International Journal of Physical Education, Sports and Health 2020; 7(6): 94-98

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2020; 7(6): 94-98

www.kheljournal.com
Received: 29-08-2020
Accepted: 11-10-2020

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Isolated and combined effect of yogic and physical exercises on selected physical, physiological and anthropometric variables among college men football players in Vellore district of Tamil Nadu

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Abstract
Yoga is the universal religion, a way of life, which above all caste, creeds, languages, regions and nations. It is simple and easy to practice, acceptable to the people of all professions and ages of India. Yoga exercises have been practiced since thousands of years. Now it is accepted that many yoga exercises are suitable for all people and recommended for long living and healthy life. The practice of yoga has been made systematic by the exponent of the system, Pathanjali' being an important teacher. The yoga exercises, according to Pathanjali have to be practiced in a systematic way and he advocated eight steps to progressive achievement, namely abstention (yama), regulations discipline (Niyama), easy posture (Asana), control of breathing (Pranayama), sense of control (Pratyahara), concentration (Dharana), meditation (Dhyana), and superconscious state (Samathi).

Keywords: Yoga, physical exercises, physiological and anthropometric etc.

Introduction
Modern sports scientists and physical educators are interested in human performance in a variety of sports and games. Researchers have taken sincere effort to find out the relationship of different physiological factors and performance in sports and games. The study of physical fitness has an important and valuable place in modern society due to its close relation to every area of life. Soccer is by far the most popular sport in the world. Tens of thousands of fans regularly show up for games played in stadiums in every continent. The beautiful game has thrilled and captivated sports fans for more than 100 years. The game spread from the Britain to rest of the world. In 1904, the Federation International de Football Association (FIFA) was formed to regulate international play. Soccer has grown to enormous level of popularity since Second World War. The world cup tournament sets off a wave of Soccer that encompasses the entire world. Yoga and Health are closely related. Yoga is a popular aid in improving both physical and mental health. This is the basically, the most common goal of people who practice yoga for health reason. For year yoga has been considered therapeutic. Several researches have been conducted to look at the effects of this practice on the body. When yoga is practiced correctly, it helps to reduce the negative effects of stress on the mind and body and can help the body cope with aging. Yoga practice and proper diet can help to improve the flexibility and strength of musculoskeletal system.

Yoga provides holistic approach in coping with respiratory ailments by improving one's physical, mental and spiritual health. Yoga for a fact is not a sport; however, it helps players, particularly those who play Soccer, perform better in their game. Yoga is now intertwined to the game, giving the benefits that every player needs. Soccer involves agility and concentration among players. Since they get most of the game by using their leg muscles, chances of their being injured or sprained is much likely. This is where yoga steps into bring enlightenment. Yoga basically emphasizes on a person's wellbeing, putting it to state where everything is in the right place and in the right track. Yoga helps Soccer players both in the aspect of physical and mental health. Soccer players who perform yoga are much likely to have a firm and precise mind that is very important in the game.

Yoga practices can help the Soccer players in preventing injuries and improving their strength and flexibility. Yoga and Soccer make a great team.

Methodology

The selection of subjects, the selection of variables, the experimental design, criterion measures, and reliability of data, orientation of subjects, reliability of instruments, tester reliability, subject's reliability, and administration of test, training programme and the statistical procedure used are explained.

1. **Physical variables:** a. Speed b. Leg Explosive Power c. Agility
2. **Physiological variables** a. Resting Pulse Rate b. Blood Hemoglobin c. Anaerobic Power
3. **Anthropometric variables** a. Chest Girth b. Thigh Girth c. Calf Girth
4. **Treatment variables** a. Yoga group b. Physical Exercise group c. Combination of yoga & Physical Exercise group d. Control group

Criterion measures

By referring to literature and in consultation with the professional experts, the following variables were selected as the criterion measures in this study for testing the hypothesis For measuring speed, 50 yards run was used and the unit of measurement was 1 /100 of a second. For measuring Leg explosive power, standing broad jump was used and the unit of measurement was in meter. For agility, shuttle run was used and the unit of measurement was 1/100 of a second. For resting pulse rate, stethoscope was used and the unit of measurement was beats per minute. For anaerobic power, Margaria Kalaman's test was used and the unit of measurement was kilogram / meter / second. The blood haemoglobin content was recorded in gram percentage. For Chest girth, non-elastic cloth tape was used and the unit of measurement was in centimetre.

Results of the study

The four groups namely Yoga Group, Physical Exercise Group, Combination of Yoga and Physical Exercise and Control Group were analysed with the difference in the measures of physical variables such as speed, leg explosive power and agility, physiological variables such as resting pulse rate, blood haemoglobin and anaerobic power, anthropometric variables such as chest girth, thigh girth and calf girth in relation to pre-test, post -test and adjusted post test scores were presented in this chapter. The subjects were selected at random, but the groups were not equated in relation to the factors to be examined. Hence the difference between the means of four groups in the pre- test had to be taken into account during the analysis of the study. This was achieved by the application of the analysis of covariance, where the final means were adjusted for difference in the initial means, and the adjusted means were tested for significance. When the adjusted post- test means were significant, the Scheffe's post – hoc test was administrated to find out the paired means significant difference.

The following tables illustrate the statistical results of the Quantification of Physical, Physiological and Anthropometric, responses to yogic practices, physical exercises and combination of both among Men football players in Vellore District, Tamil Nadu State.

Table 2 shows the mean, standard deviation and 't'ratio on Speed. The pre-test mean and standard deviation on Speed of yoga, Physical exercise, combined, and control groups were 6.543, 6.526, 6.594 and 6.595 and 0.336, 0.201, 0.301, and 0.350 respectively. The post-test mean and standard deviation on Speed of yoga, Physical exercise, combined, and control groups were 6.379, 6.393, 6.381 and 6.604 and 0.311, 0.206, 0.302, and 0.352 respectively. The obtained 't' ratio for yoga, physical exercise, combined, and control groups were 12.791, 19.667, 19.276 and 1.368 respectively. Since the table 't' ratio 1.979 was lesser than obtained value the speed was significant. However there was no significant difference in control group.

Table 2: The summary of mean and dependent 't' test for the pre and post tests on speed of four groups (Scores in seconds)

	Pre - test		Post - test		Obtained t ratio
	Mean	SD	Mean	SD	
Yoga	6.543	0.336	6.379	0.311	12.791*
Physical Exercise	6.526	0.201	6.393	0.206	19.667*
Combined	6.594	0.301	6.381	0.302	19.276*
Control	6.595	0.350	6.604	0.352	1.368

*Significant at 0.05 level table value 1.979 for 't' test with df of 3 and 116

Result of speed

Table 2a shows the adjusted post-test means on Speed. The adjusted post – test means were 6.400 for Yogic practices group, 6.430 for Physical exercise group, 6.352 for combined (Yogic practices and Physical exercises) group and 6.574 for control group. As the obtained Fratio 98.876 was greater than the table F-ratio 2.688 the adjusted post –test was significant at 0.05 level of confidence for the degree of freedom 3 and 115. Scheffe's post hoc test was therefore resorted to find out the significance of ordered adjusted final mean differences among the groups.

Table 2a: Computation of analysis of covariance of adjusted post - test of speed of four groups (Scores in seconds)

Yoga	Physical exercise	Combined	Control		SS	df	MS	F- value	Table
6.400	6.430	6.352	6.574	Between	0.821	3	0.274	98.876*	2.688
				Within	0.315	115	0.003		

*Significance at 0.05 level with df of 3 and 115

The Table 2b shows the Scheffe's post –hoc test results. The ordered adjusted final mean difference for Speed of experimental groups Yoga, Physical Exercise, Combination of Yoga and Physical Exercise and Control groups were tested for significance against Scheffe's post –hoc Fratio. The obtained F ratio between yoga group and physical exercise group was 0.030 and it was seen to be lesser than the Table F ratio, 0.038. Hence the above comparison was not significant.

However the obtained F ratio between the yoga group and combination of yoga and physical exercise group, yoga group and control group, physical exercise group and combination of yoga and physical exercise group, physical exercise group and control group, combination of yoga and physical exercise group and control group, were 0.048, 0.174, 0.078, 0.144 and 0.222 respectively, and it was seen to be greater than the Table F ratio 0.038. Hence the above comparisons were significant.

Table 2b: The Scheffe's post HOC test for the differences among paired means of speed (Scores in seconds)

Yoga	Physical exercise	Combined	Control	MD	CI
6.400	6.430	-	-	0.030	0.038
6.400	-	6.352	-	0.048*	0.038
6.400	-	-	6.574	0.174*	0.038
-	6.430	6.352	-	0.078*	0.038
-	6.430	-	6.574	0.144*	0.038
-	-	6.352	6.574	0.222*	0.038

Table 3 shows the mean, standard deviation and 't'ratio on Leg Explosive Power. The pre-test mean and standard deviation on Leg Explosive Power of yoga, Physical exercise, combined, and control groups were 2.641, 2.677, 2.635 and 2.634 and 0.117, 0.132, 0.114 and 0.143 respectively. The post-test mean and standard deviation on Leg Explosive Power of yoga, Physical exercise, combined, and control groups were 2.840, 2.840, 2.828 and 2.624 and 0.105, 0.117, 0.112, and 0.140 respectively. The obtained 't' ratio for yoga, Physical exercise, combined, and control groups were 14.858, 10.757, 12.885 and 1.544 respectively. Since the table 't' ratio 1.979 was lesser than obtained value the Leg Explosive Power was significant. However there was no significant difference in control group.

Table 3: The summary of mean and dependent 't' test for the pre and post tests on leg explosive power of four groups (Scores in meters)

	Pre - test		Post - test		Obtained t ratio
	Mean	SD	Mean	SD	
Yoga	2.641	0.117	2.840	0.105	14.858*
Physical Exercise	2.677	0.132	2.840	0.117	10.757*
Combined	2.635	0.114	2.828	0.112	12.885•
Control	2.634	0.143	2.624	0.140	1.544

*Significant at 0.05 level table value 1.979 for 'C test with df of 3 and 116

Results of leg explosive power

Table 3a shows the adjusted post-test means on Leg explosive The adjusted post – test means were 2.844 for Yogic practices group,2.816 for Physical exercised group,2.838 for combined (Yogic practices and Physical exercises) group and 2..634 for control group. As the obtained F-ratio 68.763 was greater than the table F-ratio 2.688 the adjusted post –test was significant at 0.05 level of confidence for the degrees of freedom 3 and 115. Scheffe's post hoc test was therefore resorted to find out the significance of ordered adjusted final mean differences among the groups.

Table 3a: Computation of analysis of covariance of adjusted post- test of leg explosive power of four groups

Yoga	Physical exercise	Combined	Control		SS	df	MS	F- value	Table
2.844	2.8 16	2.838	2.634	Between	0.895	3	0.298	68.763*	2.688
				Within	0.499	115	0.004		

•Significance at 0.05 level with df of 3 and 115

The Table 3b shows the Scheffe's post –hoc test results. The ordered adjusted final mean difference for Leg explosive power of experimental groups Yoga, Physical Exercise, Combination of Yoga and Physical Exercise and Control groups were tested for significance against Scheffe's post – hoc F-ratio. The obtained F ratio between experimental group's yoga group and physical exercise group, yoga group and combined group, physical exercise group and combined group were respectively 0.028, 0.006, and 0.022 and it was seen to be lesser than the Table F ratio, 0.048 Hence the above comparison was not significant. However the obtained F ratio between the yoga group and control group, physical exercise group and control group, combined group and control group were 0.21, 0.182 and 0.204 respectively, and it was seen to be greater than the Table F ratio 0.048. Hence the above comparisons were significant.

Table 3b: The Scheffe's post Hoc test for the differences among paired means of leg explosive power (Scores in meters)

Yoga	Physical exercise	Combined	Control	MD	CI
2.844	2.816	-	-	0.028	0.048
2.844	-	2.838		0.006	0.048
2.844	-	-	2.634	0.21'	0.048
-	2.816	2.838	-	0.022	0.048
-	2.816	-	2.634	0.182*	0.048
-	-	2.838	2.634	0.204*	0.048

Table 4 shows the mean, standard deviation and 't'ratio on Agility. The pre-test mean and standard deviation on Agility of yoga, Physical exercise, combined, and control groups were 19.099, 19.091, 19.081 and 19.094 and 0.742, 0.748, 0.774 and 0.787 respectively. The post-test mean and standard deviation on Agility of yoga, Physical exercise, combined, and control groups were 18.839, 18.839, 18.817 and 19.100 and 0.778, 0.785, 0.806 and 0.788 respectively. The obtained 't' ratio for yoga, Physical exercise, combined, and control groups were 18.535, 18.599, 13.100 and 1.490 respectively. Since the table 't' ratio 1.979 was lesser than obtained value the Agility was significant. However there was no significant difference in control group.

Table 4: The summary of mean and dependent 't' test for the pre and post tests on agility of four groups

	Pre - test		Post test		Obtained t ratio
	Mean	SD	Mean	SD	
Yoga	19.099	0.742	18.839	0.778	18.535*
Physical Exercise	19.091	0.748	18.839	0.785	18.599*
Combined	19.081	0.774	18.817	0.806	13.100*
Control	19.094	0.787	19.100	0.788	1.490

*Significant at 0.05 level table value 1.979 for 't' test with df of 3 and 116

Results of agility

Table 4 shows the adjusted post-test means on Agility. The adjusted post – test means were 18.831 for Yogic practices group,18.839 for Physical exercised group,18.828 for combined (Yogic practices and Physical exercises) group and 19.096 for control group. As the obtained F-ratio 94.713 was greater than the table F-ratio 2.688 the adjusted post –test was significant at 0.05 level of confidence for the degrees of freedom 3 and 115. Scheffe's post hoc test was therefore resorted to find out the significance of ordered adjusted final mean differences among the groups.

The Table 4 shows the Scheffe's post –hoc test results. Theordered adjusted final mean difference for Agility of experimental groups Yoga, Physical Exercise, Combination of Yoga and Physical Exercise and Control group were tested for significance against Scheffe's post –hoc F-ratio. The obtained F ratio between experimental yoga group and physical exercise group, yoga group and combined group, physical exercise and combined group were 0.008, 0.003 and 0.011 and it was seen to be lesser than the Table F ratio, 0.055. Hence the above comparison was not significant.

However the obtained F ratio between the yoga group and control group, physical exercise and control group, combined group and control group, were 0.265, 0.257 and 0.268 respectively, and it was seen to be greater than the Table F ratio 0.055 Hence the above comparisons were significant.

Summary

Yoga is the universal religion, a way of life, which above all caste, creeds, languages, regions and nations. It is simple and easy to practice, acceptable to the people of all professions and ages of India. Yoga exercises have been practiced since thousands of years. Now it is accepted that many yoga exercises are suitable for all people and recommended for long living and healthy life. The practice of yoga has been made systematic by the exponent of the system, Pathanjali' being an important teacher. The yoga exercises, according to Pathanjali have to be practiced in a systematic way and he advocated eight steps to progressive achievement, namely abstention (yama), regulations discipline (Niyama), easy posture (Asana), control of breathing (Pranayama), sense of control (Pratyahara), concentration (Dharana), meditation (Dhyana), and superconscious state (Samathi). The many aspects of yoga are blended in a synergistic flow as we express and experience life. Yoga is a way and a means to assisting us in experiencing the self-theta within us and expanding that inner spirit and life force. Yoga is an Art and a way of living at the highest possible level for human experience and a way of creating inner joy and outer harmony with one's self and the external world. Yoga is a pragmatic science that was developed by seers thousands of years ago that can be practiced by any person, regardless of age, sex, race, religion and origin of physical limitations. In researching the benefits and value of yoga, Patanjali, the author of the yoga Sutras, clearly defines the Eight Limbed path or Astanga, as guidance system of hierarchical structure that gives the students an emphasis on which to concentrate upon. The eight limbs are presented in a systematic core, however, just as all things flow in a synergistic wave with nature, as one approaches one limb or aspect and dedicates compassionate energy and focus that aspect, it is part of the natural process to be drawn to and evolve into another limb of the path. The paths consist of the following ethics and progress through physical and mental processes that ultimately connect us with the highest and the most intimate self. The main purpose of this study is to find out the Isolated and combined effect of yogic practices and Physical exercises on selected Physical, Physiological and Anthropometric variables among college Men football players in Vellore District.

For this study, 120 men students from Vellore District, Tamil Nadu State were selected as subject at random and their age ranged from eighteen to twenty five years only, and they were divided into four groups namely yogasana groups, Physical exercise group and combination of physical exercise and yoga group and control group. The first group did selected yogic practices, the second group physical exercises and third group both yoga, physical exercise respectively for twelve weeks. The pre-test and post-test were conducted for all subjects before the start of training and after the completion of training of twelve weeks. The study was formulated as a true random group design, consisting of a pre – test and post- test. In this study, analysis of covariance (ANCOVA) statistical technique was used to test the adjusted post–test mean differences among the experimental groups. When the adjusted post-test result was significant, the Scheffe's post hoc test was used to find out the paired mean significant differences. Level of confidence was fixed at 0.05 level.

Table 5: Intra - class correlation coefficient of test-retest scores

S. No.	Name of the variable	Correlation value
I	Speed (sec)	0.96
2	Leg Explosive Power (mts)	0.95
3	Agility (sec)	0.95
4	Resting pulse rate (beats/min)	0.94
5	Blood Hemoglobin (g /dB	0.93
6	Anaerobic Power (kg/ mts /sec)	0.93
7	Chest Girth (cm)	0.94
8	Thigh Girth (cm)	0.94
9	Calf Girth (cm)	0.95

Conclusions

Within the limitations of the present study, the following conclusions were drawn. There was significant improvement in Physical variables, such as speed, leg explosive power, agility, Physiological variables such as resting pulse rate, blood haemoglobin, anaerobic power, Anthropometric variables such as chest girth, thigh girth, calf girth, among college men students in Vellore District Tamil Nadu State. The combined training of yogic practices and physical exercises significantly improved Physical variables, such as speed, leg explosive power, agility, Physiological variables such as resting pulse rate, blood haemoglobin, anaerobic power, Anthropometric variables such as chest girth, thigh girth and calf girth, greater than that of yogic practices and physical exercises among college men students in Vellore District Tamil Nadu State. Yogic practices significantly improved Physical variables, such as speed, leg explosive power, agility, Physiological variables such as resting pulse rate, blood haemoglobin, anaerobic power, Anthropometric variables such as chest girth, thigh girth and calf girth, greater than that of physical exercises among college men students in Vellore District Tamil Nadu State.

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