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Effect of two weeks training of Suryanamaskar on flexibility in college female students

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ABSTRACT

Yoga is a form of mind-body fitness that involves a combination of muscular activity and an internally directed focus on awareness of the self, the breath, and energy. Suryanamaskar (SN) is a part of yoga. Since time is often seen as a limiting factor when exercising, a daily practice of SN can be the perfect solution for time-challenged individuals as it gives more benefits with less expenditure of time.

Aim & objectives

To study the effectiveness of Suryanamaskar on flexibility in college female students

Methodology

60 female students of Physiotherapy College, aged 18-25 years were selected as per inclusion criteria. Outcome measures used where Sit and reach test and Shoulder and wrist elevation test. The subjects were made to do 12 slow Suryanamaskars for 2 weeks (6 days/ week)

Result

Mean age was 21.45. Sit and reach test improved after SN by (mean difference of 4.56 and $P < 0.0001$) Shoulder and wrist elevation test improved after SN by (mean difference of 5 and $P < 0.0001$)

Conclusion

The study indicates that the two weeks of SN training may be effective to observe improvising flexibility in female students

Keywords: Yoga, Suryanamaskar, Flexibility

INTRODUCTION

Yoga is a form of mind-body fitness that involves a combination of muscular activity and an internally directed focus on awareness of the self, the breath, and energy [1]. Suryanamaskar (SN) or Sun salutation is a part of yoga [2]. It is a series of physical postures (asanas) with regulated breathing aiming at range of physical, mental and spiritual benefits [3]. Ross et al. conducted a review which suggests that yoga may be equally effective or better than exercise at improving a variety of health-related outcome measures like blood glucose, blood lipids and oxidative stress [4]. Nevertheless, there is a dearth of research in the field of SN and also it is not used frequently as a therapeutic exercise [5]. It includes 12 physical

postures with forward and backward bends. The series of movements stretch the spinal column and upper and lower body through their full range of motion, by alternately flexing the body forwards and backwards. It builds upper body strength through the inherent weight bearing positions, especially in the arms and shoulders. The series gives such a profound stretch to the body that it is considered to be a complete yoga practice by itself [6]. Benefits of yoga include increasing lubrication of the tendons, joints and ligaments. It is important to include flexibility training as part of our regular fitness routines. It is a form of active relaxation that can improve both mental and physical recovery [1].

In most cases facilitating mind and body flexibility is easily put aside when it is probably needed the most. However, keeping the body flexible may help decrease tightness and tensions that can lead to chronic and often debilitating physical problems [6]. We need flexibility to perform activities of daily living with relative ease. Flexibility tends to deteriorate with age, and the sedentary life hastens its deterioration [1]. Jakhotia KA et al have done a study on Suryanamaskar: An equivalent approach towards management of physical fitness in obese females and concluded that SN was effective in improving body flexibility [7]. There is scientific evidence that the incidence of injury decreases when people include flexibility training in their routines due to the enhanced ability to move unimpeded through a wider range of motion [1].

Regardless of the potential physical risks of inflexibility, even the most dedicated runner or recreational athlete often does not make time for adequate flexibility training [8]. Since time is often seen as a limiting factor when exercising, a daily practice of SN can be the perfect solution for time-challenged individuals as it gives more benefits with less expenditure of time [9]. It is claimed that SN practice improves general health and fitness [10]. Multiple studies have shown that people who maintain appropriate flexibility, using judicious regimes of exercise have additional benefits of prolonged life and helps to avoid contractures and musculoskeletal injuries [11]. Therefore, the aim of this study was to study the effectiveness of SN on flexibility in females.

MATERIALS AND METHODS

Subjects

All the subjects were briefed about the study and written informed consent was taken prior to enrolment and the research work was carried out after receiving permission from the institutional ethical committee and was conducted in accordance with the guidelines of Helsinki declaration prior to beginning. 60 female students studying in Physiotherapy College, aged 18-25 years were recruited. Subjects with history of active sports training, previous experience of yoga training, history of major medical illness such as tuberculosis, hypertension, diabetes mellitus, bronchial asthma in the past and history of major surgery in the recent past were excluded from the study. All participants were asked to continue their present level of lifestyle and dietary habits.

Study design

Experimental study

OUTCOME MEASURES

Sit and reach test [12]

Flexibility of back and leg muscles was measured by the sit and reach test. The subjects were asked to place their feet against the testing box, without shoes while sitting on the floor with straight knees. They were asked to keep both hands parallel so that the middle fingers of both hands were together at the same length. The subjects were supposed to lean forward and place their hands without bouncing over the measuring scale lying on the top of the box for at least one second. The score was expressed in inches. Three trials were given and the highest score was recorded.

Shoulder and wrist elevation test [13]

Flexibility of shoulder and wrist was measured by the shoulder and wrist elevation test. The subjects were asked to lie prone on the floor with the arms fully extended overhead; grasp a scale with the hands, shoulder width apart. Raise the stick as high as possible and measure the vertical distance from the floor. Measure the arm length from the acromion process to the tip of the longest finger. Subtract the average vertical score from the arm length. Arm Length – Average Vertical Score

PROCEDURE

All the subjects were measured for their flexibility using the sit and reach test which is used to measure hip and trunk flexibility and shoulder and wrist elevation test which is used to measure shoulder and wrist flexibility. Prior to the technique the subjects were given a demonstration. After measuring the tightness levels using the two above tests, the subjects were made to do 12 slow SN (20 sec hold at each position) for 2 weeks i.e. 6 days per week. After completion of 2 weeks of 12 slow SN, post measurements of tightness levels were taken using the above two tests to see the effect of SN on flexibility.

SURYANAMASKAR TECHNIQUE [2]

It consists of a total of 12 steps/asanas:

Step 1: Pranamasan: Stand straight. Look straight. Place the feet together. Pull in knees, thigh muscles and belly. Expand the chest. Fold hands. Palms pressed against each other to perform namaskar

Step 2: Hastauttanasan: Raise arms above head. Grow taller. Then bend back. Stretch abdomen

Step 3: Hastapadasana: Bend forward. Don't bend knees. Go down and place your hands on the arm rests of the chair

Step 4: Ashwasanchalanasan: Take right leg back and stretch it while balancing it on the toe and keep left leg in front of your body aligned with the front legs of the chair. Keep palms straight on both sides of the arms rests of the chair and look upwards

Step 5: Parvatasan: Take back the left leg as well and keep both the feet together while raising hip from the ground and balancing on all fours (Hands on chair arm rest and feet on the floor)

Step 6: Chaturnamaskar: Slowly come down and bring your shoulders near your hands, chest sinking on the chair. Knees should not touch the ground and waist and hip slightly raised above so that they don't touch the chair

Step 7: Bhujangasan: Lower waist and raise torso, make arms straight and balance. Feel bend of spine and stretch of abdomen

Step 8: Parvatasan: Same as position 5

Step 9: Ashwasanchalanasana: Same as position 4

Step 10: Hastapadasana: Same as position 3

Step 11: Hastauttanasan: Same as position 2

Step 12: Pranamasan: Same as position 1

RESULTS AND DATA ANALYSIS

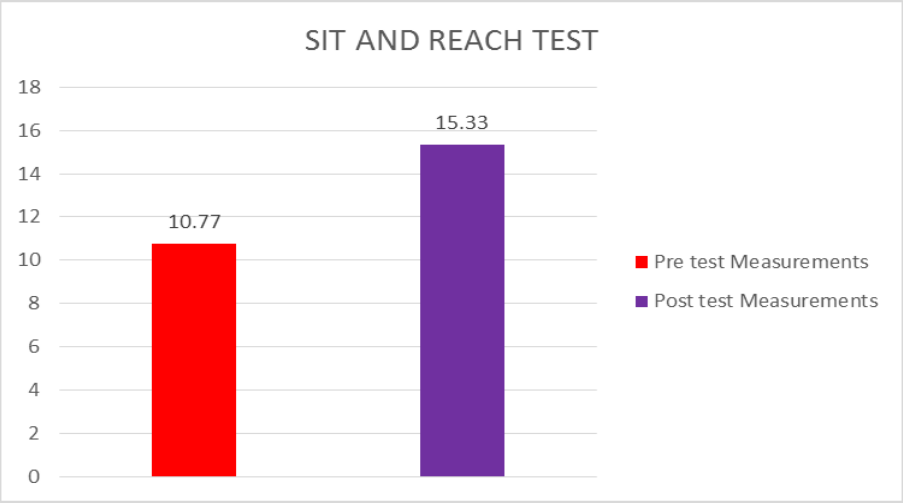
All data are presented as mean ± standard deviation. Statistics was recorded using Instat Software. Within-group data to compare the difference between pre- and post-intervention was analysed with one way ANOVA. Differences were considered statistically significant at $p < 0.05$.

The total number of participants were 60 with mean age 21.45

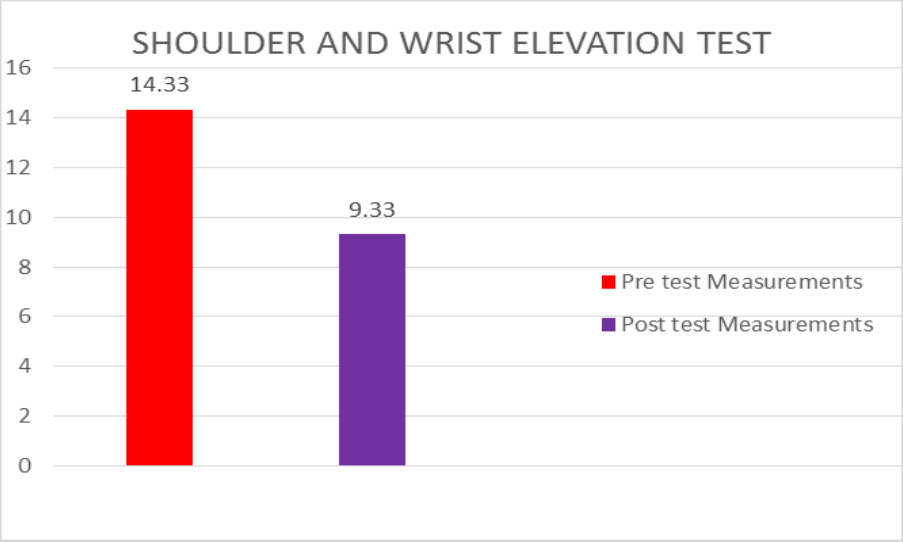
Sit and reach test improved after SN by (mean difference of 4.56 and $p < 0.0001$) (Graph 1 & Table 1) Shoulder and wrist elevation test improved after SN by (mean difference of 5 and $p < 0.0001$) (Graph 2 & Table 1)

Table 1: Showing test and p value

Test	p VALUE
Sit and Reach	p<0.001
Shoulder and Wrist Elevation	p<0.001



Graph: Showing mean of pre and post sit and reach test



Graph 2: Showing mean of pre and post shoulder and wrist elevation test

DISCUSSION

The study was conducted to examine the effects of SN on flexibility in females ranging from the age group of 18-25years. Mean age was 21.45. Sit and reach test and shoulder and wrist elevation test was used to measure flexibility. Participants within poor to average scores were taken in the study and those who fulfilled the inclusion criteria. Comparing data after intervention showed a significant improvement in flexibility. There was a marked decrease in tightness levels as per the sit and reach test and shoulder and wrist elevation test scores. Test in relation to flexibility shows that the duration of the two weeks of the treatment was sufficient to bring about significant difference. This finding is in agreement with the result of many researchers who proved that SN improves flexibility [2,5,7,9,12,14,15].

The increase in flexibility can most likely be attributed to the static stretching nature of the asanas [1]. The probable reason may be that SN is the combination of twelve exercises that include stretching, holding and relaxation [9]. Stretching is most commonly advised as a method for increasing flexibility. The increased range of motion resulting from prolonged stretching is most likely due to an increase in length of both connective and muscle tissue [1]. Increased connective tissue length can occur due to its property of plastic elongation, and increased muscle length can occur through the addition of sarcomeres to the ends of muscle fibers [1].

The viscoelastic properties of muscle exhibit several phenomena when external load is applied. When tissues are held at a constant length, the force at that length gradually declines and is described as the "stress relaxation" response [16]. When tissues are held at a constant force, the tissue deformation continues until approaching a new length and is termed "creep". Creep might be another explanation for the immediate increased range of motion after static stretching [16].

CONCLUSION

The study indicates that the two weeks of SN training may be effective to observe improvising flexibility in female students.

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