

Effect of Various Yogic Intervention Strategies on Back Strength of Homemakers

Sanjib Kumar Bhowmik¹, Avjeet Mondal², Shrikrishna Patel^{3*}, Upendra Pandey⁴

¹Department of Physical Education, Tripura University Suryamani nagar, Tripura (West) INDIA PIN – 799022

²Department of Physical Education, S.N.C. College, Saltora, Bankura, West Bengal, INDIA PIN – 722158

³Faculty of Education, D.A.V. Training College, Kanpur, INDIA PIN – 208024

⁴Department of Physical Education, C.S.J.M. University, Kanpur, INDIA PIN – 208024

* E-mail of the corresponding author: krishna_phd2@yahoo.co.

Abstract

The purpose of this study was to determine the effect of various yogic intervention strategies on back strength of homemakers. Further, the purpose of study was to find out the trend of the effect of various yogic intervention strategies on back strength of homemakers. Fifty homemakers from Gwalior city were selected as subjects for this study. The average age of the subject was 35-45 years. The parameter selected was Back Strength. The subjects were equally assigned using random sampling procedure into two groups, i.e., one experimental group and one control group. The quantitative measurement of each subject was taken before the training programme was started and after every month of training programme for the three months. ANCOVA was employed to find out the effect of various yogic intervention strategies in experimental group and control group on back strength and further, trend analysis was used to find out the trend effect of various yogic intervention strategies in experimental group on back strength at 0.05 level of significance. The study concluded that significant effects of various yogic intervention strategies on back strength were also found. In relation to the same, significant trend of the effect was also found. Linear trend was found significant on the other hand quadratic and cubic trend were found insignificant

Keywords: Homemakers, Yogic Intervention, Trend Analysis

Introduction

Body posture also depends on the physical and mental state of an individual as well as in their movement habits. However, proper body posture can be determined by the shaping of the anterior-posterior curvature of the spine. It can also be used to measure the efficiency of one's kinetic abilities, muscular balance and motor coordination [1].

Women's work demands a high degree of physical efforts leading to fatigue and frustration. There is a large amount of energy spent, demands on the body due to the different types of activities and manner in which these activities are performed leads the body segment to be manipulated in the space, and thus results in change in posture leading to increase in physiological cost of work. Wrongly designed posture induces improper postures, leading to operational uneasiness and strain while working.[2] It may also result in permanent change in spine, in position of the joints, ligaments and muscles and in location of the organs of the body. [3]

The different aspects of working body postures are related to specific injuries. For instance the need to bend the torso is generally considered to be important factor in low back bending, many yoga practitioners develop an ability to maintain correct body posture, increase their articular mobility and improve muscular strength and efficiency. Physical exercise version of Yoga, *Hatha* Yoga, focuses on the maintenance of specific postures known as *Asanas*. [4] The purposes of the *Asanas* are to condition the body, and consequently increase strength, flexibility and endurance. Practice of these poses is also thought to improve concentration, focus and the awareness of body sensations. [5]

There are many more benefits of practicing hatha yoga, one of which is that specific asanas can improve the functioning of the whole body, as well as its particular systems and organs [6].

Asanas are performed standing, sitting, reclining or inverted and may involve forward bending, backward bending, and twisting of the trunk. It has been argued that holding these poses for a prolonged period of time (about 30 seconds or more for each pose) along with controlled breathing may be one of the most important aspects of Yoga exercise, since it impels the mind and body to focus on the active muscles responsible for stabilizing the body in the various poses. [7]

This has been supported through evidence of increased muscle size, strength and endurance. [8] Yoga makes the body more flexible, strengthens muscles and, above all, is conducive to spinal elongation and in maintaining

correct body posture. Yoga practitioners consciously work with their bodies to properly align their body, so that that the obtained yoga position becomes ever more stable and comfortable. With those affected by a flattened anterior-posterior curvature of the spine, as was found in many of the study's participants, hatha yoga would be beneficial as such exercises strengthen excessively extended muscles, e.g. thoracic spine extensors, and extend excessively contracted muscles, e.g. ischio-crural and pectoral muscles. However, one of the most important aspects of practicing yoga is postural re-education, i.e. the development and maintenance of correct body posture, which is often hindered by a number of improper postural habits. [9]

1. Purpose:

1.1 The purpose of this study was to determine the effect of various yogic intervention strategies on back strength of homemakers.

1.2 Further, another purpose of study was to find out the trend of the effect of various yogic intervention strategies on back strength of homemakers.

2. Materials & Methods

2.1 *Participants:* Fifty homemakers from Gwalior, Madhya Pradesh (India) were selected as participants for this study. The average age of the participant was 35-45 years. The follow up period was limited to 12 weeks (Three months). The participants were randomly assigned as experimental and control groups, each group consisted of 25 subjects. The requirement of the study was explained to all the participants. All the participants voluntarily agreed to undergo the testing and training programmes.

2.2 *Procedure:* Back strength was measured by back dynamometer and the score was recorded to nearest kilogram. The experimental group was imparted 45-60 minutes of training of various yogic intervention strategies for 3 months under the supervision and guidance of the scholar. The practice session was conducted in the evening i.e. 5: 30 PM to 6:30 PM on five days a week for duration of 3 months, while no training was imparted to control group. At the end of every month post – test was conducted for both the groups

2.3 *Statistical Analysis:* The data collected on back strength viz. pre-test and post-test (after every month for the duration of three months) were subjected to following statistical analysis to find out effect of treatment for the experimental group. Descriptive Statistics, Analysis of Variance and Analysis of Co-variance was used to analyze data at 0.05 level of confidence. Further Trend Analysis was used to find out the trend effect of various yogic intervention strategies.

2.4 *Delimitation and Limitation of the Study:* This study was delimited to back strength. Daily routine, food habits and the life style of the house wives was considered as a limitation for the study.

2.5 Yogic Program

2.5.1 *Asanas:* Asana means holding the body in a particular posture to bring stability to the body and poise to the mind. The practices of asana bring purity in tabular channels firmness to the body and vitality to the body and the mind.[10]

2.5.1.1 *Surya Namaskara (Sun Salutation:* (lit. "Salute to the sun") It is a common sequence of Hatha yoga asanas. These asanas are ordered so that they alternately stretch the spine backwards and forwards. When performed in the usual way, each asana is moved into with alternate inhalation and exhalation (except for the sixth asana where the breath is held in external suspension).

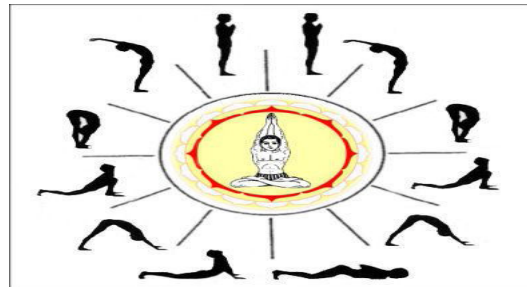


Fig. 1: Surya Namaskara

2.5.1.2 *Pashchimottanasana:* Sitting Forward Bend Pose: Take a long sitting position , Loosen back muscles and bend forward. Catch hold of the toes and place the forehead between the knees. Come back slowly.



Fig. 3: Pashchimottasana

2.5.1.3 Ushtrasana: Camel Pose: Stand on Knees with sole upward, toes pointing backward on the ground. Taking the hands towards the back and giving the spine a backward bending place the palms with straight hands on respective soles. Keep the head relaxed. Come back in the reverse order.



Fig. 4: Ushtrasana

2.5.1.4 Shalabhasana: Locust Pose: Traditionally the asana is practiced in following way. Take prone lying position with chin on the ground and fists closed. Raise both the legs together slowly. Come back.



Fig. 5: Shalabhasana

2.5.1.5 Uttanapadasana: Leg Raised Pose: Lie supine with legs together, hands by the side of the body, palms placed on ground. Raise slowly both the legs up to 60° angle and slowly come back



Fig. 6: Uttanapadasana

2.5.1.6 Matsyasana: Fish Pose: Sit in Padmasana, with the help of elbows lie on your back. Bend your head backward and place middle part of the head on the ground. Catch hold of toes and pull them a little in order to place the elbows on the ground. Come back in reverse order.



Fig. 7: Matsyasana

2.5.1.7 Bhujangasana: Cobra Pose: Take prone lying position. Fold hands at elbows, place palms by the side of chest, fingers not crossing the shoulder line. Raise the head, chest and abdomen up to navel, look upward. Come back slowly.



Fig. 8: Bhujangasana

2.5.1.8 Vakrasana: Twisted Pose: Take a long sitting position, Hands by the side of the body, palms on the ground. Fold right leg at the knee and place the sole on the ground by the side of left knee. Folded knee should point upward. Take right hand backward and place the palm on the ground at a distance of around 10 inches in the line of spine. Take left hand towards the right side of the right knee and place the palm on the ground. Pushing the right knee towards the left side, twist your head towards the backside.



Fig. 9: Vakrasana

2.5.1.9 Ardha Matsyendrasana: Half Twist Pose: Take long sitting position, Fold the left leg and place the sole by the right side of the right knee. Now, turning the body towards left side, cross the right hand against left knee and catch hold of the toes. Now take the left hand towards back and place it on the waist while twisting the body towards left as much as possible. Come back in the reverse sequence. Repeat with the other leg.



Fig. 10: Ardha Matsyendrasana

2.5.1.10 Halasana: Plow Pose: Adopt initial position as in Uttanapadasana (1) raise both legs up to 90°. Pressing hands on the ground, raise your buttocks and take legs towards the head. Continue stretching legs backward till toes touch the ground behind head. Make a finger lock of hands and place it on the head. Slowly come back.



Fig. 11: Halasana

2.5.1.11 Dhanurasana: Bow Pose : Take prone lying position, slowly bend legs at knee and catch hold of ankles from respective hands. Slowly try to straighten the legs as if they want to get released from hands. Raise the head and chest in order to assume the shape of a bow. Come back slowly in reverse order.



Fig. 12: Dhanurasana

2.5.2 Pranayama: Pranayama means control and regulation of breath. “Prana” is a Sanskrit word which means ‘Vital force’, “Ayana” means the control of the prana, so Pranayama means the control of the vital force (Prana) by concentration and regulated breathing.

2.5.2.1 Anuloma – Viloma: Close the right nostril. Inhale through the left nostril. After Inhalation close the left nostril as per technique and release the right nostril and exhale through it. Similarly inhale through right nostril and exhale through the left. This makes one round of Anuloma Viloma



Fig. 14: Anuloma – Viloma

2.5.3 Meditation: Meditation as a family of self-regulation practices that aim to bring mental processes under voluntary control through focusing attention and awareness.

2.5.3.1 Omkar Chanting : AUM is a root of all mantras. "Mantras" is a typical combination of words which affects the surrounding and human beings through the vibrations. AUM is composed of 3 elements, 'a', 'u' and 'm'. The fusion of these 3 elements is AUM or OM. The 3 alphabets are pronounced in series.

2.6 Day –Wise Yoga Program Schedule

Table 1 yogic program for day – 1

Name of the Yogic Practices	Duration
Savasana	5 minutes
Suryanamaskar	2 times (12 posture)
Uttanpadasana	1 Minute
Halasana	1 Minute
Shetubandhasana	1 Minute
Bhujangasana	1 Minute
Shalavasana	1 Minute
Paschimottanasana	1 Minute
Vakrasana	1 Minute
Anuloma-Viloma	10 cycle (One round)
Om chanting	3 times

Table 2 yogic program for day – 2

Name of the Yogic Practices	Duration
Savasana	5 minutes
Suryanamaskar	2 times (12 posture)
Uttanpadasana	1 Minute
Sarvangasana	1 Minute
Matsyasana	1 Minute
Shetubandhasana	1 Minute
Naukasana	1 Minute
Dhanurasana	1 Minute
Pashimottanasana	1 Minute
Ardhamatsyndrasana	1 Minute
Ustrasana	1 Minute
Anuloma-Viloma	10cycle (One round)
Om Chanting	3 times

Table 3 yogic program for day - 3

Name of the Yogic Practices	Duration
Savasana	5 minutes
Suryanamaskar	2 times (12 posture)
Uttanpadasana	1 Minute
Halasana	1 Minute
Shetubandhasana	1 Minute
Bhujangasana	1 Minute
Salabhasana	1 Minute
Paschimmottasana	1 Minute
Ardhamatsyndrasana	1 Minute
Ustrasana	1 Minute
Anuloma-Viloma	10 cycle (One round)
Om chanting	3 times

Table 4 yogic program for day – 4

Name of the Yogic Practices	Duration
Savasana	5 minutes
Suryanamaskar	2 times (12 posture)
Uttanpadasana	1 Minute
Sarvangasana	1 Minute
Matsyasana	1 Minute
Shetubandhasana	1 Minute
Naukasana	1 Minute
Dhanurasana	1 Minute
Paschimmottanasana	1 Minute
Ardhamatsyndrasana	1 Minute
Ustrasana	1 Minute
Anuloma-Viloma	10 cycle (One round)
Om Chanting	3 times

Table 5 yogic program for day – 5

Name of the Yogic Practices	Duration
Savasana	10 Minutes
Meditation	45 Minutes
Om Chanting	5 Minutes

3. Results

In Section – I, data was analyzed using the Analysis of Covariance at .05 level of significance. ANCOVA was applied with regard to an experimental group and control group as the random group design was employed in this study. The difference in the initial means of the group at the time of pretest was taken in to account during the analysis of the post test difference between the means by the process of application of ANCOVA, where the final means were adjusted for difference in the initial means, tested for significance of differences. In section – II, trend of effect of various yogic intervention strategies on selected parameters was analyzed.

Section - I.

Table 6: Descriptive Statistics of Pre-Test & Post-Test of Experimental & Control Group in Back Strength

		Mean	SD	Minimum	Maximum
Experimental Group	Pre-test	44.92	15.80327	10.00	80.00
	Post-test	67.12	12.69291	48.00	99.00
Control Group	Pre-test	44.92	15.80327	10.00	80.00
	Post-test	45.04	15.91771	10.00	80.00

Table7: Analysis of Variance Experimental Group and Control Group In Back Strength

		Sum of Squares	df	Mean Square	F- Value
Pre Test	Between Groups	.000	1	.000	.000
	Within Groups	11987.680	48	249.743	
Post Test	Between Groups	6094.080	1	6094.080	29.406*
	Within Groups	9947.600	48	207.242	

*Significant at .05 level; F value required to be significant at 1, 48 df = 4.03

Table 8: Analysis of Co-Variance Adjusted Post Test Means of Experimental & Control Group in Back Strength

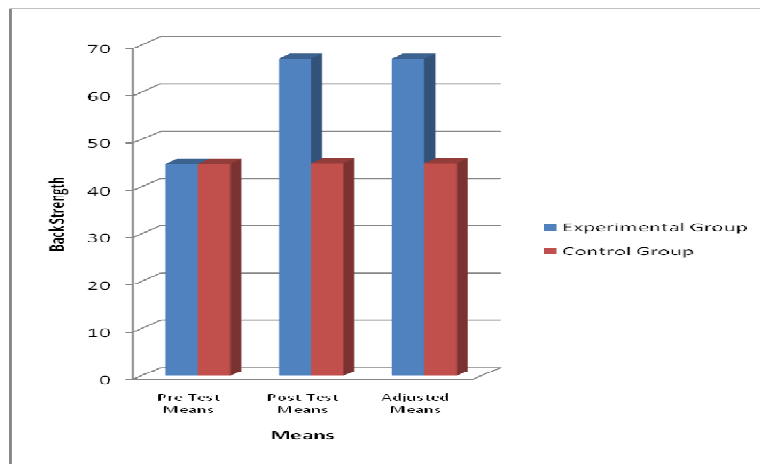
	Sum of Squares	df	Mean Square	F-Value
Contrast	6094.080	1	6094.080	181.650*
Error	1576.781	47	33.549	

*Significant at .05 level, F value required to be significant at 1, 47 df = 4.06

Table 9: Adjusted Post Test Means Of Experimental Group & Control Group in Relation to Back Strength

Groups	Adjusted Mean	Std. Error
Experimental Group	67.120	1.158
Control Group	45.040	1.158

Figure: 10 Comparison of Pre – Test Means, Post Test Means & Adjusted Means of Experimental Group & Control Group in Back Strength



Section – II

Table10: Trend of Effect of Various Yogic Intervention Strategies on Back Strength

Source of Variation	Sum of Squares	df	Mean Square	F
Trials	6732.040	3	2244.013	82.288*
Subjects	18153.340	24	756.389	
Subjects X Trials	1963.460	72	27.270	

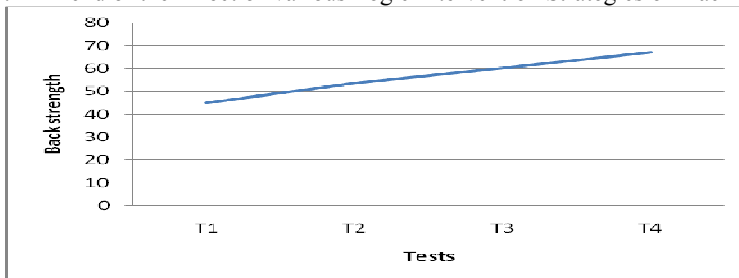
$F_{0.05}(3, 72) = 2.74$, *Significant at 0.05 level of significance

Table 11: Linear, Quadratic & Cubic Trends during Treatment on Back Strength

Source of variation	Trends	Sum of Squares	Df	Mean Square	F	Sig.
Among Means	Linear	6697.800	1	6697.800	124.620*	0.000
	Quadratic	27.040	1	27.040	3.537	0.072
	Cubic	7.200	1	7.200	.353	0.558
Within Group	Linear	1289.900	24	53.764		
	Quadratic	183.460	24	7.644		
	Cubic	490.100	24	20.421		

$F_{0.05}(3, 72) = 4.26$, *Significant at 0.05 level of significance

Figure : 11 Trend of the Effect of Various Yogic Intervention Strategies on Back Strength



4. Discussion

The results of the present investigation shows the Significant effect of various yogic intervention strategies on back strength supported by the following

Mistry A. (2011) investigate the effects of Yoga on improving low back stability (threshold of stability, and mean total velocity of center of pressure), trunk strength (isometric strength in extension and flexion), and back endurance (isometric endurance in extension, flexion, and side laterals). The outcomes of this study illustrate the potential of Yoga as a low impact exercise regime for improving low back stability via neuromuscular control and proprioception. [11]

Ananthanarayanan T.V., Srinivasan T.M (1994) found the results of clinical trials on 16 patients using this method of asana selection and rehabilitation indicate the usefulness of this method for the management of low back pain. Only regular practitioners of these exercises improve while indifferent or improper practice has been found to have no rehabilitative value. [12]

The results of present investigation also shows the significant trend of the effect of various yogic intervention strategies on back strength

Galantino M.L. et.al. (2004) A randomized controlled trial studied a 6-week modified hatha yoga protocol with 22 patients. [13] The yoga group spent an hour with a certified instructor twice weekly, while the control group received the same intervention delayed until the study phase was completed. This underpowered pilot study found trends in functional measurement scores for improved balance and flexibility, as well as decreased disability and depression in the yoga group, but the sample size was too small to detect significant changes.

Hudson S. (1998) Patients who practice hatha yoga say it is valuable for preventing and managing stress-related chronic health problems, including low back pain. In a survey of 3000 people receiving yoga for health ailments (1142 [38%] with back pain), 98% claimed that yoga benefited them.[14]

Jacobs B.P. et.al. (2004) linear trend during experimental treatment of back strength was found significant. A number of rationales have been put forward for yoga's utility as a therapy for chronic back pain. Yoga improves strength, range of motion, balance and agility, and mobilizes the spine. [15]

Sherman K.J. et.al. (2005) Yoga couples physical exercise with breathing, which links the mind and the body, and thus offers physical movement with a mental focus [26].

Morone N.E. et.al. (2008, 2009) Research on meditation as an effective intervention for chronic low back pain highlights the constructive role of cognitive components in people's ability to manage their pain. Mindfulness meditation helps reduce pain, improve physical function, and increase quality of life [17, 18].

5. Conclusion

Strength, muscular endurance, and flexibility are important components of healthy back function. Balanced, healthy functioning of the musculoskeletal system requires that muscles be able to exert force or torque (measured as strength). Because of this, strength, endurance and flexibility are viewed as important dimensions of health related fitness [19]. Of utmost concern is healthy back functioning, because a frequent cause of activity limitation among homemakers is low back pain (LBP). [24] Many yoga practitioners develop an ability to maintain correct body posture, increase their articular mobility and improve muscular strength and efficiency. There are many more benefits of practicing asanas, pranayams and meditation, one of which is that specific asanas can improve the functioning of the whole body, as well as its particular systems and organs, as in case of present investigation, practice of various yogic intervention strategies for the period of 3 months produced a significant trend of the effect on back strength of homemakers.

6. Acknowledgement: Authors would be remiss to express gratitude Department of Health Science and Fitness (AT) Lakshmi Bai National University of Physical Education, Gwalior (Madhya Pradesh) for providing assistance in collecting the pertinent information for undertaking quality research.

7. References

- [1] Nowotny J., Saulicz E., (1993). Some problems of nomenclature within the scope of faulty postures. *Zeszyty Medyczo-Naukowe AWF Katowice*, 3:5–15
- [2] Kumari P, Dayal R. (2009). Feeling of discomfort perceived by rural women while working in the existing kitchen arrangements. *Asian Journal of Home Science*, 3(2): 158-160.
- [3] Grand Jean E. (1988). *Ergonomics of the Home*. London: Taylor and Francis.
- [4] De Looze M. P., Toussaint H. M., Ensink, J. and Mangus, C. (1994). The validity of visual observation to assess posture in laboratory-stimulated manual material handling task. *Ergonomics*, 37: 1335-43.
- [5] Satchidananda, S. (1990). *The yoga sutras of Patanjali*. Yogaville: Integral Yoga Publications.
- [6] Posadzki P., (2005). Selected aspects of yoga in view of manual therapy. *Medycyna Manualna*, 1(2): 9–20.
- [7] Weil R., 2007. Yoga. <http://www.medicinenet.com/Yoga/article.htm>.
- [8] Brochu, M., Savage, P., Lee, M., Dee, J., Cress, M., Poehlman, E., Tischler, M. & Ades, P. (2002). Effects of resistance training on physical function in older disabled women with coronary heart disease. *Journal of Applied Physiology*, 92: 672-678.
- [9] Greendale G.A., Huang M.H., Karlamangla A.S., Seeger L., Crawford S., (2009) Yoga decreases kyphosis in senior women and men with adult-onset hyperkyphosis: results of a randomized controlled trial. *Journal of Amateur Geriatric Sociology*, 57 (9):1569–1579.
- [10] Miller, B. S. (1998). *Yoga Discipline of Freedom*. New York: Bantam Books.
- [11] Mistry A., (2011). Effects of Yoga on Low Back Stability, Strength and Endurance Master of Science in Industrial and Systems Engineering September 8, 2011 Blacksburg, Virginia.
- [12] Ananthanarayanan T.V., Srinivasan T.M., (1994). Asana-based exercises for the management of low-back pain. *Journal of International Association of Yoga Therapists*, 4:6–15.
- [13] Galantino ML, Bzdewka T.M., Eissler-Russo J., et al. (2004). The impact of modified Hatha yoga on chronic low back pain: a pilot study. *Alternate Therapy Health Medical*, 10:56–58.
- [14] Hudson S. (1998). Yoga aids in back pain. *Australian Nursing Journal*, 5(9):27.
- [15] Jacobs B.P., Mehling W., Avins A.L., Goldberg H, Eppel E. et al. (2004). Feasibility of conducting a clinical trial on hatha yoga for back pain: Methodological lessons. *Alternative Therapies in Health & Medicine*, 10: 80-83.

- [16] Sherman K.J , Cherkin D C., Erro J , Miglioretti D.L., Deyo R.A., (2005). Comparing yoga, exercise, and a self-care book for chronic low back pain: A randomized controlled trial. *Annals of Internal Medicine*, 143: 849-856.
- [17] Morone N.E., Greco C.M., Weiner D.K., (2008). Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study. *Pain* 134: 310-319.
- [18] Morone N.E., Rollman B.L., Moore C.G, Li Q., Weiner D.K., (2009). A mind-body program for older adults with chronic low back pain: Results of a pilot study. *Pain Med.* 10: 1395-1407.
- [19] Plowman S.A., (2001). Muscular strength, endurance, and flexibility. <http://www.cooperinst.org/ftgrefintro.asp>.
- [20] Balagué F., Damidot P., Nordin M., Parnianpour M., Waldburger M., (1993). Cross-sectional study of the isokinetic muscle trunk strength among school children. *Spine*, 18: 1199-1205.