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Effect of Suryanamaskar on flexibility of school girls

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Abstract

The objectives of the study were to determine the effect of Suryanamaskar on flexibility and to compare effect of different pace of Suryanamaskar on flexibility. Pretest-posttest group design was used for this study. Three groups were created, two experimental group and one control group. 15 girls were in each group in the age range of 16 – 18 years, out of 45 girls only 30 girls were able to complete total six weeks practices. First experimental group performed Suryanamaskar with 2 minutes pace, second experimental group performed with 4 minute pace and third served as a control group. Total treatment duration was six weeks. Flexibility was measured by sit and reach test before (pretest) and after (posttest) the treatment period of all three groups. To determine the effect of Suryanamaskar on flexibility of school girls analysis of covariance was used and level of significance was set at 0.05. In relation of flexibility, a significant improvement ($P < 0.05$) was found in both pace 2 and pace 4 at the end of six weeks of practice.

Keywords: Suryanamaskar, Pace and flexibility

1. Introduction

Flexibility is the ability to move the body joints through a maximum range of motion without strain. Flexibility is an important component of health related fitness and the lacks of flexibility create functional problems or disorders for many individual. Lack of flexibility in the back can be responsible for bad posture, compression of peripheral nerves, back pain and many more and if an individual with good flexibility have great ease movements, less chance of injury during movements. (miller, 2006) [7].

The Sanskrit name surya here refers to the sun and namaskara means 'salutations'. Surya namaskara has been handed down from the enlightened sages of the vedic age. The sun symbolizes spiritual consciousness and in ancient times was worshipped on a daily basis. In yoga the sun is represented by pingala or surya nadi, the pranic channel which carries the vital, life giving force. This dynamic group of asanas is not a traditional part of hatha yoga practices as it was added to the original asana group at a later time. However, it is an effective way of loosening up, stretching, massaging and toning all the joints, muscles and internal organs of the body. (Saraswati, 2002) [5].

Practice of asanas is one of the best ways to improve flexibility. There are plenty of studies have been done to see the effect of yogic asanas on flexibility, and Suryanamaskar is itself combination of six asanas. Going through many research papers this query has been raised that will change in the pace of Suryanamaskar effect on the flexibility of joints. (Bhavanani, 2011) [9].

The objectives of the study were to determine the effect of suryanamaskar flexibility and to compare effect of different paces of suryanamaskar on flexibility.

2. Method

Subjects: The subjects for this study were selected from the KIDDY'S CORNER SCHOOL, Gwalior. Forty five girls in the age range of 16 – 18 years from class 11th and 12th were selected randomly for this study.

Variables: Suryanamaskar was considered as independent variable and flexibility was considered as dependent variable.

Test for flexibility: Flexibility of lower back and leg muscles was measured by Sit and Reach test. The subject was asked to remove shoes and place her feet against the testing box while sitting on the floor with straight knees. Then the subject was asked to place one hand on top of

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the other hand so that the middle fingers of both hands were together at the same length. The subject was asked to lean forward and place his hands without bouncing over the measuring scale on the top of the box for at list one second. Bending of knee was not allowed. The score was expressed in number of centimeters. Three trials were given and the highest score was recorded

Experimental design: pretest-posttest group design was used for this study. Three groups were created, two experimental group and one control group. 15 girls were in each group. First experimental group preformed Suryanamaskar with 2 minutes pace, second experimental group performed with 4 minutes pace and third served as a control group. Total treatment duration was six weeks. Flexibility was measured by sit and reach test before (pretest) and after (posttest) the treatment of all three groups.

All participants were briefed introduced about general objectives and requirement of Suryanamaskar. Suryanamaskar training was carried for a period of six weeks, five days per week. The scheduled time of practice was during their physical education period for 30-35 minutes. Each day of the first week, Suryanamaskar practice was demonstrated to the group by the research scholar and most important points were reviewed several times. The pace of Suryanamaskar was control by watch. In two minutes pace of Suryanamaskar each round took around 10 seconds. Similarly in four minutes pace of Suryanamaskar each step took around 20 seconds. To determine the effect of Suryanamaskar on flexibility of school girls analysis of covariance was used and level of significance was set at 0.05. Practice of Suryanamaskar was performed according book asana pranayama mudra bannnda (bhihar school of yoga). 12 steps of Suryanamaskar are following.

Table 1

Steps	Asana	Pace 1 (Time in seconds)	Pace 2 (Time in seconds)
1 & 12	Pranamasana	10 + 10 = 20	20 + 20 = 40
2 & 11	Hasta utthanasana	10 + 10 = 20	20 + 20 = 40
3 & 10	Padahasthasana	10 + 10 = 20	20 + 20 = 40
4 & 9	Ashwa sanchalanasana	10 + 10 = 20	20 + 20 = 40
5 & 8	Parvatasana	10 + 10 = 20	20 + 20 = 40
6	Ashtanga namaskara	10	20
7	Bhujangasana	10	20
Total = 120 seconds		Total = 240 seconds	

3. Results

The values of the means (unadjusted) and standard deviation for the data on flexibility in different groups during post-test are show in table 2.

Table 2: Descriptive Statistics

Groups	Mean	Std. Deviation	N
Pace 2	24.95	2.60	10
Pace 4	26.70	2.03	10
Control	21.20	3.15	10
Total	24.28	3.45	30

Adjusted means for data on flexibility of different groups during post-test shows in table 3.

Table 3: adjusted post means

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Pace 2	24.34	.58	23.14	25.53
Pace 4	27.31	.58	26.12	28.51
Control	21.19	.57	20.01	22.36

In table 4 (Test between subjects) shows that the f-value for the adjusted of three groups during post-test. Since p-value (0.00) of groups is less than 0.05, which indicate that there is significant difference in adjusted means of flexibility between three groups.

Table 4: Tests of Between-Subjects Effects

Source	Type I Sum of Squares	Df	Mean Square	F	p-value
Pre	76.59	1	76.596	23.55	.00
Groups	184.68	2	92.340	28.39	.00
Error	84.56	26	3.252		
Total	18036.25	30			
Corrected Total	345.84	29			

Since, the analysis of covariance for flexibility scores was found significant difference among groups. Therefore post

hoc comparison LSD test was applied and it is presented in table number 5.

Table 5: Post Hoc Test (LSD)

(I) groups	(J) groups	Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
Pace 2	Pace 4	-2.97*	.835	.001	-4.692	-1.258
	Control	3.15*	.813	.001	1.481	4.825
Pace 4	Pace 2	2.97*	.835	.001	1.258	4.692
	Control	6.12*	.814	.000	4.455	7.802

Table 5 indicates that there is a significant difference found between pace 2 and pace 4 (p = 0.001) as the p-value is less than 0.05. There is also significant difference found between

pace 2 and control group (p = 0.001) as the p-value is less than 0.05. There is a significant difference found between pace 4 and control group (p = 0.00) is less than 0.05.

4. Discussion

The objectives of the study were to determine the effect of suryanamaskar on flexibility and to compare effect of different pace of Suryanamaskar on flexibility. The finding of study revealed that there was a significant improvement found in flexibility due to regular practice of suryanamaskar in both experimental groups (pace 2 and pace 4). The finding is in agreement with the results of (Shankar & Pancholi, 2011) [4, 8]. Flexibility depends more on the soft tissues (ligament, tendon and muscles). Muscle, ligament and tendon have an extensibility property. It's mean due to regular stretching exercises increase extensibility of muscles, ligaments and tendon. In same way in Suryanamaskar practice we perform flexion and extension or hyperextension of hip joint which improve flexibility of hip joint, lower back and posterior thigh muscles.

There was significant difference between experimental group (pace 2) and control group as well as between experimental group (pace 2) and control group and there was also a significant difference found between experimental (pace 2) and experimental (pace 4) group on flexibility. When we compare both paces than we found that pace 4 adjusted post mean is 27.31 which is greater than pace 2 adjusted post mean 24.34 this indicated that flexibility improved more in pace 4 as compare pace 2 group. In this way present study confirmed that practice of suryanamaskar for six weeks are sufficient to bring out significant improvement on flexibility of hip joint with both paces (pace 2 and pace 4).

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