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The effect of different packages of yogic practices on selected motor fitness components (agility, flexibility) among adolescent boys

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Abstract
The purpose of the study was to find out "The effect of different packages of yogic practices on selected motor fitness components (Agility, Flexibility) among adolescent boys". The study was formulated as a true random group design, consisting of a pretest and posttest. The randomly selected subjects (n=90) adolescent boys from different schools in Andhra Pradesh, were randomly assigned to three equal groups of thirty each. The groups were assigned as Experimental Groups I, II and control group respectively. Pre-tests were conducted for all the subjects on selected motor fitness, such as flexibility, agility. The experimental groups participated in their respective yogic practices simplified *kundalini* yoga and *suryanamaskar* respectively for a period of twelve weeks. The post-tests were conducted on the above said dependent variables after the experimental periods from all the three groups. The differences between the initial and final means of the selected variables were the effect of different packages of *yogasanas* on adolescent boys. The obtained data were subjected to statistical treatment to find out the significance in the means using ANCOVA. In all cases 0.05 level was fixed to test the hypothesis set for this study.

Keywords: yogic practices, Agility, Flexibility

Introduction

"When you are fit, you look better, feel better and are likely to have more physical energy; when you feel fit; the good things of life have more meaning: The sky is bluer, the music sweeter, the steak tastier" (Percival, 1977) [1].

Added to the woeful inadequacy of level of physical exercises, the mental stress is on the increase. Now that the world is shrinking into a global village, thanks too many internet challenges. It is a highly competitive world the man has to live in, so mental stress takes a heavy toll of his health. So for a man to be fit, he has to not only resort to physical exercises, but also to yoga practices to give rest to his over worked mind (Weinbergh and Gould, 1995) [4].

Yogic concept of human body

According to yogic physiology, the human framework is comprised of five bodies or sheaths, which account for the different aspects to dimensions of human existence. These five sheaths are known as:

a) *Annamayakosha*, the food or material body.
b) *Manomayakosha*, the mental body.
c) *Pranamayakosha*, the bioplasmic or vital energy body.
d) *Vijnanamayakosha*, the psychic or higher mental body.
e) *Anandamayakosha*, the transcendental or bliss body.

Although these five sheaths function together to form an integral whole, the practices of *pranayama* work mainly with *pranamayakosha*. The *Pranamayakosha* is made up of five major *pranas* which are collectively known as the *pancha* or five *pranas: prana, apana, samana, udana* and *vyana*.

Yoga

Yoga means the experience of oneness or unity with inner being. This unity comes after dissolving the duality of mind and matter into supreme reality. It is a science by which the individual approaches truth. The aim of all yoga practice is to achieve truth where the individual soul identifies itself with the supreme soul or God. Yoga has the surest remedies for man's physical as well as psychological ailments. It makes the organs of the body active in their functioning and has good effect on internal functioning of the human body. Yoga is a re-education of one's mental process, along with the physical.

Effect of Yogic Training

It is necessary to note that the nature of all yogic practices is psychological and physiological. Some exercises emphasizing the control of mental processes directly are more psychological. Other exercises are more physical or physiological. It is this latter part of yogic practices that has become more popular and is being extensively used for the development and promotion of health and fitness. The yogic exercise in general differ from the physical exercises and the important differences are:

1. The physical exercises are repetitive in character and utilize a lot of energy whereas yogic exercise help to conserve energy. The caloric requirement of yogic exercises is only 0.9 to 3 calories per minute depending upon the severity of exertion.
2. Relaxation forms the most important aspect of yogic exercise unlike physical exercises, during the practice of asana, muscles which do not support weight or which are not actively involved are relaxed. With relaxation, the muscles return to normality after contraction and therefore yogic exercises keep the body more flexible. Physical exercises improve the circulation of blood in voluntary system, thereby resulting in better muscular development as a result of improved function of the muscles. Yogic

exercises aim at improving blood circulation to all, the vital organism thus improve their function.

Motor Fitness: Motor fitness are activities involved in motor activities of the body such as flexibility and agility.

Flexibility: In general, flexibility means the range of movements around the skeletal joints of the body. The flexibility is not a general body character but it is specific to each body region. If a person is highly flexible shoulder, it does not necessarily mean that he/she will have good knee flexibility or hip flexibility. Even it is possible that one shoulder joint is more flexible than the other. For a good physical fitness, it is essential that a person has quite flexible joints and is able to maintain his or her body flexibility. The flexibility component of physical fitness enables the person to have free body movements, better coordinated movements requiring lesser work and to handle greater stress with lesser changes of injury. (Hardayal Singh, 1991) [2].

Agility:-Agility is capacity to change direction quickly and to control movements. (Hardayal Singh, 1991) [2].

Importance of Agility: Agility is very important in sports involving quick changes in position of the body parts with fast starts and stop and quick changes in direction which are fundamental to good performance in practically. All court games such as basketball, tennis, badminton and volleyball as well as in many field games such as football and baseball. Agility is mostly involved in football, basketball and hockey in game situations. These games are requiring high amount of agility.

Need of the Study: There are different forms of yogic practices advocated, practiced and popularized by different experts / gurus in the field. In this study, the investigator was interested to find out the influence of different packages of yogic practices, namely, Simplified *Kundalini Yoga* practiced by Vethathiri Maharishi and *surya namaskar* on selected motor fitness variables agility, flexibility and muscular strength and psychological variables anxiety, aggression and self-confidence among adolescent boys.

Objectives of the Study: The objective of the study was to make a status analysis of motor fitness variables agility, flexibility and muscular strength and psychological variables anxiety, aggression and self-confidence among adolescent boys. And to find out the effect of different packages of yoga, namely, simplified *kundalini yoga* and *surya namaskar* on selected physiological and psychological variables.

Statement of the Problem: The purpose of the study was to find out "the effect of different packages of yogic practices on selected motor fitness components (Agility, Flexibility) among adolescent boys".

Methodology

The selection of subjects, selection of variables, pilot study undertaken, experimental design, reliability of instruments, competency of tester, reliability of data, test administration, collection of data and the statistical procedure used have been explained.

Selection of Subjects: The purpose of this study was find out the effects of different packages of yogic practices on selected motor fitness (Agility, Flexibility) components among adolescent boys.

To facilitate the study, ninety adolescent boys were randomly selected in the age group of 14 to 17 years. The selected subjects were randomly divided into three groups, consisting of 20 in each group. Group I and II were experimental groups and group III was control group.

The requirements of the experimental procedures, testing as well as exercise schedules were explained to them so as to avoid any ambiguity of the effort required on their part and prior to the administration of the study, the investigator got the individual consent from each subject.

Selection of Variables: The research scholar reviewed the various scientific literature pertaining to the yogic practices of different packages on selected motor fitness, from books, journals, periodicals, magazines and research papers. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following variables were selected.

Dependent Variables: Motor Fitness Variables

1. Agility
2. Flexibility

Experimental Design: The study was formulated as a true random group design, consisting of a pretest and posttest. The randomly selected subjects (n=90) adolescent boys from different schools in Andhra Pradesh, were randomly assigned to three equal groups of thirty each. The groups were assigned as Experimental Groups I, II and control group respectively. Pre-tests were conducted for all the subjects on selected motor fitness, such as flexibility, agility. The experimental groups participated in their respective yogic practices simplified *kundalini* yoga and *suryanamaskar* respectively for a period of twelve weeks.

The post-tests were conducted on the above said dependent variables after the experimental periods from all the three groups. The differences between the initial and final means of the selected variables were the effect of different packages of *yogasanas* on adolescent boys. The obtained data were subjected to statistical treatment to find out the significance in the means using ANCOVA. In all cases 0.05 level was fixed to test the hypothesis set for this study.

Test Administration: Flexibility (Sit and Reach)

Purpos: To estimate the trunk flexibility

Equipments: Yardstick and measuring steel tape

Procedure: Place the yardstick on the floor and put an 18 inch piece of tape across the 15 inch mark on the yard stick. The tape should secure the yardstick to the floor. The subject sits with the O end of the yardstick between the legs. The subject heel should almost touch the tape at the 15 inch mark and be about 12 inch apart with the legs held straight. The subject bends forward slowly and reaches with parallel hand as far as possible and touches the yardstick. The subject should hold this reach long enough for the distance to be recorded.

Scoring: The best score recorded out of the three trials was the score in flexibility.

Agility
Objective: The purpose of this test was to measure agility.

Facilities and Equipments: Floor, stop watch, whistle, score sheet, measuring tape, *chunnam* powder, two wooden blocks (2" x 2" x 4"), score card and pencil.

Administration: Two parallel lines were drawn on the floor 10 metes apart. The blocks were placed behind one of the lines. The subjects were instructed to start from behind the other line. To start the shuttle run a whistle was blown and the subject ran to the blocks up one block, run back to the starting lines and placed the block on the ground beyond the line. Then the subject ran back picked up the other block and run across the starting line as fast as possible. The stop watch was started as the whistle blew and stopped when the subject crossed the starting line.

Scoring: The trials were administered with a rest period of five minutes in between the best of the two times were recorded as the scores in seconds.

Statistical Technique: Analysis of variance (ANOVA) and analysis of covariance (ANCOVA) analyzed the data obtained. The analysis of variance will be used to assess the significance of difference between the pre-test and post-test, for each of the variables on the effect of different yogic practices and control groups separately.
Analysis of covariance may be computed for any number of experimental groups, the final means were adjusted for differences in the means were tested for significance. A further of this method is that analysis of variance is first computed for the difference between initial mans. In this instance, no significance, 'F' ratio will provide confidence that the critical samples came from the same population and are devoid of sampling bias.
When the F ratio was found to be significant, Scheffe's post hoc test was to find out the paired mean significant difference.
Scheffe test has the greatest power and is the most conservation with respect to Type 1 error: this method loads to the smallest number of significance differences. The difference between two means would be significant if it exceed Scheffe F. In order to be significant, F' must equal (k – 1) ($F_{.05}$ or $F_{.01}$). Thus, the necessary F' rations for the difference between paired adjusted mean (k-

Results and Discussions
Computation of Analysis of Covariance and Post HOC Test
Results on Agility: The statistical analysis comparing the initial and final means of Agility due to different packages of Yogic practices, namely, Simplified *Kundalini* Yoga and *Suryanamaskar* among adolescent boys is presented in Table I

Table 1: Computation of Analysis of Covariance of Agility

	Simplified Kundalini Yoga	Suryanama-Skar Yoga	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	10.78	10.75	10.91	Between	0.47	2	0.23	1.25
				Within	16.17	87	0.19	
Post Test Mean	10.43	10.35	10.90	Between	5.25	2	2.63	15.36*
				Within	14.88	87	0.17	
Adjusted Post Test Mean	10.45	10.39	10.84	Between	3.53	2	1.77	15.66*
				Within	9.70	86	0.11	
Mean Diff	-0.34	-0.40	-0.01					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df) 3.10, 2 and 86 (df) =3.10.
*Significant at 0.05 level

As shown in Table I, the obtained pretest means on Agility on Simplified *kundalini* yoga group was 10.78, *Suryanamaskar* yoga group was 10.75 was and control group was 10.91. The obtained pretest F-value was 1.25 and the required table F-value was 3.10, which proved that there was no significant difference among initial scores of the subjects.
The obtained post-test means on Agility on Simplified *kundalini* yoga group was 10.43, *Suryanamaskar* yoga group was 10.35 was and control group was 10.90. The obtained posttest F-value was 15.36 and the required table F-value was 3.10, which proved that there was significant difference among post test scores of the subjects.
Taking into consideration of the pre-test means and post-test means adjusted posttest means were determined and analysis of covariance was done and the obtained F-value 15.66 was greater than the required value of 3.10 and, hence, it was accepted that there was significant differences among the treated groups.
Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table 2: Scheffe's Confidence Interval Test Scores on Agility

MEANS				Required C.I.
Simplified *kundalini* yoga Group	*Suryanamaskar* yoga Group	Control Group	Mean Difference	
10.45	10.39		0.07	0.22
10.45		10.84	0.39*	0.22
	10.39	10.84	0.46*	0.22

***** Significant at 0.05 level

The post-hoc analysis of obtained ordered adjusted means proved that there was a significant difference existed between Simplified *kundalini* yoga group and control group (MD: 0.39). There was significant difference between *Suryanamaskar* yoga group and control group (MD: 0.46). There was no significant

difference between treatment groups, namely, Simplified *kundalini* yoga group and *Suryanamaskar* yoga group. (MD: 0.07).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure-I.

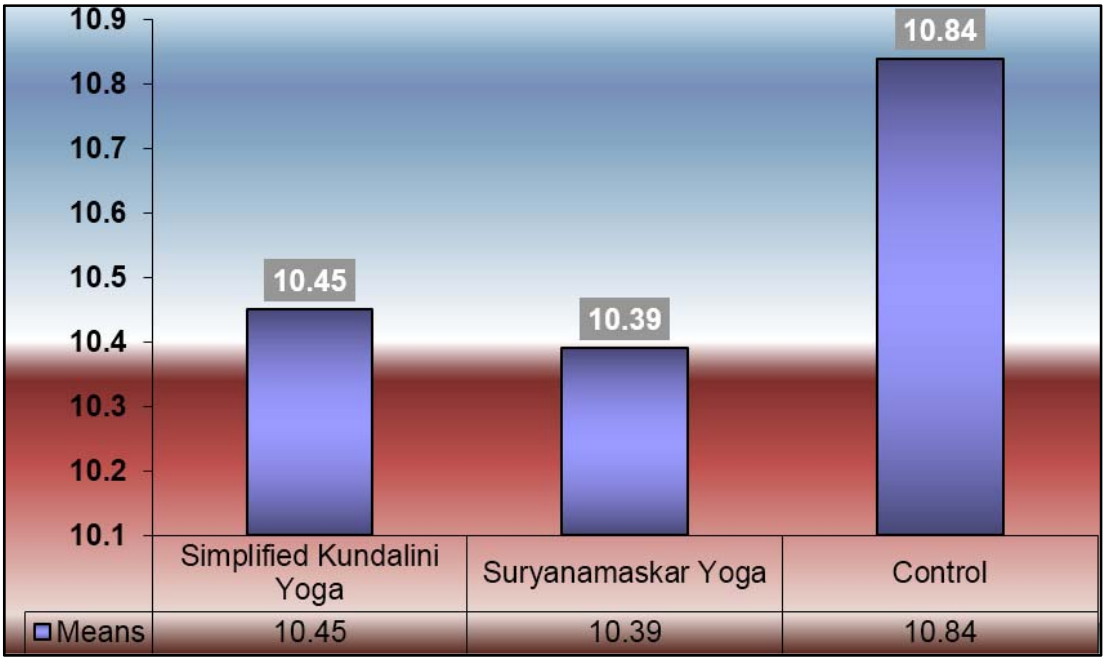

Fig 1: Bar Diagram on Ordered Adjusted Means on Agility

Discussions on Findings on Agility

The effect of Simplified *kundalini* yoga and *Suryanamaskar* yoga on Agility is presented in Table-I. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 15.66 was greater than the required table F-value to be significant at 0.05 level.

Since significant F-value was obtained, the results were further subjected to post hoc analysis and the results presented in Table-II proved that there was significant difference between Simplified *kundalini* yoga group and control group (MD: 0.39) and *Suryanamaskar* yoga group and control group (MD: 0.46). Comparing between the treatment groups, it was found that there was no significant difference between Simplified *kundalini* yoga and *Suryanamaskar* yoga group among adolescent boys.

Thus, it was found that Simplified *kundalini* yoga and *Suryanamaskar* yoga were significantly better than control group in improving Agility of the adolescent boys.

Results on Flexibility: The statistical analysis comparing the initial and final means of Flexibility due to different packages of Yogic practices, namely, Simplified *Kundalini* Yoga and *Suryanamaskar* among adolescent boys is presented in Table-III

Table 3: Computation of Analysis of Covariance of Flexibility

	Simplified Kundalini Yoga	Suryanama-Skar Yoga	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	13.73	14.60	14.23	Between	11.36	2	5.68	2.09
				Within	236.43	87	2.72	
Post Test Mean	16.63	16.07	14.73	Between	57.09	2	28.54	7.79*
				Within	318.70	87	3.66	
Adjusted Post Test Mean	16.97	15.76	14.70	Between	75.93	2	37.96	17.09*
				Within	191.04	86	2.22	
Mean Diff	2.90	1.47	0.50					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df) =3.10, 2 and 86 (df) =3.10.
*Significant at 0.05 level

As shown in Table-III, the obtained pre-test means on Flexibility on Simplified *kundalini* yoga group was 13.73, *Suryanamaskar* yoga group was 14.60 was and control group was 14.23. The obtained pre-test F-value was 2.09 and the required table F-value was 3.10, which proved that there was no significant difference among initial scores of the subjects.

The obtained posttest means on Flexibility on Simplified *kundalini* yoga group was 16.63, *Suryanamaskar* yoga group was 16.07 was and control group was 14.73. The obtained post-test F-value was 7.79 and the required table F-value was 3.10, which proved that there was significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted posttest means were determined and analysis of covariance was done and the obtained F-value 17.09 was greater than the required value of 3.10, and hence, it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table-VI.

Table 4: Scheffe's Confidence Interval Test Scores on Flexibility

MEANS				Required C.I.
Simplified *kundalini* yoga Group	***Suryanamaskar* yoga Group**	**Control Group**	**Mean Difference**	
16.97	15.76		1.20*	0.96
16.97		14.70	2.27*	0.96
	15.76	14.70	1.06*	0.96

***** Significant at 0.05 level

The post-hoc analysis of obtained ordered adjusted means proved that there was a significant difference existed between Simplified *kundalini* yoga group and control group (MD: 2.27). There was significant difference between *Suryanamaskar* yoga group and control group (MD: 1.06). There was significant difference between treatment groups, namely, Simplified *kundalini* yoga group and *Suryanamaskar* yoga group. (MD: 1.20).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure-II.

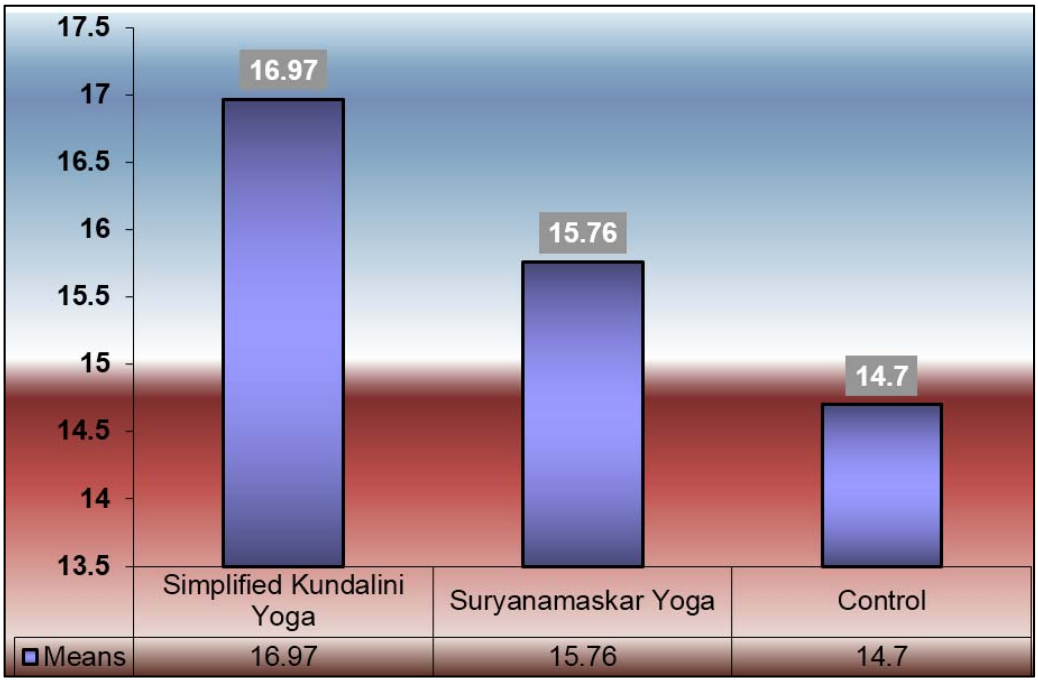

Fig 2: Bar Diagram on Ordered Adjusted Means on Flexibility

Discussions on Findings on Flexibility

The effect of Simplified *kundalini* yoga and *Suryanamaskar* yoga on Flexibility is presented in Table-III. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 17.09 was greater than the required table F-value to be significant at 0.05 level.

Since significant F-value was obtained, the results were further subjected to post-hoc analysis and the results presented in Table-IV proved that there was significant difference between Simplified *kundalini* yoga group and control group (MD: 2.27) and *Suryanamaskar* yoga group and control group (MD: 1.06). Comparing between the treatment groups, it was found that there was significant difference between Simplified *kundalini* yoga and *Suryanamaskar* yoga group among adolescent boys.

Thus, it was found that Simplified *kundalini* yoga was significantly better than *Suryanamaskar* yoga and control group in improving Flexibility of the adolescent boys.

Discussions on Hypotheses

Physical inactivity is a serious issue for the American public. Because of conditions that result from inactivity, individuals incur close to $1 trillion USD in health-care costs, and approximately 2,50,000 pre-mature deaths occur per year. Researchers have linked engaging in yoga to improved overall fitness, including improved flexibility. Researchers have not yet investigated the impact of yoga on exercise adherence. (Bryan, S. *et al.*, 2012) [3]. Researches also proved that yogic practices influences psychological levels and contributed for healthful living and mind set. Thus, previous researches laid

theoretical foundations that a yogic practice contributes for improvement in motor fitness variables. These findings further give scope for research among different forms of yogic practices, which of the yogic practice contribute for specific motor fitness parameters. In this study, the investigator two distinct yogic practices, namely, Simplified Kundalini Yoga (SKY) advocated by Maharishi Vethathri and *Suryanamaskar* (SN) advocated by Bihar School of yoga on selected motor fitness parameters of adolescent boys. For this purpose, the investigator formulated the following hypotheses.

It was hypothesized that there would be significant difference in motor fitness components, such as, agility, flexibility, due to different packages of yogic practices, namely, simplified *kundalini* yoga and *suryanamaskar* among adolescent boys.

Comparing between simplified *Kundalini* Yoga and *Suryanamaskar*, simplified *Kundalini* Yoga would be significantly better than *suryanamaskar* in altering selected motor fitness components and psychological variables among adolescent boys.

The formulated hypothesis stated that there would be significant difference in motor fitness components, such as, agility, flexibility, due to different packages of yogic practices, namely, simplified *kundalini* yoga and *suryanamaskar* among adolescent boys. The results presented in Tables-I and III shows the ANCOVA results on agility, flexibility respectively. As the obtained F-values on adjusted means were greater than the required table F-value to be significant at 0.05 level, it was proved that different packages of yogic practices, namely, simplified *kundalini* yoga and *suryanamaskar* yoga significantly improved agility, flexibility and the formulated hypothesis was accepted at 0.05 level.

Conclusions

1. It was concluded that Simplified *Kundalini* Yoga and *Suryanamaskar* have significant effect on motor fitness variable such as agility among adolescent boys. It was found that there was no significant difference between simplified *kundalini* yoga and *suryanamaskar* yoga in altering agility among adolescent boys.
2. It was concluded that Simplified *Kundalini* Yoga and *Suryanamaskar* have significant effect on motor fitness variable such as flexibility among adolescent boys. It was found that simplified *kundalini* yoga was significantly better than *suryanamaskar* yoga in improving flexibility of adolescent boys.

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