



IMPACT OF YOGIC PRACTICES AND AEROBIC TRAINING ON PACKED CELL VOLUME AMONG MIDDLE AGED WOMEN

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Abstract

Purpose of this study was to finding out the impact of yogic practices and aerobic training on packed cell volume among middle aged women. To achieve the purpose of this study, 45 middle aged women were selected randomly as subjects. Their age ranged between 35 and 45 years. The subjects were teachers of different schools in Ananthapuramu town, Ananthapuramu (Dist.), Andhra Pradesh, India. Packed cell volume was selected as dependent variable for the study. The selected subjects were divided into two experimental groups and a control group with fifteen subjects in each (n=15). Experimental Group I (YPG) underwent yogic practices, Group II (ATG) underwent aerobic training and Group III served as control group (CG) for the training period of 12 weeks. The data on selected dependent variable for pre and post tests were collected two days before and two days after the training programme respectively. Wintrobe Hematocrit Method with the blood samples collected from every subject assessed the data on packed cell volume. Fasting blood samples from every subject was taken in the morning to assess the packed cell volume and was assessed in the Care Diagnostic Centre, Ananthapuramu, Andhra Pradesh, India. The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance (ANCOVA). Whenever the F ratio was found to be significant, Scheffe's test was used as post hoc test to determine which of the paired means differed significantly. In all cases, the criterion for statistical significance was set at 0.05 level of confidence ($P < 0.05$). It was found that systematic and well planned yogic practice and aerobic training programs significantly increased the packed cell volume in middle aged women.

Keywords: *Yogic Practices, Aerobic Training, Middle Aged Women, Packed Cell Volume.*

Introduction

"To keep the body in good health is a duty... otherwise we shall not be able to keep our mind strong and clear."

~ **Buddha**

Human lifespan undergoes a series of developmental periods and changes right from conception to death. Each period has its own characteristic strategies that show a rational impact on physical, physiological, psychological, emotional and nutritional status of an individual irrespective of age and gender. The word Yoga is derived from Sanskrit root 'Yuj', means to bind and yoke (**Iyengar, 1996**). It is true union of our will with the will of God. Our ancient stages have suggested eight sages of yoga to secure purity of body, mind, soul and final communion with God. The present age of speed and competition has increased the stresses and strains. It is resulting in lifestyle related health problems such as obesity, diabetes mellitus, hypertension and coronary artery disease (**Deshpande, et al., 2008**).

Yoga and pranayama can solve the above health problems by free of cost. Hence, yoga and pranayama has been incorporated into modern medicine during recent decades. Pranayama is the art of prolongation and control of breath that helps in bringing conscious awareness to breathing and reshaping habits and patterns (**Ankad, et al., 2011**). Asanas is a state of being, and by definition, there could be thousands of probable states, which one can achieve. Pathanjali has defined asana 'Sthir Sukha Asanam' that is 'Asana means steady and comfortable posture (**Jack Peter, 2006**). Aerobic is a new work, but not a new Idea (**Jackson, 1985**). Aerobic refers to a variety of activities like walking, jogging and running for a measured time. These produce beneficial changes in the body, especially the action of the lungs, heart and blood circulation (**Mitchell and Dalc, 1980**).

Aerobic exercise is the 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. They are several kinds of aerobic exercise which are performed at moderate levels of intensity for extended periods of time. 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 (**Kenneth, 2009**).

Physical fitness as defined by the World Health Organizations (**WHO**) is "the ability to perform muscular work satisfactorily". Physical fitness is the ability of an individual to live and lead a balanced life. It involves physical, mental, emotional, and spiritual factors and the capacity for their wholesome knowledge (**Charles A Bucher, 1991**). Training is a pedagogical



process, based on scientific principles, aiming at preparing sportsmen for higher performances in sports competitions (**Hardayal Singh, 1993**). Regular exercise results in an increase in the blood flow and improves oxygen carrying, waste removal capacity, and further increases workload capacity (**Frank Vitale, 1973**).

Packed cell volume (PCV) is the percentage of red blood cells in circulating blood. A decreased Packed Cell Volume generally means red blood cell loss from any variety of reasons like cell destruction, blood loss and failure of bone marrow production. An increased Packed Cell Volume generally means dehydration or an abnormal increase in red blood cell production. The total volume of blood cells packed in a tube by centrifugal force is called packed cell volume (**Suad Y Alkarib, et al., 2017**).

Accordingly, the investigator attempts to study the impact of yogic practices and aerobic training on packed cell volume of middle aged women.

Methodology

The present study was to find out the impact of yogic practices and aerobic training on packed cell volume among middle aged women. To achieve the purpose of this study, 45 middle aged women were selected randomly as subjects. Their age ranged between 35 and 45 years. The subjects were teachers of different schools in Ananthapuramu town, Andhra Pradesh, India and hence there was no difference in routine life pattern and hence were considered as a homogeneous group. The selected subjects were divided into two experimental groups and a control group with fifteen subjects in each (n=15). Experimental Group I (YPG) underwent yogic practices, Group II (ATG) underwent aerobic training and Group III served as control group (CG) for the training period of 12 weeks. The subjects of the control group were not allowed to participate in any of the training programme except in their routine activities. Among various hematological variables, packed cell volume was selected as dependent variables for the study.

During the training period, the experimental groups underwent their respective training programme three days per week on alternate days for twelve weeks in addition to their regular daily activities. Before the commencement of the experimentation and at the middle of the training period (after sixth week), the investigator recorded the target heart rate tests for aerobic training group subjects. The data on selected dependent variable for pre and post tests were collected two days before and two days after the training programme respectively.

Wintrobe Hematocrit Method assessed the data on packed cell volume with the blood samples collected from every subject. Fasting blood samples from every subject was taken in the morning to assess the packed cell volume and was assessed in the Care Diagnostic Centre, Ananthapuramu, Andhra Pradesh, India. The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance (ANCOVA). Whenever the F ratio was found to be significant, Scheffe's test was used as post hoc test to determine which of the paired means differed significantly. In all cases, the criterion for statistical significance was set at 0.05 level of confidence ($P < 0.05$).

Results

The analysis of covariance on the data obtained for packed cell volume of pre test, post test and adjusted post test of yogic practices, aerobic training and control groups are presented in table 1.

Table 1: Analysis of Covariance for the Pre Test, Post Test and Adjusted Post Test Data on Packed Cell Volume of Yogic Practices, Aerobic Training and Control Groups

Tests / Groups		Yogic Practices Group	Aerobic Training Group	Control Group	SOV	Sum of Squares	df	Mean Squares	F ratio
Pre Test	\bar{X}	43.98	43.58	43.79	B	1.58	2	0.78	0.06
	σ	3.58	4.04	2.32	W	698.26	57	12.23	
Post Test	\bar{X}	48.85	49.35	43.96	B	354.35	2	177.17	27.39*
	σ	2.90	1.96	2.42	W	368.62	57	6.45	
Adjusted Post Test	\bar{X}	48.80	49.40	43.96	B	356.12	2	178.05	31.61*
					W	315.37	56	5.61	

*Significant at 0.05 level of confidence.

SOV: Source of Variance; B: Between, W: within

(The Table value for significance at 0.05 level with df 2 and 57 and 2 and 56 are 3.14 and 3.15 respectively)



The statistical analysis from the above table shows that the pre test means of yogic practices group, aerobic training group and control group are 43.98, 43.58 and 43.79 respectively. The obtained F ratio 0.06 for pre test is lesser than the table value of 3.14 for df 2 and 57 required for significance at 0.05 level. The post test means of yogic practices group, aerobic training group and control group are found 48.85, 49.35 and 43.96 respectively. The obtained F ratio 27.39 for post test is greater than the table value of 3.14 for df 2 and 57 required for significance at 0.05 level. The adjusted post test means of yogic practices group, aerobic training group and control group are 48.80, 49.40 and 43.96 respectively. The F ratio obtained for adjusted post test 31.61 is greater than the table value of 3.15 for df 2 and 56 required for significance at 0.05 level.

The above analysis of the study indicates that there is a significant difference among the adjusted post test means of yogic practices group, aerobic training group and control group. Further, to determine which of the three paired means had a significant difference, the Scheffe's test was applied as post hoc test and the results are presented in table 2.

Table 2: Scheffe's Post Hoc Test for Differences between the Adjusted Post Test Paired Means of Packed Cell Volume

Adjusted Post Test Means			Mean Differences	F Value
Yogic Practices Group	Aerobic Training Group	Control Group		
48.81	49.41	--	0.60	0.65
48.81	--	43.97	4.88	41.59*
--	49.41	43.97	5.44	52.55*

* Significant at 0.05 level.
Table F (0.05) = 6.32

From the above table it can be seen that the mean difference between yogic practices group and aerobic training group was 0.60 ($P > 0.05$) and the calculated F value was 0.65 ($P > 0.05$). The mean difference between the yogic practices group and the control group was 4.88 ($P > 0.05$) and the calculated F value was 41.59 ($P > 0.05$). The mean difference between aerobic training group and the control group was 5.44 ($P < 0.05$) and the calculated F value was 52.55 ($P < 0.05$). From that it can be clearly noticed that aerobic training group responded to the training with more positive influences on packed cell volume when compared with the yogic practices group and control group. The yogic practices group responded better when compared with the control group.

The pre test, post test and adjusted post test means values of yogic practices group, aerobic training group and control group on packed cell volume are graphically presented in figure 1.

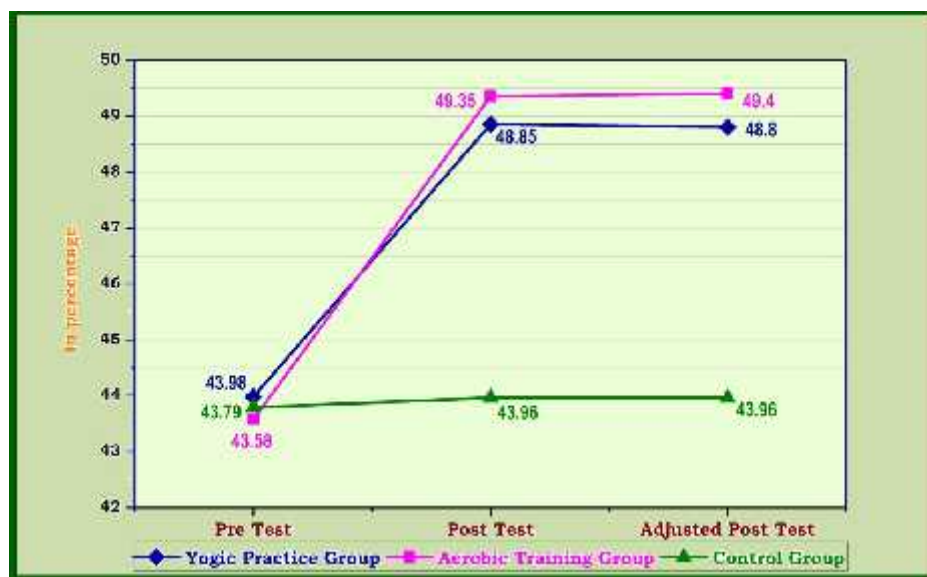


Figure 1: Line Graph Showing Pre Test, Post Test and Adjusted Post Test Means of Yogic Practices Group, Aerobic Training Group and Control Group on Packed Cell Volume



Conclusions

In the present investigation, because of two training programmes, namely, yogic practices and aerobic training, the following improvements occurred on packed cell volume of middle aged women.

1. Significant improvement was found in yogic practices group and aerobic training group when compared to control group towards increasing the packed cell volume.
2. It concludes that aerobic training group responded to be better than the yogic practices group in developing the packed cell volume.
3. The yogic practices group responded better when compared with the control group.
4. Systematic and well-planned yogic practice and aerobic training programs significantly increased the level of packed cell volume in middle aged women.

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