

## **Effect of Yoga Practices on Respiratory Function and Cardiovascular Endurance of School Going Girls**

**Dr. Sopan Kangane:** Associate Professor, M. Ms. Chandrashekar Agashe college of Physical Education, Pune-37, Maharashtra (India)

**Sharwan Kumar:** Research Scholar M. Phil., SMYM Samiti's Scientific Research Department, Kaivalyadham, Lonavla, Pune, (India)

### **Abstract**

The present study was undertaken with a purpose to evaluate the **Effect of Yoga Practices on Respiratory Function and Cardiovascular Endurance of School Going Girls**. Forty girls subjects (n=40) were selected **randomly** from S. Y. S, Vidyalaya, Aundh (Satara) for this study. The subject's age group was ranging from **14 to 15 years**. The selected forty students were then again randomly assigned into **two equal groups**, viz., one experimental group (Group A; n1=20) and one control group (Group B; n2=20). The researcher made sure that the entire subjects were **medically fit**. All the subjects of experimental and control groups were exposed to different **physiological tests** viz., PEFR, and Harvard Step test to record the pre test data.

After completion of pre test, all the subjects of experimental group exposed to **6 weeks** Yoga training for **two hours daily** in the **morning 7.15 am to 8.15 am & evening 5.30 pm to 6.30 pm** except Sundays and Holidays. After 6 weeks post test was conducted. **Descriptive statistics** have been applied to process the data prior to employing inferential statistics **2 x 2 x 2 Factorial ANOVA**. Further, **Scheffe's post hoc** test was employed to record comparative effects of Yoga training on Respiratory function and Cardiovascular Endurance of school going girls. The result summarized that the Yoga training has **significant effects** for improving **Respiratory function and Cardiovascular Endurance** of school going girls.

**Key words:** Yoga, Pranayama, Respiratory function, Cardiovascular Endurance, Peak Expiratory Flow Rate & Harvard step test.

### **Introduction**

The current research studies conducted earlier show there is a youth fitness crisis. Our nation's adolescents have increased risk of heart disease as indicated through too much body fat deposition, elevated blood pressure, high cholesterol, and poor fitness caused by lack of exercise. If things do not change, our nation's precious asset, the adults of tomorrow, will likely to have health problems related to heart and lungs.

Nevertheless, to reduce the risk of heart and lungs problems of our youth it is essential to improve cardiovascular endurance and respiratory functions. Hence, this study on Pranayama-being a non-invasive, drugless, and non-expensive technique has been undertaken.

As a technique, Pranayama can assume rather complex forms of breathing, but the essence of the practice is slow and deep breathing. Such breathing is essential because it reduces dead space ventilation. It also refreshes air throughout the lungs, in contrast with shallow breathing that refreshes air only at the base of the lungs (**Bijlani, 2004**). Pranayama breathing has been shown to alter automatic activity. A study by **Udupa, et. al., (1975)** indicates that Pranayama training produces a decrease in basal sympathetic tone.

**Raghuraj, et. al., (1985)** have reported that Nadi-Shodhan Pranayama increases parasympathetic activity. Slow and deep breathing itself has a calming effect on the mind and

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helps an individual to distress (Sandeep, et. al., 2002). This calming effect may also exert profound physiological effects on pulmonary, cardiovascular, and mental functions of the brain.

The practice of breathing exercises like Pranayama is known to improve automatic function by changing sympathetic or parasympathetic activity. In one of the study **Harinath, et. al., (2004)**. Found that Yogic practices for 3 months resulted in an improvement in cardio respiratory performance and psychological profile. These observations suggest that Yogic practices can be used to promote or enhance cardiovascular efficiency in adolescents. Given this, the investigators sought to study the **Effect of Yoga Practices on Respiratory Function and Cardiovascular Endurance of School Going Girls.**

### Material and Methods

The present study was undertaken with a purpose to evaluate the **Effect of Yoga Practices on Respiratory Function and Cardiovascular Endurance of School Going Girls.** Forty girls subjects (n=40) were selected **randomly** from S. Y. S, Vidyalaya, Aundh (Satara) for this study. The subject's age group was ranging from **14 to 15 years**. The selected forty students were then again randomly assigned into **two equal groups**, viz., one experimental group (Group A; n1=20) and one control group (Group B; n2=20). The researcher made sure that the entire subjects were **medically fit**. All the subjects of experimental and control groups were exposed to different **physiological tests** viz., PEFR, and Harvard Step test to record the pre test data.

After completion of pre test, all the subjects of experimental group exposed to **6 weeks** Yoga training (Table 1) for **two hours daily** in the **morning 7.15 am to 8.15 am & evening 5.30 pm to 6.30 pm** except Sundays and Holidays. After 6 weeks post test was conducted.

**Table1. Yoga Training**

WEEK	REPETATION ROUND	TRAINING / ACTIVITY
1 <sup>st</sup>	15 min. 20 min. 10 min. 5 min (2-10 Rounds) 4 min (2-5 Rounds) 4 min 2 min (5-10 Rounds)	Prayer, Introduction about Pranayama & Yoga Asana* Demonstration & practice of Pranayama Kapalbhati Anulom-Viloma Deep breathing Om Recitation
2 <sup>nd</sup> & 3 <sup>rd</sup>	10 min. 20 min. 25 min. 5 min.	Prayer, Introduction about Pranayama Asanas* & relaxation Kapalbhati Kriya 25, Anulom-Viloma 6 to 10, Ujjayi 10 to 25 Bhashrika 6 to 8, Bhramari 10 to 15 Om Recitation
4 <sup>th</sup> to 6 <sup>th</sup>	15 min. 40 min. 5 min.	Prayer, Asanas* & relaxation Kapalbhati Kriya 25-50, Anulom-Viloma 25-50, Ujjayi 20 to 25 Om Recitation (*For preparing a body for Pranayama practice)

Sufficient time was given for relaxation after Pranayama practices.

### Results:

**Descriptive statistics** have been applied to process the data prior to employing inferential statistics **2 x 2 x 2 Factorial ANOVA**. Further, **Scheffe's post hoc** test was employed to record comparative effects of Yoga Practices on Respiratory Function and Cardiovascular Endurance of School Going Girls.

**Table 2 Analysis of Descriptive Data, Mean & SD**

Variables	Experimental Group		Control Group	
	Pre	post	Pre	post
PEFR (Lit. / min.)	341.75	365.25		343.46
344.25	(20.46)	(22.34)		(21.31)
(27.38)				
C. V. Endurance (Index)	44.98	53.58	41.15	43.06
(9.21)	(6.57)	(7.43)		(5.25)

The information as obtained from the Table 2 revealed that the training intervention i.e. Yoga training may have better treatment effect than the controls in improving Respiratory function and C. V. Endurance in school going girls.

**Table 3 Result of ANOVA**

Source of variation	SS	df	MS
F			
Total	2781.95	20	----
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Dependant Variable	826.94	1	826.94
54.62*			
Subject's Group	533.82	1	533.82
36.58*			
Interaction	1194.09	3	398.03
26.29*			
Error	227.10	15	15.14
	**p < 0.01		*p < 0.05

The result of analysis (ANOVA) as presented in Table 3 revealed that the achievement scores in the selected dependent variables of among two groups were significantly different (F=54.62, p<0.01). The impact of such statistical differences has also been evidenced in the case of group comparison (F=36.58, p<0.05). This indicates, the interaction was not statistically significant (F=26.29, p>0.05). However, employing Scedge's Post Hoc technique, the specific variables were identified, which showed significant changes as a result of Yoga training intervention.

The result helps to interpret that the selected Yoga training intervention perhaps helped to train the respiratory muscles and might have improved the functional ability of inter-costal

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muscles. This in turn helped to improved PEFR (CD=0.63,  $p<0.05$ ) of school going girls. Thus, Yoga has significant effects for improving PEFR.

The result helps to interpret that although the selected Yoga practices could train the respiratory muscles, they might have opened micro circulation in cardiac muscles and, therefore, cardiovascular Endurance of the selected school going girls might have improved. Thus, Yoga has significant effects (CD=0.40,  $p<0.05$ ) in improving cardiovascular Endurance of the selected school going girls.

### **Discussion**

Pranayama, in fact, voluntary controls one's breathing that in turn influences the respiratory functions. Although breathing is an autonomic activity controlled by autonomic nervous system (ANS) and no voluntarily control over one's respiratory system is possible, however, Pranayama can do this deliberately. The result of the present study evidenced the same, because Yoga training improves one's PEFR. This supports that Pranayama might have improved lungs function ability.

The result of Yoga on cardiovascular endurance revealed similar result as it was evident in case respiratory function with special reference to PEFR.

Overall result helps to interpret that the training of Yoga improves both PEFR and Cardiovascular Efficiency of the school going girls.

### **Conclusion**

Based on the results, this study concludes that, Yoga training was found effective in improving functional abilities of lungs and heart as indicated by improved Peak Exploratory Rate (PEFR) and Cardiovascular Endurance.

### **References**

- Dikshit, M. B., et. al., (1991). Peak Exploratory Rates in Elderly Indians. *Indian Journal of Physiology and Pharmacology*. 35, 1, pp.39-43.
- Frostell, C. et. al., (1985). Effect of high frequency breathing on pulmonary ventilation and gas exchange. *Proceeding ICVR*, 15, pp.125-130.
- Jain, N., et. al., (2005). The effects of right and left nostril breathing on cardio respiratory and autonomic parameters. *Indian Journal of Physiology and Pharmacology*. 49, 4, pp. 469-474.
- Joshi, L. N., et. al., (1992). Effects of short tem Pranayama on ventilator functions of lung. *Indian Journal of Physiology and Pharmacology*. 36, 1, pp.105-108.
- Pal, G. K., et. al., (2004). Effects of short term practice of breathing exercises on autonomic functions in normal human volunteers. *Indian journal of Medical Research*, 120, 2, pp. 115-121.
- Upadhyay, et. al., (2008). Effects of alternate nostril breathing exercise on cardio respiratory functions. *Nepal medical college journal*, 10, 1, Pp. 25-27.
- Vyas, R. & Dikshit, N. (2002). Effect of meditation on respiratory system, cardiovascular system, and lipid profile. . *Indian Journal of Physiology and Pharmacology*. 46, 4, pp.487-491.