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Effects of different modes of yoga practice on depression high density lipoproteins and strength endurance among middle aged women

Ajayakumar Koorma
Associate Professor and Head of the Department of Physical Education, S.N. College, Kannur, Kerala, India

Abstract
The purpose of the present study was to find out the effect of different modes of yoga practice on depression, high density lipoproteins and strength endurance among middle aged women. For this purpose, forty five middle aged women residing around Kannur town, Kerala state, were selected as subjects. The age of the subjects were ranged from 40 to 45 years. They were divided into three equal groups, each group consisted of fifteen subjects, in which experimental group - I underwent Bihar School of yoga practice, experimental group - II underwent B.K.S. Iyengar yoga practice and group - III acted as control that did not participate in any special activities apart from their regular curricular activities. The training period for the study was six days (Monday to Saturday) in a week for twelve weeks. Prior and after the experimental period, the subjects were tested on depression, high density lipoproteins and strength endurance. Depression was assessed by Hamilton depression scale, high density lipoproteins was tested after taking 5 ml of blood samples by venous puncture method, by using Boehringer Mannheim Kit Method and strength endurance was tested by administering sit-ups test. The Analysis of Covariance (ANCOVA) was applied to find out any significant difference between the experimental groups and control group on selected criterion variables. Since three groups were involved in the present study, the Scheffe *S* test was applied as post hoc test. The result of the study shows that the Bihar School of Yoga practice group and B.K.S. Iyengar Yoga practice group were decreased the depression and an increase in high density lipoproteins and strength endurance significantly. It was concluded from the results of the study that Bihar School of Yoga practice and B.K.S. Iyengar Yoga practice has bring positive changes in depression, high density lipoproteins and strength endurance as compare to the control group. Moreover it was also concluded that there was no significant difference found between the experimental groups in all criterion variables.

Keywords: Bihar school of yoga and B.K.S. iyengar yoga, depression, high density lipoproteins, strength endurance

Introduction

Yoga is one of the most ancient cultural heritages of India. The word *yoga* in Sanskrit means “to unite”, and so *yoga* can be said to connote a unitive discipline. In this sense, it is an exercise in moral and mental cultivation that generates good health (*arogya*), contributes to longevity (*chirayu*), and the total intrinsic discipline culminates into positive and perennial happiness and peace [1]. Yoga is one of the orthodox systems of Indian philosophy. It was collated, coordinated and systematized by Patanjali in his classical work, the Yoga Sutras, which consists of 185 terse aphorisms. 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 [2].

Bihar School of Yoga (Swami Satyananda Saraswati) is a type of yoga which integrates intellect, emotion and action: the head, heart and hands. Known as Satyananda Yoga or Bihar Yoga (the school lies in Bihar in India), the system embraces many different philosophies and encourages students to examine the very essence of their being and make gradual changes to improve their awareness. Satyananda Yoga is considered truly holistic and suitable for everyone [3]. Iyengar Yoga, named after and developed by B.K.S. Iyengar, is a form of Hatha Yoga that has an emphasis on detail, precision and alignment in the performance of posture (asana) and breath control (pranayama) [4].

Recent scientific studies of the effects of yoga and meditation on health validates its ability to improve virtually every aspect of our functioning—brain function, hormonal function, sleep, mood, balance, etc. More active practices followed by relaxing ones lead to deeper relaxation than relaxing practices alone, documented by research from Swami Vivekananda yoga research foundation near Bangalore city and possibility of neuroplasticity bringing about changes in the hypo-pituitary–pancreatic axis [5]. In a German study a 90 minutes of yoga practices for 24 emotionally depressed women, a significant reduction in depression after the training [6]. The improvewoment in the lipid levels after yoga could be due to increased hepatic lipase and lipoprotein lipase at cellular level, which affects the metabolism of lipoprotein and thus increase uptake of triglycerides by adipose tissues [6, 7]. Direct stimulation of the pancreas by the postures can rejuvenate its capacity to produce insulin [8]. Regeneration of pancreatic beta cells could occur by yoga exercises that promote blood circulation in the region of the pancreas and yoga asanas that stimulate the meridian of pancreas also could assist in some diabetic patients [9]. Pranayama practices, stretches the lung tissue producing inhibitory signals from action of slowly adapting receptors and hyperpolarizing currents. These inhibitory signals coming from cardio-respiratory region involving vagi are believed to synchronize neural elements in the brain leading to changes in the autonomic nervous system; and a resultant condition characterized by reduced metabolism and parasympathetic dominance [10].

Methodology

Thirty middle aged women residing around Kannur town, Kerala state were selected as subjects. The age of the subjects were ranged from 40 to 45 years. The selected subjects were divided into three equal groups, each group consisted of ten subjects, in which group - I (n = 15) underwent Bihar School of Yoga practice, experimental group - II (n = 15) underwent B.K.S. Iyengar Yoga practice and group - III (n = 15) acted as control, which did not participate in any special activities apart from their regular day-to-day activities. Different modes of yoga practices were conducted six days (Monday to Saturday) per week for twelve weeks. The researcher consulted with the yoga experts and doctors and selected the following variables as criterion variables: 1. depression, 2. high density lipoproteins and 3. strength endurance. Depression was assessed by Hamilton Rating Scale for Depression [11], high density lipoproteins were assessed by using the Boehringer Mannheim Kit method and strength endurance were assessed by administering sit-ups test. For the purpose of collection of data, the subjects were asked to report at early morning, one day prior and one day after experimental period, in fasting condition. 5 ml of blood was collected from each subject by venous puncture method and the blood thus collected was stored in small bottles for pre and post-test for measuring the high density lipoproteins.

Analysis of covariance (ANCOVA) was applied to find out the significant difference if any, among the experimental groups and control group on selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as appropriate.

Results

The data collected on depression, anxiety and strength endurance among experimental and control groups were analyses and the results were presented in Table – I.

Table 1: Analysis of covariance on selected criterion variables among exercise groups and control group

Variable Name	Group Name	Bihar School of Yoga Practice Group	B.K.S. Iyengar Yoga Practice Group	Control Group	'F' Ratio
Depression (in Points)	Pre-test Mean ± S.D	22.28 ± 1.28	22.10 ± 1.15	23.89 ± 1.92	0.816
	Post-test Mean ± S.D.	20.12 ± 1.53	20.86 ± 1.29	24.56 ± 1.88	38.86*
	Adj. Post-test Mean	20.08	20.31	25.44	45.54*
High Density Lipoprotein (mg/dl)	Pre-test Mean ± S.D	47.23 ± 2.33	47.53 ± 2.89	47.57 ± 2.86	0.83
	Post-test Mean ± S.D.	49.88 ± 1.98	49.39 ± 2.07	46.91 ± 1.88	8.96*
	Adj. Post-test Mean	49.35	49.12	46.51	22.43*
Strength endurance (no./min)	Pre-test Mean ± S.D	12.86 ± 0.86	12.22 ± 0.79	12.15 ± 1.11	0.267
	Post-test Mean ± S.D.	15.97 ± 0.59	15.86 ± 0.47	12.01 ± 2.86	34.523*
	Adj. Post-test Mean	15.53	15.86	12.35	50.213*

*Significant .05 level of confidence. (The table values required for significance at .05 level of confidence with df 2 and 42 and 2 and 41 were 3.22 and 3.21 respectively).

Table – I shows that pre test mean 'f ratio of Bihar School of Yoga practice group, B.KS Iyengar practice group and control group on depression were 0.816, which is insignificant at 0.05 level of confidence. The post test and adjusted post test mean 'f' ratio value of experimental groups and control group was 38.86 and 45.54, which were significant at 0.05 level of confidence. The pre test mean 'f ratio of Bihar School of Yoga practice group, B.KS Iyengar practice group and control group on high density lipoproteins were 0.83, which is insignificant at 0.05 level of confidence. The post and adjusted post test mean 'f' ratio value of experimental groups and control group was 8.96 and 22.43, which were significant at 0.05 level of confidence. The pre test means 'f ratio of Bihar School of Yoga practice group, B.KS Iyengar practice group and control group on strength endurance were 0.267, which is insignificant at 0.05 level of confidence. The post and adjusted post test mean 'f' ratio value of experimental groups and control group were, 34.523 and 50.213, which was significant at 0.05 level of confidence. After applying the analysis of covariance, the result of this study shows that there was a significant decrease in depression and an increase in strength endurance and high density lipoprotein levels. Further more, to find out which of the adjusted post test mean difference is significant Scheffe *S* test was applied on selected criterion variables and presented below.

Table 2: Scheffẽ S Test for the Difference between the Adjusted Post-Test Mean of Selected Criterion Variables

Adjusted Post-test Mean on Depression				
Bihar School of Yoga Practice Group	**BKS Iyengar Yoga Practice Group**	**Control group**	**Mean Difference**	**Confidence interval at .05 level**
20.08		25.44	5.36*	2.973
20.08	20.31		0.23	2.973
	20.31	25.44	5.13*	2.973
Adjusted Post-test Mean on High Density Lipoproteins				
49.35		46.51	2.84*	0.979
49.35	49.12		0.23	0.979
	49.12	46.51	2.61*	0.979
Adjusted Post-test Mean on Strength endurance				
15.53		12.35	3.18*	1.866
15.53	15.86		0.33	1.866
	15.86	12.35	3.51*	1.866

* Significant at .05 level of confidence.

Table – II shows that the Scheffĕ *S* Test for the difference between adjusted post-test mean on depression of Bihar School of Yoga practice group and control group (5.36) and BKS Inyengar Yoga Practice group and control group (5.13), which were significant at .05 level of confidence. There was a significant difference on high density lipoproteins between Bihar School of Yoga practice group and control group (2.84) and BKS Inyengar Yoga Practice group and control group (2.61) and also there was a significant difference on strength endurance between Bihar School of Yoga practice group and control group (3.18) and BKS Inyengar Yoga Practice group and control group (3.51) which was significant at 0.05 level of confidence after the respective training programme. After applying the Scheffé *S* test, the result of this study shows that there was a significant decrease in depression and an increase in high density lipoprotein and strength endurance due to the various modes of yoga practices.

Discussion

1. The experimental groups such as, Bihar School of Yoga practice group and B.K.S. Iyengar Yoga practice group have achieved a significant reduction in depression [12, 19] and a significant improvement in strength endurance and high density lipoprotein [16, 17, 18] when compared with the control group.
2. It was also found that there was no significant difference found between Bihar School of Yoga practice group and B.K.S. Iyengar Yoga practice group on selected criterion variables.

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