

Original Research Article

## **Comparative Efficacy of Physiotherapy Treatment and Yogic Asana on Low Back Pain Intensity among Data Entry Operators in Pondicherry University**

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### **ABSTRACT**

Nowadays low back pain is very common among all who is involved in working settlement. The purpose of the present study was to examine the comparative efficacy of selected physiotherapy treatment and yogic asanas on low back pain intensity among data entry operators in Pondicherry University. Thirty subjects of data entry operators, age ranges from 18-30 years randomly selected those who feeling low back pain intensity comprised into two equal groups; experimental group-I and experimental group-II. Physiotherapy treatment and Yogic asanas were given for training period. The experimental group-I was taken Physiotherapy treatment and experimental group-II received hot fomentation followed by selected Yogic asanas. The statistical analysis t-ratio was used to see the significance difference between the Physiotherapy treatment and Yogic asanas treatment. The results revealed that in both training assessments were significantly reduce low back pain intensity among the data entry operators.

**Key words:** Physiotherapy, Yogic asana, Low back pain and Data entry operators.

### **INTRODUCTION**

Low back pain is so common that according to an estimate about 60-80% of the people experience low back pain sometime during their lifetime. The structure of lumbosacral spine is such that predisposes it to mechanical injury causing low back pain. Any movement or series of movements, which places abnormal stress or abnormal loading on the spine, can injure it. This may be a sudden overload or a cumulative overload. Various studies have confirmed that lower back problems are second only to foot problems in order of incidence to humans throughout their lives. It is a common complaint among the overall population and athletes. Low back pain is more common among the sportsmen as they

are subjected to repetitive bending, twisting or compressive loading stresses to the spine. In athletes, reported incidence rates of lumbar pain vary between 7% and 27% (Spencer & Jackson, 1983 and Varlotta & Birnbaum, 1995).

Although low back pain is very common, however the exact cause of low back pain cannot be identified in 80% to 90% of the patients. An exact diagnosis cannot be made due to a loose association among symptoms, physical examination and anatomical findings. Low back pain is most often due to an incompetence of the soft tissue structure, and the onset of pain is believed to be caused by a mechanical injury (Mooney, 1996). Several factors may contribute to low back pain including

muscular deficiencies (specifically insufficient abdominal strength and trunk flexibility) and incorrect posture and body mechanics. Mechanical pain is produced by deformation of structures containing nociceptive nerve endings, and there is a clear correlation between certain body positions and patient's symptoms. Conversely, non-mechanical pain is of a constant nature. This may be exacerbated by movement or position, but importantly, no position will be found which completely relieves the symptoms (Norris, 1993). The non-mechanical category may include inflammatory, infective, vascular, visceral, metabolic, psychological or other conditions that may produce low back pain.

There are various types of healing therapies, and each one claims to give best results in the low back pain. Physiotherapy treatment and Yogic asanas are both excellent means of promoting flexibility to the joints and soft-tissues. They also help improve muscular strength, endurance, controlled muscular actions and relaxation.

The important role that physiotherapy and remedial exercises have on improving or restoring muscle-strengths, flexibility and body mechanics in preventing or remediating back problems have been well documented by many including Melleby (1982), Getchel (1983) and Liemohn (1988). Jasmine & Mhatre (2006) in a study conducted on 20 patients suffering from mechanical low back pain showed that the group of the patients that received training of core stabilizer muscles improved significantly in pain relief and functional ability. Shahand Gohel (1989) conducted a study on 100 patients with low back pain having age 31 -50 years and the patients were treated with various modalities like Short Wave Diathermy, flexion exercises/extension exercises alone, or in combination, and found that the maximum number of patients got relief by a combination of Short Wave Diathermy and flexion exercises.

Signifying the yoga as a great source of health and fitness, Dr. Salk, Noble Prize

Winner rightly said, "Medicine is Science of disease and Yoga is the Science of health". Asanas forms only one of the basic components of complete ashtanga yoga. Each asana is a series of scientifically developed slow, rhythmic and graceful movements of various joints and muscles of the body aimed at attaining a definite posture as related to that particular asanas. Various studies have confirmed the usefulness of yogic asanas in preventing as well as curing many ailments and diseases. With reference to the positive effects of yogic asanas in back related problems, few studies are cited here. Many researchers have shown that with yogasanas like Konasana, Suptavajrasana, Bhujangasana, Shalabhasana and Chakrasana, favourable response was shown in patients suffering from low back pain with improved functional capacity. Jothiwaran (1998) indicated a significant change in the postural deviations of spinal column due to influence of yoga and remedial exercises. Thirumalaisamy (1996) found that low back pain may be subsided by means of selected yogic practices.

#### ***Aim of the Study***

The aims of central objective to study low back pain intensity among data entry operators in Pondicherry University with special training assessment of selected physiotherapy treatment and yogic asanas.

#### ***Objectives of the Study***

The following objective was elucidated;

1. To examine whether any difference between pretest and posttest physiotherapy treatment group participants with low back pain intensity.
2. To examine whether any difference between pretest and posttest yogic asanas group participants with low back pain intensity.
3. To examine whether any difference between physiotherapy treatment and yogic asanas with pre and posttest among participants with low back pain intensity.

## MATERIALS AND METHODS

### Research Design

The experimental research design adopted for this present study. The 30 subjects were chosen through using simple random sampling. The Experimental Group-I was given Physiotherapy treatment and Experimental Group-II was given yogic asanas.

### Participants

The sample was consisted of 30 data entry operators in Pondicherry University and the sample were selected through simple random sampling technique. The criterion for including the samples were gender, age (i.e., 18-30 years), duration of working hours (at least 4 h a day or 20 h per week); Prior to the administration of test the investigator detail elaborated purpose of the study and their role in the investigation. Instruction in connection with the testing procedure of selected variables was also explained to the subjects. The investigators personally demonstrated and familiarize the subjects with the techniques involved in various training assessments used to collect the information.

### Research Instruments

#### Physiotherapy Training

The physiotherapy training was taken Experimental Group-I such as:

#### Pulsed Short Wave Diathermy (for 10 minutes)

Short wave Diathermy is one important modality which can help in improvement of range of motion. It can also elevate tissue temperature within physiological range of 37.5°C and increases extensibility of deep collagen tissue decreases joint stiffness, relieves pain, muscle spasm, assists in resolution of inflammation.

#### Flexion and Extension regimes of spinal exercises

The following Physiotherapy Training was interpreted below;

**Prone Extension (Positioned):** Lie on stomach with pillows under chest for comfort. The process workouts with repeat

exercises (3 times) and hold position (15 seconds).

**Prone Extension (Elbow):** Keep your back and buttocks relaxed and rise up on elbows as high as possible. The process workouts with repeat exercise (3 times) and hold position (15 seconds)

Concentrate on keeping your hips down. The process workouts with repeat exercise (3 times) and hold position (15 seconds)

Place hands beside shoulders with repeat exercise (3 times) and hold position (15 seconds).

**Prone Extension (Press-Up):** Keep your back and buttocks relaxed and use your arms to press up. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Concentrate on keeping your hips down with repeat exercise (3 times) and hold position (15 seconds).

Push up your upper body as high as possible with repeat exercise (3 times) and hold position (15 seconds).

**Standing Extension:** Stand with your feet apart and hands on the small of your back with fingers pointing backwards. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Bend backwards at the waist, supporting the trunk with your hands with repeat exercise (3 times) and hold position (15 seconds).

Keep your knees straight with repeat exercise (3 times) and hold position (15 seconds).

**Side Glide in Standing:** Stand at a right angle to the wall about 2 feet out from the wall. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Lean your elbow and shoulder into the wall with repeat exercise (3 times) and hold position (15 seconds).

Move your hips toward the wall, keeping your legs together and your knees straight. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Return to the starting position

**Prone Extension (Bridging):** Tighten your abdominal muscles to keep your back in a neutral position. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Use your buttock muscles to slowly rise off the surface without bending your lower back. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Relax your shoulders and neck as you hold and Make sure to keep your breathing even freely.

**Prone Extension (Leg Raises):** Lie on your stomach with a pillow under your hips. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Raise the right leg 1 inch off the mat. Then, raise the right leg 3-6 inches off the mat. The process workouts with repeat exercise (3 times) and hold position (15 seconds).

Repeat with the left leg.

### **Yogic Asanas**

The yogic asanas was taken Experimental Group-II with following techniques such as:

**Bhujangasana:** Lie down on your stomach, rest your head on your hands and relax the body position.

Then join on your legs and stretch your arms.

Keep your forehead on the ground and place your hands beside the body

Then keep your palms and elbows on the ground.

And inhale slowly; lift the chin and chest come up to naval region.

**Dhanurasana:** Lie down with face and stomach downward.

Then Stretch the arms and hold the feet firmly.

Inhale slowly, raise the trunk and head. Continue to raise trunk, simultaneously raise the knees and head, so that the body stretches like head, so that the body stretches like a bow. Hold for few seconds with normal breathing.

Start exhaling, slowly lower the knees and the head

Release the feet, hands and relax completely

**Pavanmuktasana:** Lie down flat on the back and bends both knees and bring the things to the chest.

Then interlock the fingers and clasp the shin below knees.

Slowly exhale; rise the heads till your chin touches the knees and come in relax moment.

**Paschimottanasana:** Sit on the floor with your back up straight.

Stretch your legs out in front of you, keeping them close to each other but slightly apart with feet pointed to the ceiling.

Then pulling the flesh from underneath sit bones towards backside and increase the level of stretching and decrease the spine curvature.

Inhale and raise your arms over your head, stretching them towards the ceiling. Look at your palms, lengthening your spine at the same time.

Exhale, bending forward-try bending from the hips, keeping your spine as straight as possible until you will be unable to bend further without curving it.

**Shavasana:** Lie down on your back with arms and legs comfortably apart.

Palms facing upward; eyes closed.

Then come in relax position with consciously of your whole body.

All these asanas received hot fomentation for 10 minutes at the time of training period.

### **Numeric Pain Intensity Scale**

The most commonly used one-dimensional pain scale is the Numeric Pain Intensity Scale (NPI), also called the Numeric Rating Scale (NRS). This scale is made up of a horizontal line with the beginning point marked 0, or "no pain," and the opposite end marked 10, or "worst possible pain." Patients are asked to rate their pain from 0 to 10 after training and before training, choosing the number that best represents the intensity of the pain. The

pain intensity rating point was collected from participants with pre and post treatment.

**Procedures**

Thirty data entry operators of Pondicherry University, aged 17-24 years from Pondicherry were randomly selected. These subjects having complaint of low back pain reported to Physiotherapy center of the Institute for treatment. The subjects were divided into two equal groups; Experimental Group I and Experimental Group II. Experimental Group-I was given Physiotherapy treatment which included Pulsed Short Wave Diathermy application for 10 minutes and Flexion and Extension regimes of spinal exercises. Experimental Group-II received hot fomentation for 10 minutes to low back region followed by selected yogic asanas namely Bhujangasana, Dhanurasana, Pavanmuktasana, Paschimottanasana, and Shavasana. Both groups received treatment for three weeks (5 days a week). Short Wave Diathermy model

Thermatur-200 manufactured by Uniphy, Netherlands was used with drum shaped treatment head (14cm diameter) for the study. Flexion regime of exercises included posterior pelvic tilt, Knees to the chest, and sit up straight and obliquely from supine crook lying position. Extension regime of exercises included the prone press up with hands clasped behind the back, and alternate leg extension from prone position. The selected yogic asanas were done empty stomach (under the supervision of a qualified yoga expert). Duration of holding the asanas was gradually increased as per the tolerance of each subject. And finally, the low back pain was assessed before and after the treatment of subjects.

**Statistical Treatment of Data**

The data from both the groups were statistically analyzed for before and after the treatment and the data were tabularized by following statistics like, paired means, t-ratio was applied to see the significance difference between the groups.

**RESULTS & DISCUSSION**

**Table 1: Pre Mean Difference between Experimental Group-I and Experimental Group II.**

Groups	Pre- Mean	S.D.	D.M.	σD.M.	t-ratio
Experimental Group I	3.00	0.76	0.13	0.25	0.51 <sup>ns</sup>
Experimental Group II	3.13	0.64			

Note: <sup>ns</sup> = Not significant

**Table 2: Pre and Post Means Difference of Experimental Group-I (Physiotherapy Treatment).**

Experimental Group-I	Pre- Mean	S.D.	D.M.	σD.M.	t-ratio
Pre-Treatment	3.00	0.75	1.60	0.24	6.82 <sup>**</sup>
Post-Treatment	1.40	0.50			

Note: <sup>\*\*</sup> = Significant at 0.01 levels

The table-1 revealed Pre Mean difference between Experimental Group-I and Experimental Group II. The difference in the Pre-Means of Experimental Group I and Experimental Group II is statistically insignificant (t=0.51, p > 0.05). Therefore, there is no significant difference between the Experimental Group I and Group II prior to the treatment.

Finding of table-2 shows that the significance of difference between the Pre and Post Means of Experimental Group I. Since the obtained value of (t = 6.82) is significant beyond 0.01 levels. Therefore, it can be concluded that Physiotherapy treatment comprising of Pulsed Short Wave Diathermy and Exercises for duration of three weeks (five days a week) relieves the low back pain significantly.

**Table 3: Pre and Post Mean Difference of Experimental Group II (Yogic Asanas).**

Experimental Group-II	Pre- Mean	S.D.	D.M.	σD.M.	t-ratio
Pre-Treatment	3.13	0.64	1.53	0.23	6.60 <sup>**</sup>
Post-Treatment	1.60	0.61			

Note: <sup>\*\*</sup> = Significant at 0.01 levels

**Table 4: Post Means Difference between Experimental Group-I and Experimental Group II.**

Experimental Groups	Pre- Mean	S.D.	D.M.	σD.M.	t-ratio
Experimental Group-I	1.40	0.50	1.20	0.21	0.95 <sup>ns</sup>
Experimental Group-II	1.60	0.63			

Note: <sup>ns</sup> = Not significant

Finding of table-3 reveals that there is significance of difference between the Pre and Post Means of Experimental Group II. Since the obtained value of  $t = 6.60$  is significant beyond 0.01 levels. Therefore, it can be concluded that the yogic treatment consisting of heat and yogic asanas for duration of three weeks (five days a week) relieves low back pain significantly.

Finding of table-4 observed that the 't' value between the Post-Means of Experimental Group I and Experimental Group II is (0.957) much less than the required value for significance ( $t=0.95$ ,  $p > 0.05$ ). Therefore, it can be concluded that there is no difference between the Experimental Group I and Group II after treatment.

From the statistical analysis it is revealed that there is significant reduction and relief in low back pain in both the Experimental Group I and Experimental Group II which received Physiotherapy treatment, and Yogic asanas treatment respectively. The first objective was found that there was significant difference between pretest and posttest physiotherapy treatment group participants with low back pain intensity. In this context, the experimental group-I feel better in back pain after training intervention in physiotherapy treatment. Which indicates that physiotherapy treatment have good effect for posttest group than pretest group. The posttest group was scored low pain intensity in comparison to pretest group.

The second objective was found that there was significant difference between pretest and posttest yogic asanas group participants with low back pain intensity. In this context, the experimental group-II feels better in back pain after training intervention in yogic asanas. Which indicates that yogic asanas treatment have good effect for posttest group than pretest

group. The posttest group scored low pain intensity in comparison than pretest group.

The third objective was found that there was no significant difference between physiotherapy treatment and yogic asanas with pre and posttest among participants with low back pain intensity. In this context, the experimental group-I and experimental group-II with pretest mean score and posttest mean score found insignificant. Which indicates that the pretest between experimental group-I and experimental group-II, and posttest between experimental group-I and experimental group-II participants have no such difference in back pain intensity

The relief of pain in Experimental Group-I could be attributed to the therapeutic effect of Pulsed Short Wave Diathermy because of increased blood circulation, acceleration of healing process, and selection of planned regimes of exercises. The findings of the present study are in consonance with the findings of Melleby (1982), Getchel (1983), and Jasmine (2006). Further, the relief of pain in Experimental Group II may be due to the effect of heat on pain relief as well as the ability of yogic asanas in improving flexibility of joints and muscular strength. Holding of asana for a certain period of time involves static posture, which is very important for efficient conditioning of the body (Tirumalaisamy, 1996).

## CONCLUSION

In the present study it may be concluded that both the Experimental Groups that received Physiotherapy and Yogic asanas treatment separately, low back pain reduced significantly. Both assessments were more adversely affect to reduce low back pain intensity among data operators in Pondicherry University. Future studies may be conducted with a combined approach of Physiotherapy and Yogic

practices. General population as well as the sports persons must be educated for correct body mechanics and posture at work, study, play field or while sleeping so that the low back pain can be prevented.

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