
EFFECT OF PHYSICAL ACTIVITIES AND YOGASANAS ON RESTING HEART RATE AMONG MEN DIABETES PATIENTS

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Abstract

The study efforts were made to determine the effect of physical activities and yogasanas on resting heart rate among men diabetes patients. To achieve this purpose, thirty Type 2 men diabetic patients ($n = 30$) were randomly selected as subjects. The age of the subjects ranged from 40 to 50 years. The subjects divided into three equal groups of ten subjects each ($n = 10$). In which, group I underwent physical activities (PG), group II underwent yogasanas (YG) for five days per week for twelve weeks and group III acted as control (CG) they did not exposed any special training programme. Resting heart rate was selected as independent variable and assessed before and after the training period. The collected data were statistically analysed by using Analysis of Covariance (ANCOVA) and Scheffe's test was applied as post hoc test to determine the paired mean difference. From the results of the study, it was found that there was a significant reduction ($p \leq 0.05$) in resting heart rate of both physical activities group and yogic exercise group when compared to control group.

Key words: Physical activities, yogasanas, resting heart rate, diabetes

Introduction

Yoga is a complete science of life that originated in India many thousands of years ago. It is the oldest system of personal development in the world, encompassing body, mind and spirit. Yoga is a practical aid, not a religion. It is an ancient art based on a harmonizing system of development for the body, mind, and spirit. The continued practice of yoga will lead you to a sense of peace and well-being, and also a feeling of being at one with their environment. The practice of yoga makes the body strong and flexible; it also improves the functioning of the respiratory, circulatory, digestive, and hormonal systems. Yoga brings about emotional stability and clarity of mind (Devananda, 2000).

Regular physical activities boost the immune system, and helps prevent diseases of affluence such as heart disease, cardiovascular disease. It is the activity that develops and maintains physical fitness and overall health. It is often practiced to strengthen muscles and the cardiovascular system, and to improve athletic skills. Adaptation of the human body to physical exercise can improve the health of internal system and the efficiency of external movements. Such an adaptation to one kind of stress may also prepare the person physically and emotionally to resist other stresses life.

Heart rate is actually the frequency of pressure waves (one minute) propagated along the peripherally arteries (Astrand and Keare, 1970). Resting heart rate is the rhythmical dilation of an artery produced by the increased volume of blood through the vessel by the contraction of the heart (Benjamin, 1965). There are some important steps to overall health and well-being that have been shown to also reduce your resting heart rate. $\text{Max HR} = 208 - (\text{age} \times 0.7)$. In 40-year-old subjects, both formulas yield the same result (ie. 180 beats per minute). However, the Tanaka equation produces slightly lower limits (than the old formula) in subjects younger than 40, and raises the limit slightly in subjects older than 40 years old (Eystone, 2004).

Diabetes mellitus (just called diabetes from now on) occurs when the level of glucose (sugar) in the blood becomes higher than normal. Type 2 diabetes occurs mainly in people aged over 40. The 'first-line' treatment is diet, weight control and physical activity. If the blood glucose level remains high despite these measures, then tablets to reduce the blood glucose level are usually advised. Insulin injections are needed in some cases. Other treatments include reducing blood pressure if it is high, lowering high cholesterol levels and also other measures to reduce the risk of complications. Physical training helps to improve the level of insulin generation (Miller et al., 1994) and yogic exercise normalizes the blood sugar level (Gore, 1987).

Materials and methods

For this purpose type 2 men diabetes patients from Medical College, Kalamaserry and Medical Trust Hospital, Ernakulam, Kerala were randomly selected as subject. Their age were ranged between 40 and 50 years. The selected thirty subjects were divided into three groups of ten each. Out of which, group I (n = 10) underwent physical activities, group II (n = 10) underwent yogasanas and group III (n = 10) acted as control. The training programme was carried out for five days per week during morning session only (6 am to 8 am) for twelve weeks. Resting heart rate was selected as variable and it was measured by using number of score or strokes/minutes. Both experimental groups initially performed thorough warming up exercises. After that Group I performed the following physical activities. These are the exercises were given, calisthenics, stretching, sit-ups, push-ups and medicine ball with moderate intensity. Group II performed the following yogasanas. These are the exercises were given, padmasana, bhujangasana, halasana, vajrasana, eka padhasana, parivatasana, oorthavamugabhujangasana, dhanurasana, shasanasana, veerabhadhrasana, vakhrasana, patchimoththanasana, shalabhasana, trikonasana, padhahasthasana, pranayama, and meditation.

Data Analysis

Mean and standard deviation were calculated for resting heart rate for each training group. And the data were analyzed by using analysis of covariance (ANCOVA). If the 'F' value was found to be significant for adjusted post-test mean, Scheffe's test was used as post hoc test to determine the significant difference between the paired mean. Statistical significance was fixed at 0.05.

Results**Table I. Analysis of covariance for Resting heart rate of experimental groups and control group**

Test		YG	PG	CG	SOV	SS	df	MS	F
Pre test	Mean	79.05	79.2	78.28	B	4.87	2	2.44	0.22
	S.D.	3.02	2.77	4.12	W	303.06	27	11.22	
Post test	Mean	72.26	71.11	78.14	B	284.39	2	142.2	16.04*
	S.D.	3.39	3.14	2.28	W	239.38	27	8.87	
Adjusted Post test	Mean	72.29	71.16	78.07	B	270.65	2	135.33	15.01*
					W	234.48	26	9.02	

*Significant $F = (df 2, 27) (0.05) = 3.35$; ($P \leq 0.05$) $F = (df 2, 26) (0.05) = 3.37$; ($P \leq 0.05$)

The table I showed that the pre test mean values on resting heart rate for yogic exercise group, physical activity group and control group were 79.05, 79.2 and 78.28 respectively. And obtained 'F' ratio of 0.22 for pre test which was lower than the required table value 3.35 with df 2 and 27 at 0.05 level of confidence on resting heart rate. The post test mean values on resting heart rate for yogic exercise group physical activity group and control group were 72.26, 71.11 and 78.14 respectively. And the obtained 'F' ratio of 16.04 for post test which was higher than the required table value 3.35 with df 2 and 27 at 0.05 level of confidence on resting heart rate. The adjusted post test mean values on resting heart rate for yogic exercise group physical activity group and control group were 72.29, 71.16 and 78.07 respectively. The obtained 'F' ratio of 15.01 for adjusted post test which was higher than the required table value 3.37 with df 2 and 26 for significance at 0.05 level of confidence on resting heart rate.

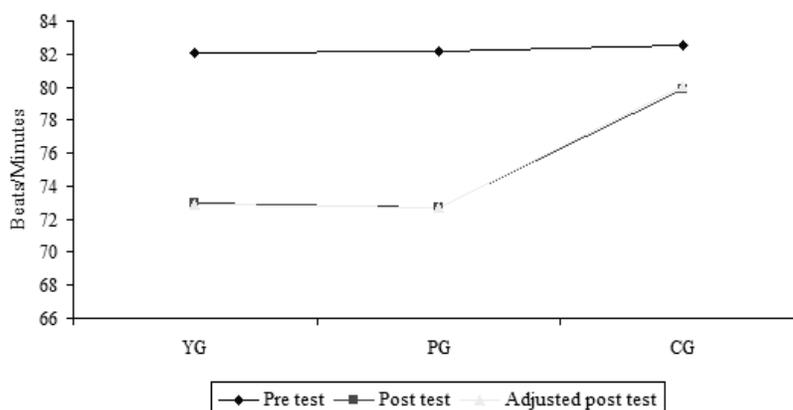
Hence, the results of the study showed that there was a significance difference exists between yogic exercise group, physical activity group and control group on resting heart rate. Further to determine which of the paired means has a significant improvement, Scheffé's test was applied as post-hoc test. The result of the follow-up test was presented in Table II.

Table II. Scheffe's post hoc test for mean difference between groups of resting heart rate

YG	PG	CG	MD	CI
72.29	71.16		1.13	
72.29		78.07	5.78*	4.27
	71.16	78.07	6.91*	

*Significant, $p \leq 0.05$

Table II showed that the adjusted post test mean difference on resting heart rate between yogic exercise group and control group and physical activity group and control group are 5.78 and 6.91 respectively. These values are higher than the required confidence interval value of 4.27, which shows significant difference at 0.05 level of confidence. The results of the study showed that there was a significant difference between experimental groups and control group. It also showed that there was insignificant difference between two experimental groups. The pre, post and adjusted post test mean values of experimental groups and control group on resting heart rate was graphically represented in the figure 1.

Figure 1: The pre, post and adjusted post test mean values of experimental groups and control group on resting heart rate

Discussion

This study shows that yogic exercise and physical activity are capable of decreasing heart rate level in men type 2 diabetes patients. Evidence for the benefits of yoga practice includes its effects shown to decrease the diabetes (Aljasiret *et al.* 2010, Manjunathaet *et al.* 2005 and Sharma *et al.* 2008). Many studies revealed that physical activity is beneficial and decreases diabetes (Neil & Hopkins, 2006 and Ronald *et al.* 2004) in men patients. Innes & Vincent (2007) and Sharma *et al.* (2008) concluded that yogic exercise appeared to decrease the diabetes in men and women. Thirty minutes per day of vigorous exercise, has sustained beneficial effects on heart rate (Cole

et al. 1999 and Jouven et al. 2005). No previous studies have attempted to compare the responses of resting heart rate to yogic exercise and physical activity in men diabetes patients. There are some studies suggested that yogic excises may also helps to decrease the heart rate (Barnes et al. 2004 and Bharshankar et al. 2003). The findings of Indla & Narhare (2011) and Sarang & Tells (2000) revealed that yoga training must reduce the heart rate. Kirsten et al (2003) pointed that regular physical training reduces heart rate. Therefore, the present study was determining the influence of physical activities and yogic practices on resting heart rate among diabetes patients.

Conclusion

Prevailing evidence supports the concept that yogasanas and physical activity can help to decrease the resting heart rate among type II diabetes patients. Yogasanas and physical activity are the some activity to develop or maintain physiological variables and overall health. The result of the study indicated that there was significant reduction on resting heart rate levels of men type II diabetes patients due to twelve weeks of yogasanas as well as physical activity.

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