



## A COMPARATIVE STUDY BETWEEN EFFECTIVENESS OF YOGA AND CORE STRENGTH TRAINING EXERCISES IN CHRONIC NON-SPECIFIC LOW BACK PAIN AND FUNCTIONAL DISABILITY IN NURSES

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### ABSTRACT

**Objectives-** To find out a better treatment approach in pacifying chronic non-specific low back pain and reducing functional disability between yoga and core strength training exercises. **Aim-** To compare effectiveness of yoga and core strengthening exercises in chronic low back pain and functional disability in nurses. **Design-** Experimental Study **Setting-** Hospitals in and around Pune **Method-** the study included nurses of age group 30-45 years diagnosed with non-specific chronic low back pain with complete musculoskeletal assessment. The subjects were divided by convenient sampling in two groups, the first group was treated with core strengthening exercises and the other group had yoga as treatment. **Analysis and Result-** post data analysis shows that both the treatment approaches are equally effective. **Conclusion-** there is no significant difference in core strength training exercises and yoga for treating chronic non-specific low back pain and functional disability in nurses.

### KEY WORDS

Nurses, chronic non-specific low back pain, yoga, core strength training

### INTRODUCTION

Low back pain is an important health problem in all industrialized countries. It remains to be a leading cause of disability in population younger than 45 years. Low back pain persisting for more than 12 weeks is considered as chronic <sup>(1)</sup>. Chronic non-specific low back pain is caused due to prolonged hours of standing, sitting with awkward posture, bending forward, lifting heavy weights, etc.

Nursing is a very stimulating field because of the strenuous workloads accompanying the irregular work shifts. All these factors lead to develop musculoskeletal disorders and pain in nurses. Low back pain being one of the most common health concern, it can affect the quality of life they provide to the patients along with their own life. The activities like long time sitting, forward bending, lifting heavy weights (shifting patients, moving some equipment) nurses become

more susceptible to develop low back pain. That is the reason it is necessary to find some useful and easy treatment for the chronic low back pain which is not caused due to any trauma or any underlying pathology. This study is intended to find out an effective treatment approach in pacifying chronic non-specific low back pain and functional disability in the occupation of nurses. Moist heat therapy or Hydrocollator packs are used to help raise the temperature of soft tissues directly below the surface of the skin.

Moist heat therapy applied to the surface for the skin enlarges blood vessels below the surface, relaxing tissues and temporarily relieving painful symptoms. Increasing circulation and relaxing muscles is helpful before or after therapeutic exercises and other treatments <sup>(3)</sup>.

Yoga is an ancient art which involves controlled breathing, prescribed body positions and meditation.

Yoga combines exercise with achieving a state of mental focus through breathing. Although all the sessions emphasized use of postures and breathing for managing low back symptoms, each had a specific focus: relaxation; strength building, flexibility, and large-muscle movement; asymmetric poses; strengthening the hip muscles; lateral bending; integration; and customizing a personal practice.

Strength training is focused on individual or group of muscles of back and core which by working on gaining strength can lead to pacifying the pain and improving the motor control and hence maintaining the balance. Strength training exercises are very basic exercises which can be modified over time in the form of resistance and frequency according to the person.

The core muscles, which are the primary muscle group for maintaining spinal stability<sup>3)</sup>, can be divided into two groups according to their functions and attributes. The first group of muscles is composed of the deep core muscles, which are also called local stabilizing muscles. These muscles primarily include the transversus abdominis, lumbar multifidus, internal oblique muscle and quadratus lumborum<sup>3, 6)</sup>. The lumbar multifidus is directly connected to each lumbar vertebral segment<sup>5)</sup>, and the transversus abdominis and lumbar multifidus activate a co-contraction mechanism. The abdominal draw-in that occurs during contraction provides spine segmental stability and maintains the spine within the neutral zone<sup>2)</sup>. In addition, these muscles provide precise motor control and are thus primarily responsible for spinal stability<sup>6, 8)</sup>. The second group of muscles comprises the shallow core muscles, which are also known as global stabilizing muscles, including the rectus abdominis, internal and external oblique muscles, erector spinae, quadratus lumborum, and hip muscle groups<sup>9)</sup>.

These muscles are not directly attached to the spine but connect the pelvis to the thoracic ribs or leg joints, thereby enabling additional spinal control.

These muscles produce high torque to counterbalance external forces impacting the spine; thus, this group of muscles is secondarily responsible for maintaining spinal stability<sup>6, 8, 10)</sup>. When the core muscles function normally, they can maintain segmental stability, protect the spine, and reduce stress impacting the lumbar vertebrae and intervertebral discs<sup>11)</sup>; hence, the core

muscles are also called “the natural brace” in humans<sup>10)</sup>. The causes of CLBP are complex, several of which are unknown<sup>12)</sup>. One major cause involves the weakening of the shallow trunk and abdominal muscles<sup>12, 13)</sup>. Mitigating CLBP and improving mobility typically involves strengthening these muscles<sup>12)</sup>. Another cause of CLBP is the weakening of or insufficient motor control of the deep trunk muscles, such as the lumbar multifidus and transversus abdominis<sup>4)</sup>. During physical activities, the trunk muscle tissues ensure the mobility and stability of the lumbo-pelvic region; thus, changes in trunk muscle activity (particularly in the lumbar multifidus and transversus abdominis) are typically observed in patients with low back pain<sup>8)</sup>. Core strength training is directed at training the deep trunk muscles<sup>14)</sup>. Therefore, the purpose of the present study is to study and observe the effect of yoga and core strength training exercises in chronic non-specific low back pain and functional disability in nurses.

## METHOD

40 subjects were selected who had chronic non-specific low back pain. The diagnosis was done with the help of complete musculoskeletal examination. Subjects were conveniently divided into 2 groups. Both the groups had hydro-collator packs as a common treatment. First group had core strength training exercises and hydro-collator packs and the second group had yoga and hydro-collator packs as treatment. Both the treatment approaches were given for 8 weeks. The protocols were given 3 days a week for 8 weeks.

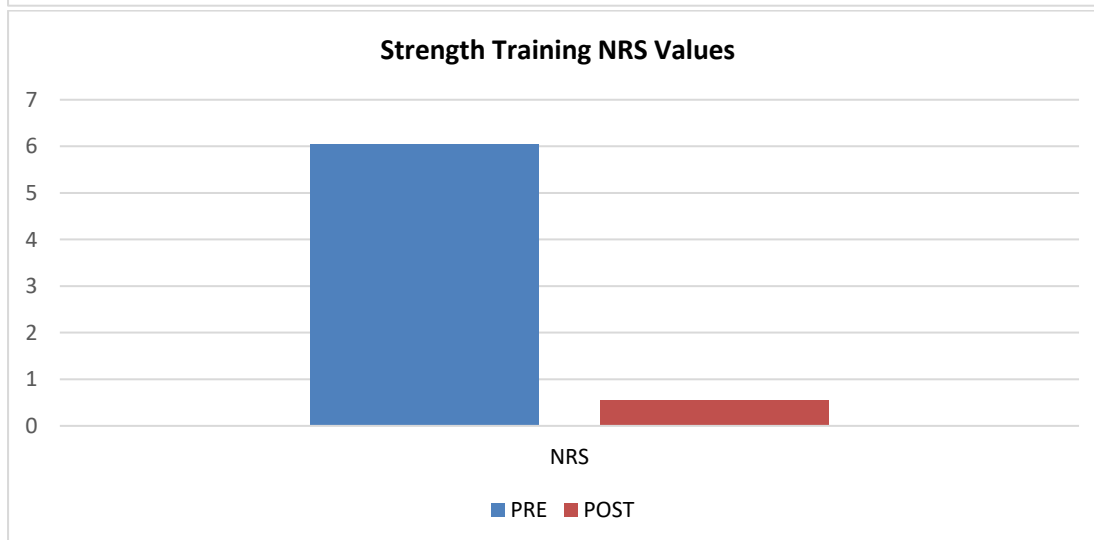
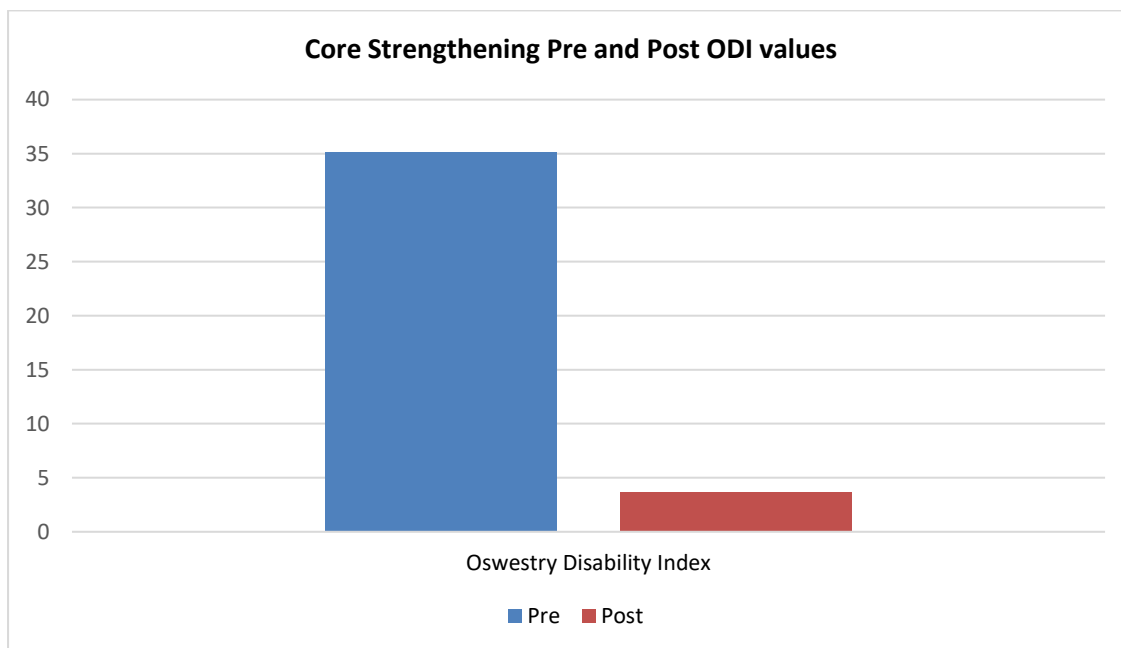
The exercises in core strength training included supine abdominal draw in, abdominal draw in with knee to chest, abdominal draw in with heel slides, supine abdominal draw in double knee to chest, supine twist, and Quadruped Opposite arm/leg. In yoga 6 asanas were included such as Trikonasana, Salabhasana, Dhanurasana, Meru wakrasana, Pascimottanasana, Savasana.

## Findings-

The analysis was done. The pre and post values of the individual group were compared which showed that both groups are extremely significant. In the comparison of the groups, there was no significant difference.

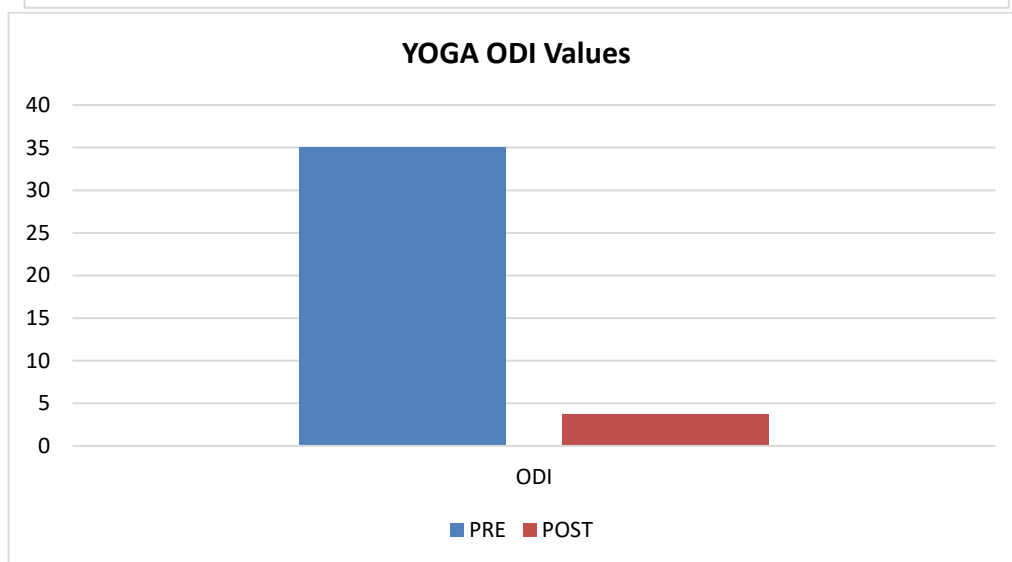
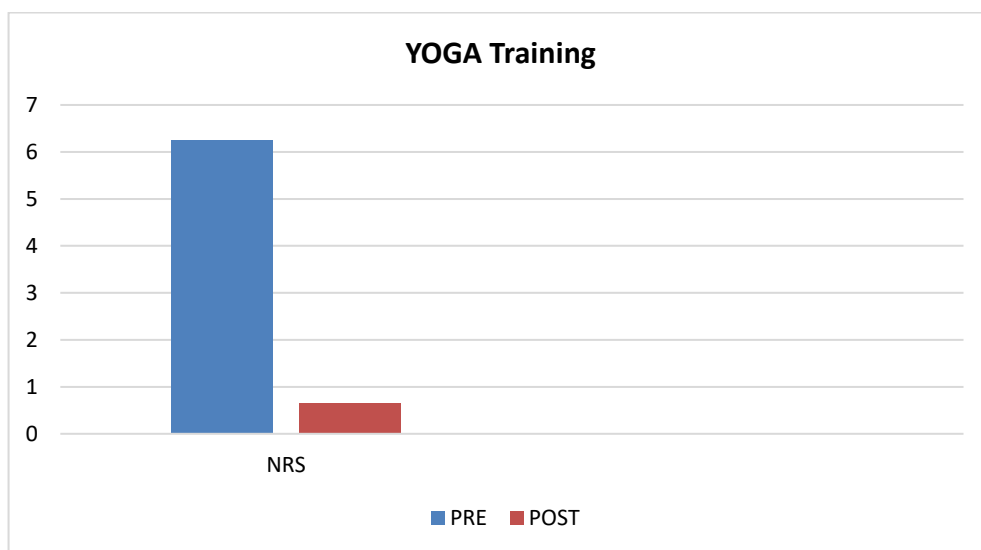
### Pre and Post Values of Strength Training Exercises

|                |      | Mean $\pm$ SD     | t value | P value | Significance          |
|----------------|------|-------------------|---------|---------|-----------------------|
| NRS            | Pre  | 6.05 $\pm$ 0.75   | 29.73   | <0.0001 | Extremely significant |
|                | Post | 0.55 $\pm$ 0.68   |         |         |                       |
| Oswestry Index | Pre  | 35.10 $\pm$ 1.026 | 98.32   | <0.0001 | Extremely significant |
|                | post | 3.60 $\pm$ 1.392  |         |         |                       |



### Pre and Post Yoga Training Values

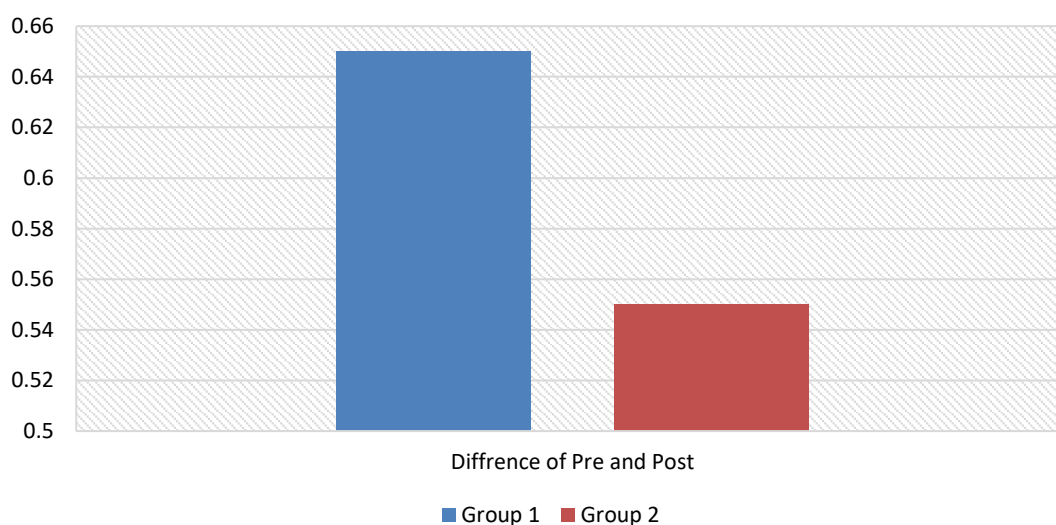
|                |      | Mean $\pm$ SD    | t value | P value | Significance          |
|----------------|------|------------------|---------|---------|-----------------------|
| NRS            | Pre  | 6.25 $\pm$ 0.63  | 25.17   | <0.0001 | Extremely significant |
|                | Post | 0.65 $\pm$ 0.74  |         |         |                       |
| Oswestry Index | Pre  | 35.0 $\pm$ 1.376 | 67.29   | <0.0001 | Extremely significant |
|                | post | 3.70 $\pm$ 1.342 |         |         |                       |



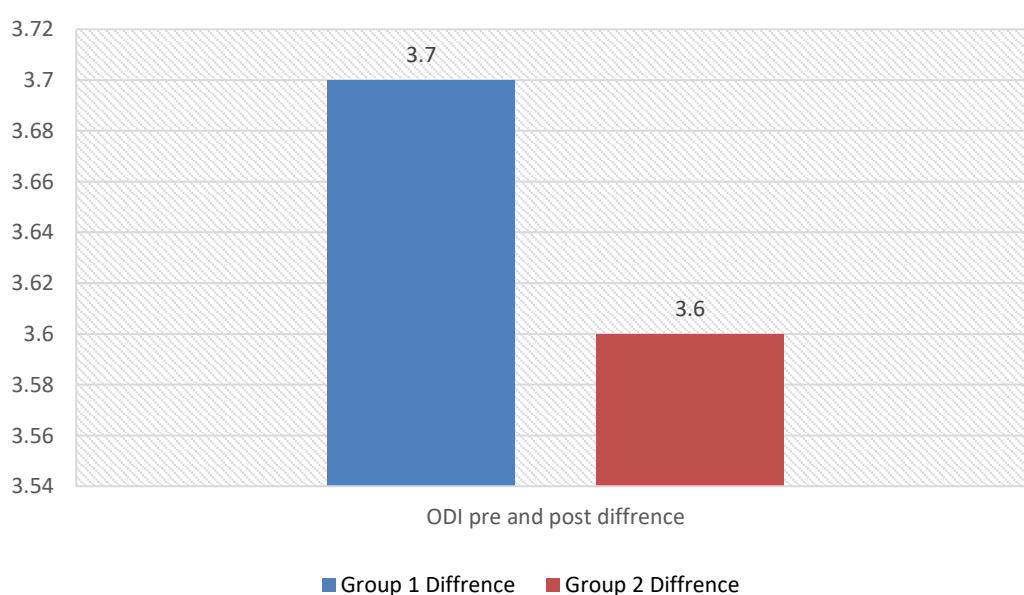
Comparison between Values of Strength training and Yoga

|                   |                                   | Mean $\pm$ SD   | t value | P value | Significance    |
|-------------------|-----------------------------------|-----------------|---------|---------|-----------------|
| NRS               | Group 1<br>Yoga                   | 0.65 $\pm$ 0.74 | 0.414   | 0.66    | Not significant |
|                   | Group 2<br>Core Strength training | 0.55 $\pm$ 0.68 |         |         |                 |
| Oswestry<br>Index | Group 1<br>Yoga                   | 3.7 $\pm$ 1.34  | 0.231   | 0.81    | Not significant |
|                   | Group 2<br>Core strength training | 3.6 $\pm$ 1.39  |         |         |                 |

Comparison Between NRS Values



Comparison Between Pre and Post ODI values of Both Groups



## RESULT

- The values of core strength training group were as following-

When compared the pre and post NRS values of the core strength training group the p value was  $<0.0001$  which considered extremely significant. When compared the pre and post values of ODI the p value was  $<0.0001$  which is extremely significant

- The values of Yoga group were as following-

The comparison of NRS values pre and post treatment gave p value of  $<0.0001$  which is considered extremely significant.

When compared the pre and post values of ODI the p value was  $<0.0001$  which is extremely significant.

The comparison of both the groups had no significant difference as their values were as following-

The NRS value gave p value of 0.66 which did not have any significant difference.

The ODI values this comparison gave p value of 0.81 which did not have any significant difference.

## DISCUSSION

The aim of the study was to find the effective treatment approach between core strength training exercises and yoga in chronic non-specific low back pain and functional disability in nurses. For this study 40 nurses fulfilling the inclusion criteria were treated for their complaints. The subjects were assessed in order to qualify for the criteria of having non-specific low back pain. After the assessment the subjects who qualified were explained about the exact procedure and then they were allotted to their respective group. Both the approaches were given to the subjects thrice a week for consecutive 8 weeks with moist heat therapy as a common treatment. The outcome measures were recorded and after completion of the 8 weeks for the data analysis.

The collected data was analysed. As there were two groups, within the group paired t test was done. Pre and post values were compared. To compare both groups, unpaired t test was done. The result showed that there was significant difference between the pre and post values of NRS and ODI in both groups which shows that both treatment approaches were effective in pacifying the pain and functional disability in the subjects. The comparison of the groups had no significant difference. Which was showed by p value of 0.66. The subjects included in strength training group was having

improvement in their pain must be a result of their strength gain. As the subjects didn't have any specific pathology behind their back pain, by doing strength training exercises with HCP, there was increased circulation due to HCP which could have helped in better healing and draining of substance P. After doing strength training exercises, there might be muscular hypertrophy and hyperplasia which increases tension-producing capacity of the muscle. By doing these exercises the core will get strengthen and it will reduce the tension load on the back by counterbalancing the weakness of back muscles. Core strengthening will also improve muscle control and hence reducing the pain. The reduction in pain helped the subjects in returning to their functional day to day activities.

While comparing the values of ODI, p value was 0.81 which had no significant difference. Yoga helps to improve muscle control which caused the back muscles to improve their strength and hence reducing the imbalance in muscles causing reduction in pain. The group who had yoga showed functional independence will be a result of the psychological component which yoga provides over strength training. Yoga is basically attaining different postures while focusing on breathing pattern which provides some psychological relief. As yoga is supposed to work on mind along with body, the subjects informed that they were feeling less anxious and depressing than usual. Over the period of treatment, they experienced that their quality of life improved and they were feeling more ease in doing their normal day to day activities. This approach might have helped the subjects to become functionally more independent.

## CONCLUSION

- The core strength training and yoga are equally effective in reducing chronic non-specific low back pain and functional disability in nurses.

### Conflict of Interest-

There is no conflict of interest in the conduct of the study.

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