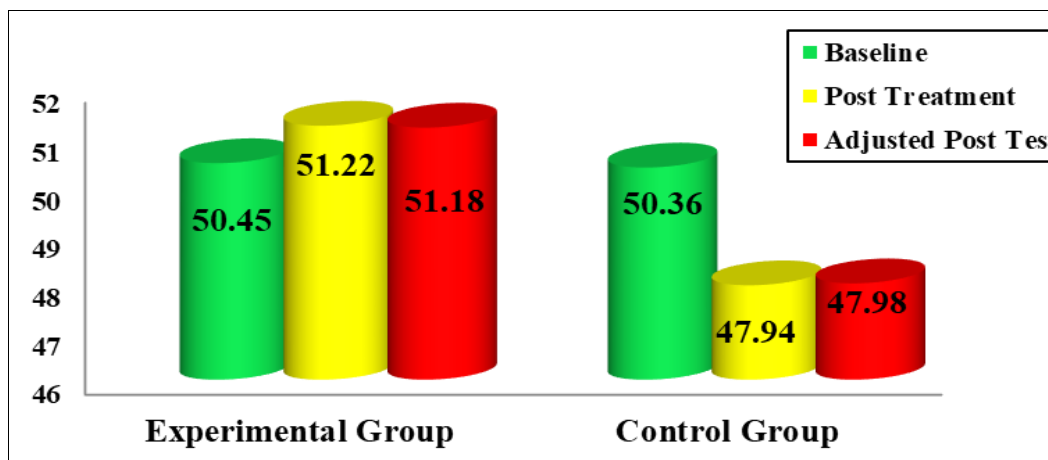
**Table 2:** Analysis of Covariance of  $VO_{2max}$  for Experimental Group and Control Group

Name of the variables	Test		Experimental Group	Control Group	Source of variance	Sum of squares	df	Mean squares	'F' Ratio	
$VO_{2max}$ (ml/kg/min)	Baseline	Mean ± SD	50.45 ± 4.15	50.36 ± 3.11	Between	0.13	1	0.13	0.009	
					Within	779	58	13.43		
	Post Treatment	Mean ± SD	51.22 ± 4.16	47.94 ± 3.14	Between	162.03	1	162.03	11.914	
					Within	788.80	58	13.60		
	Adjusted post test	Mean		51.18	47.98	Between	154.15	1	154.15	42.556
						Within	206.47	57	3.62	

$F(0.05) (1, 58 \text{ and } 1, 57) = 4.01$ , \*Significant at 0.05 level of confidence.

Table 2 shows that the Pre-test i.e. the Baseline means in Cardio respiratory fitness in terms of  $vo_{2max}$  of the Experimental Group and Control Group were 50.45 ml/kg/min and 50.36 ml/kg/min respectively, resulted in an 'F' ratio of 0.009, which indicated that statistically no significant difference was existed between the Baseline means at 0.05 level confidence. The Post-test means in Cardio respiratory fitness in terms of  $vo_{2max}$  of the Experimental Group and Control Group were 51.22 ml/kg/min and 47.94 ml/kg/min respectively, resulted in an 'F' ratio of 11.914, which indicated that statistically significant difference was existed between the Post-test means at 0.05 level confidences. The adjusted post-test means of Cardio respiratory fitness in terms

of  $vo_{2max}$  of the Experimental Group and Control Group were 51.18 ml/kg/min and 47.98 ml/kg/min respectively. The obtained F-ratio value was 42.556, which was higher than the table value 4.01 with df (1, 57) required for significant at 0.05 level. It indicates that there was a significant difference among the adjusted post-test means of Cardio respiratory fitness in terms of  $vo_{2max}$  of the Experimental Group and Control Group. Thus Cardio respiratory fitness in terms of  $vo_{2max}$  significantly reduced in the Experimental Group due to the intervention of structured yogic practices for 12 weeks. The Pre-Test, Post-Test and Adjusted Post-Test mean values of Experimental and Control Group on Cardio respiratory fitness in terms of  $vo_{2max}$  are graphically presented in Fig -1.



**Fig 1:** Mean value of BMI (kg/m2) in Baseline, Post Test and Adjusted Post Test for Experimental Group and Control Group

**Discussion**

It can be concluded from the above findings that structured

yogic practices for twelve weeks improves Cardio-respiratory fitness. Yogic Exercises done for one hour daily including

asanas, breathing exercises and pranayamas seems to improve VO<sub>2</sub> max. Doijad *et al.* (2013) <sup>[5]</sup>, it was found that regular Yoga training for 3 months improves the VO<sub>2</sub> max in females. Sreehari *et al.* (2013) <sup>[6]</sup>, the yoga practices groups showed significant improvement in, cardio respiratory endurance. Vinu (2015) <sup>[4]</sup>, observed significant difference between the posttest and adjusted posttest of vital capacity. Sekhon & Shelvam (2016) <sup>[8]</sup>. Thus this study suggests that regular yoga practice improves cardio respiratory fitness overweight school boys. Research on particular set of Yogic exercises like only selected asanas or pranayama is required and also further research with large sample size and for varied age groups is required for applying these results to population in general.

### Conclusion

On the basis of the interpretation of the data, the following conclusions were

1. There was a significant improvement in cardio respiratory fitness of overweight school children.
2. The improvement took place due to participating in structured yogic training for twelve weeks.

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