

## EFFECT OF PRANAYAMA PRACTICES ON MEAN ARTERIAL PRESSURE AND VO<sub>2</sub>MAX AMONG WOMEN CRICKETERS

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### **Abstract**

The purpose of the study was to investigate the changes on mean arterial pressure and VO<sub>2</sub>max after twelve weeks of pranayama practices among women cricketers. To achieve the purpose of the study, thirty women cricketers from Annamalai University, Chidambaram, Tamilnadu, India were selected as subjects at random in the age group of 18 years to 25 years. The selected subjects were randomly assigned into two groups of 15 each, in which, group – I (n = 15) underwent pranayama practices, group – II (n = 15) acted as control which did not participate in any special training. The training programme was carried out six days per week for twelve weeks. Prior to and after the training period the subjects were tested for mean arterial pressure and VO<sub>2</sub>max. Mean arterial pressure was assessed by digital blood pressure monitor and VO<sub>2</sub>max was measured by one mile run test. The statistical tool used for the present study was 't' ratio and ANCOVA. The result of the study reveals significant changes on mean arterial pressure and VO<sub>2</sub>max of the women cricketers after twelve weeks of pranayama practice.

**Keywords:** *Pranayama practice, mean arterial pressure and Vo<sub>2</sub>max*

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### **INTRODUCTION**

Cricket has long tradition as well as proud history, but also is a game without any training culture. It has often been said that to get fit for Cricket one should play Cricket. This has always been enough in the past for Cricketers at all levels and is perhaps a sound base on which to develop a player's level of fitness. However, in recent years modern Cricket has woken up to the benefits of well trained and conditioned athletes. Even more recently, the advent of Cricket-specific training is producing stronger, faster and more agile players than ever before. Hence, physical conditioning in Cricket is extremely important for top performance, so the correct approach to training should be based on the knowledge of the specific requirements of the performance and on the development of specific training means.

Yoga exercises become more comfortable and powerful when inhalation and exhalation flow freely. The subtle flowing of air into and out of the nose stimulates a relaxation response, which directly affects the brain and nervous system. Breathing through the nose also warms and filters the air further reducing its impact upon the nervous system. Normal breathing oxygenates our blood and removes the noxious by products of metabolism and respiration. Controlled yoga breathing (pranayama) when appropriately practiced accelerates this process. Substantial research has been conducted to look at the health benefits of yoga from the yoga postures (asanas), yoga breathing (pranayama), and meditation. The information on yoga poses and benefits are grouped into three categories such as physiological, psychological, biochemical effects. Furthermore, scientists have laid these results against the benefits of regular exercise. Practicing yogasana, an individual can remain cool, calm quiet in terms of physical as well as mental (Jain, 2003).

Pranayama means control of life force through the art of breathing. Pranayama is the fourth post of the eight fold yoga described in the yoga sutra of patanjali. Iyengar describes Pranayama as follows. "Prana" means breath, respiration, life, vitality energy or strength when used in the plural, it denotes certain vital breaths or currents of energy (Prana-vayus) "ayama" means stretch, extension, expansion, length, breath, regulation, prolongation, restraint of control. 'Pranayama' thus means the prolongation of breath and its restraint. Pranayama is an art and has techniques to make the respiratory organs to move and expand intentionally, rhythmically and intensively. It consist of long sustained suitable flow inhalation (puraka), exhalation (recaka) and retention of breath (Kumbhaka). Puraka stimulates system: recaka throws out vitiated our and toxins; kumbhaka distributes the energy throughout the body.

The exercises of pranayama the correct breathing technique helps to manipulate our energies. Most of us breathe incorrectly, using only half of our lung capacity. Pranayama is a technique, which re-educates our breathing process, helps us to release tensions and develop a relaxed state of mind. It also balances our nervous system and encourages creative thinking. In addition, by increasing the amount of oxygen to our brain it improves mental clarity, alertness and physical well being. When practiced along with yogasanas the benefits of pranayama are more pronounced. According to Patanjali's Yoga Sutra, pranayama enables the mind to acquire the capacity to concentrate on any given object of attention. It also says that scientific breathing helps in unveiling true knowledge from the darkness of ignorance. But it is eminently advisable

to be aware of all the do's and don'ts of pranayama before practicing them. By considering the above literature, an attempt has been made to analyze the changes on mean arterial pressure and  $VO_2\text{max}$  due to the effect of performing pranayama practices in women cricket players.

## **METHODOLOGY**

### **Subjects and Variables**

To achieve the purpose of the study, thirty women cricketers from Annamalai University, Chidambaram, Tamilnadu, India were selected as subjects at random in the age group of 18 years to 25 years. The selected subjects were randomly assigned into two groups of 15 each, in which, group – I (n = 15) underwent pranayama practices, group – II (n = 15) acted as control which did not participate in any special training. The training programme was carried out three days per week for twelve weeks (alternative days). Prior to and after the training period the subjects were tested for mean arterial pressure and  $VO_2\text{max}$ . Mean arterial pressure was assessed by digital blood pressure monitor and  $VO_2\text{max}$  measured by one mile run test.

### **Training Program**

During the training period, the experimental groups underwent pranayama practices six days a week for twelve weeks. The pranayama exercise included in this training program were Bhastrika Pranayama, Kapalbhata Pranayama, Bahya Pranayama, Anulom Vilom Pranayama, Bhramari Pranayama, Udgeeth pranayama, Pranav Pranayama respectively. The training program was conducted in the morning sessions from 6 `O`clock onwards.

### **Statistical Procedure**

The data collected from the experimental and control groups on selected dependent variables was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. In order to nullify the initial mean differences the data collected from the two groups prior to and post experimentation on selected dependent variables were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). In all the cases the level of confidence was fixed at 0.05 level for significance.

### **Results**

The pre and post test data collected from the experimental and control groups on mean arterial pressure and  $VO_2\text{max}$  were statistically analyzed by dependent 'T' test and the results are presented in table-I.

Table-I: Analysis of 'T' Test on Mean Arterial Pressure and VO<sub>2</sub>max of Experimental and Control Groups

Group	Test	N	Mean	SD	DM	't' - ratio
<b>Mean Arterial Pressure</b>						
<b>Pranayama Practice</b>	Pre Test	15	87.26	1.75	4.26	7.24*
	Post Test	15	83.01	1.46		
<b>Control Group</b>	Pre Test	15	87.20	1.37	0.13	0.25
	Post Test	15	87.33	1.54		
<b>VO<sub>2</sub>max</b>						
<b>Pranayama Practice</b>	Pre Test	15	28.20	0.77	2.66	9.07*
	Post Test	15	30.86	0.83		
<b>Control Group</b>	Pre Test	15	28.46	0.63	0.20	0.74
	Post Test	15	28.66	0.81		

\* Required table value for significance at 0.05 level of confidence for df of 14 is 2.15

\*Significant at .05 level of confidence

The obtained 't' ratio value is 7.24 of mean arterial pressure was greater than the required table value of 2.15 for the degrees of freedom 14 at 0.05 level of confidence. Hence it was concluded that due to the effect of twelve weeks of pranayama practice the mean arterial pressure of the subjects was significantly reduced.

The obtained 't' ratio value is 9.07 of VO<sub>2</sub>max was greater than the required table value of 2.15 for the degrees of freedom 14 at 0.05 level of confidence. Hence it was concluded that due to the effect of twelve weeks of pranayama practice VO<sub>2</sub>max of the subjects was significantly improved.

The pre and post test data collected from the experimental and control groups on mean arterial pressure and VO<sub>2</sub>max were statistically analyzed by ANCOVA and the results are presented in table- II

Table-II: Analysis of Covariance on Mean Arterial Pressure and VO<sub>2</sub>max of Experimental and Control Groups

	Pranayama Practice	Control Group	S o V	SS	df	MS	'F' ratio
<b>Mean Arterial Pressure</b>	83.02	87.37	B	154.68	1	154.68	34.91*
			W	119.64	27	4.431	
<b>VO<sub>2</sub>max</b>	30.84	28.69	B	121.87	1	121.87	99.08*
			W	33.27	27	1.23	

(The required table value for significance with degrees of freedom 2 & 41 is 4.21)

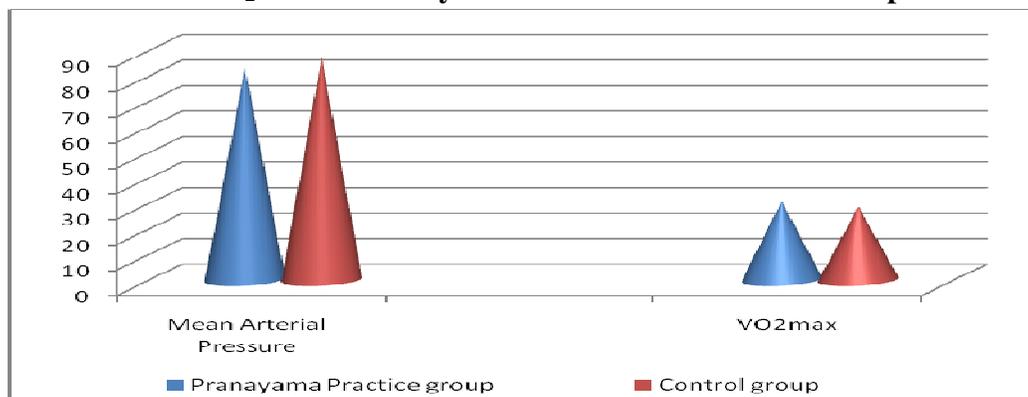
\*Significant at .05 level

The adjusted post test means on mean arterial pressure of pranayama practice and control groups are 83.02 and 87.37 respectively. The obtained 'F' ratio value of 34.91 on mean arterial

pressure were greater than the required table value of 4.21 for the degrees of freedom 1 and 27 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post test means of experimental and control groups on mean arterial pressure.

The adjusted post test means on  $VO_2\max$  of pranayama practice and control groups are 30.84 and 28.69 respectively. The obtained 'F' ratio value of 99.08 on  $VO_2\max$  were greater than the required table value of 4.21 for the degrees of freedom 1 and 27 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post test means of experimental and control groups on  $VO_2\max$ .

**Figure- I: The Adjusted Post Test Means on Mean Arterial Pressure and  $VO_2\max$  of Pranayama Practice and Control Groups**



## Discussion

Pramanik et al., (2009) found that both the SBP and DBP decreased significantly with a slight fall in heart rate after slow bhastrika pranayamic breathing for 5 minutes. Thus, the previous researches proved that yogasana and pranayama had significant influence on systolic blood pressure and the present result, is in conformity with the previous researches done by Yang et al., (2009) and Pramanik et al., (2009). Upadhyay et al., (2008) found that Pranayama (breathing exercise) significantly decreases the PR, RR and DBP. Different types of pranayams practices produce different physiological responses (Madanmohan et al., 2008). It is in conformity to the findings of Usha and Rajesh (2002), who found considerable improvement in pulse rate and other physiological variables after ten weeks of asanas programs. The development of physiological variables through yoga training is supported by the findings of Telles et al., (1997); Cox et al., (2001); Rigla et al., (2000); and Dengel et al., (1998).

## CONCLUSION

It was concluded that the selected dependent variables such as mean arterial pressure and  $VO_2$ max of the women cricketers were significantly altered due to pranayama practices. From the results of the present study and literature, it could be concluded that pranayama practices are not only effective in relaxation and stress management but also have a greater role in improving physiological parameters.

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