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Effect of Resistance Training followed by Yogic Practices on Strength Endurance Leg Strength and Blood Pressure

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Abstract

The aim of the study was to find out whether resistance training followed by yogic practices enhancing the strength endurance, leg strength and blood pressure of college aged men. Forty-five college aged men in 18 and 25 years of age group studying in various faculties of Annamalai University were selected as subjects. They were divided into two equal groups, each group consisted of fifteen subjects, in which group – I underwent resistance training followed by yogic practices and group – II acted as control which did not participate any training apart from their day to day activities. The period of training for the present study was three days (alternative days, such as, Monday, Wednesday and Friday) in a week for thirteen weeks. Prior to and after the training period the subjects were tested for strength endurance, leg strength and blood pressure (systolic and diastolic). The strength endurance was measured by administering bent knee sit-ups test, leg strength was measured by using dynamometer and blood pressure (both systolic and diastolic) was measured by using sphygmomanometer. The analysis of covariance (ANCOVA) was applied as statistical tool and whenever the 'F' ratio for adjusted post-test means were significant, the Scheffé S test was used as post-hoc test to find out any significant difference between the training groups. It was concluded from the result of the study that resistance training followed by yogic practices group have improved ($P < 0.05$) all the criterion variables, such as, strength endurance, leg strength and decreased the blood pressure (both systolic and diastolic).

Keywords: Resistance training followed by yogic practices, strength endurance, leg strength and blood pressure.

Introduction

Numerous training procedures are in practice to improve each and every physical and motor fitness qualities at various levels.[1] The major objective in training is to cause biological adaptation in order to improve performance in a specific task. Resistance training is a form of exercise that improves muscular strength and endurance.[2] Resistance training is any exercise that causes the muscles to contract against an external resistance with the expectation of increases in strength, tone, mass, and/or endurance.[3] It also causes damage or tears in muscle cells (catabolism) and quickly repaired to regenerate the muscle and grow stronger (anabolism).[3] Yoga is a complete science of life that originated in India many thousands of years ago, which of personal development in the world, encompassing body, mind and spirit.[4] Yoga is not an ancient myth buried in oblivion. It is the most valuable inheritance of the present. It is the essential need of today and the culture of tomorrow.[5] The yoga postures (known as asanas), help to stretch and relax the muscles and skeletal system. The physical release through these soothing movements can help create a sense of calmness and well-being.[6]

Physical exercise is any bodily activity that develops and maintains physical fitness and overall health.[4] Frequent and regular aerobic exercise has been shown to help prevent or treat serious and life-threatening chronic conditions such as high blood pressure, obesity, heart disease, Type 2 diabetes, insomnia, and depression.[5] Strength endurance is defined as "the force that muscle or a group of muscle can exert against a resistance for a prolonged period".[6] The socio-psychological concept of self-confidence relates to self-assuredness in one's personal judgment, ability, power, etc., sometimes manifested excessively.[7] Blood pressure (BP) is a force exerted by circulating blood on the walls of blood vessels, and is one of the principal vital signs.

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Methods

This study under investigation involves the experimentation of yogic practices and physical exercises on strength endurance, leg strength and blood pressure (systolic and diastolic). Forty five middle aged men those who were living around Annamalainagar, Chidambaram with age between 35 and 40 years were selected as subjects. The selected forty five subjects were randomly divided into three groups of fifteen each, out of

which group - I (n = 15) underwent yogic practice, group - II (n = 15) underwent physical exercise training and group - III (n = 15) remained as control. The training programme was carried out for six days (Monday to Saturday) per week during morning session only (6 am to 8 am) for thirteen weeks. Strength endurance was measured by administering sit – ups test, leg strength was measured with the help of Muktha Rani Rasthogi's self – concept scale and blood pressure was measured by using sphygmomanometer. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the experimental groups on selected criterion variables separately. In all the cases, 0.05 level of confidence was fixed to test the significance, which was considered as an appropriate. Since, there were three groups involved, the Scheffé *S* test was applied as post hoc test

Analysis of Data

The data collected prior to and after the experimental periods on strength endurance, leg strength and blood pressure (systolic and diastolic) on yogic practices group, physical exercises group and control group were analysed and presented in the following table -1.

Table 1

Analysis of covariance and 'f' ratio for strength endurance, leg strength and blood pressure (systolic and diastolic) for yoga practice group, physical exercise group and control groups

Variable Name	Group Name	Yoga Practice Group	Physical Exercise Group	Control Group	'F' Ratio
Strength Endurance (in numbers)	**Pre-test Mean ± S.D**	22.33 ± 1.877	21.47 ± 0.99	22.40 ± 1.298	1.971
	Post-test Mean ± S.D.	24.67 ± 1.291	23.20 ± 1.207	22.20 ± 1.521	12.737*
	Adj. Post-test Mean	24.491	23.595	21.981	25.707*
Self – Concept (in points)	**Pre-test Mean ± S.D**	137.80 ± 2.908	138.93 ± 2.086	139.33 ± 1.291	1.966
	Post-test Mean ± S.D.	142.87 ± 2.560	143.93 ± 2.154	139.67 ± 1.759	15.531*
	Adj. Post-test Mean	143.653	143.717	139.097	99.604*
Systolic Blood Pressure (mmHg)	**Pre-test Mean ± S.D**	131.87 ± 5.64	129.87 ± 7.96	131.40 ± 6.01	0.375
	Post-test Mean ± S.D.	129.87 ± 5.59	128.60 ± 7.92	132.87 ± 5.99	1.665
	Adj. Post-test Mean	129.060	129.755	132.518	42.863*
Diastolic Blood Pressure (mmHg)	**Pre-test Mean ± S.D**	86.40 ± 3.996	85.60 ± 5.654	85.93 ± 4.301	0.109
	Post-test Mean ± S.D.	84.07 ± 4.026	84.33 ± 5.512	87.13 ± 4.086	2.052
	Adj. Post-test Mean	83.666	84.691	87.175	39.898*

* Significant at .05 level of confidence.

(The table value required for significance at .05 level of confidence with df 2 and 43 and 2 and 42 were 3.21 and 3.22 respectively).

The data are presented in the above table – I and the result shows that there was a significant improvement was occurred on all criterion variables such as, strength endurance, leg strength, systolic and diastolic blood pressure after the yogic practices and physical exercises when compared with the control group. Further to determine which of the paired means has a significant improvement, Scheffĕ *S* test was applied as post-hoc test. The result of the follow-up test is presented in Table - 2.

Table 2
Scheffĕ s test for the difference between the adjusted post-test mean of strength endurance, leg strength and blood pressure (systolic and diastolic)

Adjusted Post-test Mean of Strength Endurance				
Yoga Practice Group	**Physical Exercise Group**	**Control Group**	**Mean Difference**	**Confidence interval at .05 level**
24.491		21.981	2.51*	0.898413
24.491	23.595		0.896	0.898413
	23.595	21.981	1.614*	0.898413
Self-concept				
143.653		139.097	4.556*	0.932646
143.653	143.717		0.064	0.932646
	143.717	139.097	4.620*	0.932646
Systolic Blood Pressure				
129.060		132.518	3.458*	1.0023173
129.060	129.755		0.695	1.0023173
	129.755	132.518	2.763*	1.0023173
Diastolic Blood Pressure				
83.666		87.175	3.509*	1.024767
83.666	84.691		1.025	1.024767
	84.691	87.175	2.484*	1.024767

* Significant at 0.05 level of confidence.

Results

Before applying the experiment all the subjects of the yoga practice, physical exercise and control groups were attended the pre-test, which was conducted a day prior to the commencement of the training and the data were collected on strength endurance, leg strength and blood pressure (systolic and diastolic). After eight weeks of training the post-test was conducted one day after the training period to find out any changes in the criterion variables. The analysis of covariance (ANCOVA) was used 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 an appropriate. Since there was three groups were involved in this study, the Scheffĕ *S* test was used as pos-hoc test and it was shown in Table - 2.

After applying the analysis of covariance, the result of this study showed that there was a significant difference among yoga practice, physical exercise and control groups on the changes in strength endurance, leg strength and blood pressure after eight weeks of training. The criterion variables such as, strength endurance and leg strength was improved for both the yoga practice group and physical exercise group and systolic and diastolic blood pressure has significantly decreased after the yoga practice, physical exercise period. Further, comparing the adjusted post-test means of all the criterion variables, such as, strength endurance, and leg strength both the training groups were significantly increased the performance after the training period, when compared with the control group.

Conclusions

Strength endurance and leg strength has improved for both the experimental groups, such as yogic practice group and physical exercise group, when compared with the control group. The blood pressure has also decreased in yogic practice group and physical exercise group when compared with the control group. But there was no significant difference was found between the experimental groups on selected criterion variables. There are so many evidences shows that selected yogasana practices has enhanced the health related physical fitness such as, muscular strength, endurance, flexibility, body composition and pulmonary function.[8,9] Moreover performing yogasana postures which helps to improve self-efficacy and self-confidence.[10,11] There is a significant improvement in social self – esteem after selected yogasana practices and physical exercise.[12] Blood pressure was also reduced significantly after the selected yogic practices which will avert the hyper or hypotension for normal human beings who were attained the above 40 years of age.[13] Involving the physical activity improves the muscle

strength, balance and endurance for people who were attained 40 years of age.[14]

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