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Effectiveness of slump stretching on chronic low back pain in nurses working ICU

Sanyukta Lad[1], Dr. Nupoor Kulkarni[2]
[1] Department of Community Physiotherapy, Dr A. P. J. Abdul Kalam College of Physiotherapy, PIMS (DU) Loni, Maharashtra, India
[2] Assistant Professor, Dr A. P. J. Abdul Kalam College of Physiotherapy, PIMS (DU) Loni, Maharashtra, India

Abstract
Background: The aim of the current study was to see effectiveness of slump stretching in chronic low back pain on nurses working in ICU.
Aim: To evaluate the effectiveness of slump stretching exercise on ICU nurse's with chronic low back pain.
Methods: Nurses were recruited from Pravara Medical Trust. The participants included were between age group 30-45 years.
Outcome Measure: The outcome measure was Schober Method and Numeric Pain Rating Scale.
Results: Significant in reducing pain intensity and increase lumbar flexion and extension Range of Motion (ROM). The T values obtained were 6.67, 5.58, 8.16. Which were considered as significant.
Conclusion: It was concluded that slump stretching is effective in the treatment of the chronic low back pain in nurses working in ICU.

Keywords: low back pain, slump stretching, schober method, numeric pain rating scale

1. Introduction

The study was designed to check the effectiveness of slump stretching on chronic low back pain in nurses working in the ICU. The results of the present study suggest that slump stretching is effective and significant in the improvement of chronic low back pain in the nurses working in the ICU. It was effective in reducing the pain intensity and increasing the lumbar flexion and extension Range of Motion (ROM). Previous studies also suggest that when slump stretching added to a treatment program, tremendous improvement is seen.

Flexibility is a key component of rehabilitation. Inadequate muscle extensibility a common accepted factor for musculoskeletal disorders. Neurodynamic treatment technique results in changes of the mechanical and psychological function of nerve tissues. There is no strong evidence till now to explain about mechanical and neurophysiologic mechanisms of slump stretching exercise. The first mechanism suggested that slump stretching could be due to intraneural edema, relieving hypoxia and improving associated symptoms in neurogenic pain syndromes thus restoring pressure gradients. Adhesions of neural tissue (eg: dura, dural sleeve, nerve root etc) to surrounding structures can prevent them from freely gliding and may result in local increase in strain. Thus producing irritation symptoms such as pain, burning, numbness and tingling sensations. Slump stretching can effectively reduce adhesions between the neural tissues and surrounding connective tissues. There were improved outcomes by reducing the antidromic impulses generated in C-fibers at the dysfunctional site. They result in the release of neuropeptides and subsequent inflammation in the tissues supplied by the nerve.

Another mechanism states that slump stretching may result in reduction of scar tissue, which had adhered to the neural tissue and the associated connective tissue. This accounts for reduction of pain in slump stretching. Improvement in viscoelastic properties of the nerve, resolution of edema, restoration of normal physiological properties lead to reduction in pain which also reduces disability. It improves the functional status of the patients.

Slump stretching involve stretching of hamstrings along with the neural tissue which increases the active knee extension range.

In the present study, the outcome measures used were Numerical Pain Rating Scale (NPRS), Lumbar flexion and extension were assessed pre-intervention and post-intervention using tape method. All the outcome parameters were assessed to check the progression and effect of the intervention. The BMI was also calculated for every subject as unhealthy lifestyle is one of the main reasons for low back pain. Problems and pain in the low back may be aggravated by obesity. The excess weight pulls the pelvis forward and straining the lower back, creating lower back pain. The Numerical Pain Rating Scale.

(NPRS) decreased at the end of the intervention and was less than 4 points for all the subjects. The Lumbar Flexion Range of Motion (ROM) increased more than the Lumbar Extension Range of Motion (ROM). This was confirmed by comparing the pre-intervention and post-intervention values of the outcome measures. The result was significant.

Slump stretching was effective in increasing both Lumbar Flexion and Extension Range of Motion (ROM). But it was more effective in increasing in increasing the Lumbar Flexion Range was concluded after the study.

2. Aims and objectives

Aim

1. To see effectiveness of slump stretching in chronic low back pain on nurses working in ICU.

Objective

1. To evaluate the effectiveness of slump stretching exercise on ICU nurse's with chronic low back pain.

3. Material and Method

3.1 Design

The design was experimental study conducted in Department of Community Physiotherapy, Dr A.P.J. Abdul Kalam College of Physiotherapy, PIMS, Loni. The study duration was for 4 months. The outcome measure was Schober Method and Numeric Pain Rating Scale for identifying severity of pain was assessed before and after the slump stretching. The study was approved (Ref. No. PIMS/CPT/IEC/2019/210) from the Institutional Ethical Committee of Dr. A.P.J. Abdul Kalam College of Physiotherapy, Pravara Rural Hospital. Written Informed Consent was obtained for experimentation with human subjects.

3.2 Participant

Study was done using Convenient Sampling 20 participants were screened for study were ICU Nurses from Pravara Rural Hospital, Loni.

4. Procedure

The study received ethical clearance from the Institutional Ethical Committee. The participants were screened and after finding suitability according to the inclusion and exclusion criteria. Written informed consent was taken from the participants. They were explained about the study, procedure and intervention. The participants were briefed about the nature of the study, duration of intervention and the intervention being used will be explained in the language best understood by the participants. The demographic data was obtained and detailed assessment was performed on the participants. The sample size of the study was 20 participants.

There will be 20 nurses working in the ICU between the age group of 35 to 45 with chronic low back pain. All the participants were assessed using the Schober method and pain rating scale. Evaluation was done pre and post – intervention. The intervention was given for 3 weeks and twice a week.

Slump Test

Step 1: The patient sits erect and the symptoms in this position are defined.

Step 2: The patient slumps and the physiotherapist isolates the movement to full flexion of the thoracic and lumbar spines, preventing any flexion of the cervical spine. The symptom response to the movement and to applied overpressure is determined.

Step 3: The patient fully flexes the cervical spine and overpressure is applied. Symptom responses are again determined.

Step 4: The patient extends one knee and the physiotherapist applies overpressure while noting the symptom responses.

Step 5: In this position of maximum knee extension, the patient dorsiflexes the ankle of the raised leg and the physiotherapist applies overpressure. The symptoms responses are again determined.

Step 6: While the patient is held in this position of maximum stretch, the flexed cervical component of the stretch is released and any change in the symptom responses noted. In patients of the spontaneous-onset group, the common response on release of the cervical flexion stretch is for pain to lessen or to be completely relieved. This response is proportional to the amount of cervical flexion released. When the cervical flexion has been released, the patient is usually able to extend the knee further before pain is again produced.

Step 7: The test can be repeated using both legs. Again the pain responses are determined. The cervical flexion is then released and the effect of symptoms and range of movement is assessed.

Step 8: A maximum stretch for the Slump Test can be performed with the patient in the "long-sitting" position while the physiotherapist adopts a position on the examination couch such that the firmness of the overpressure can be controlled. The sternum is used to control the thoracic and lumbar flexion, the chin controls cervical flexion, one hand stabilizes the knee extension and other hand controls the dorsiflexion.

Slump Stretching Exercise

1. **Patient Position:** Long –sitting with the patient's feet against the wall to assure ankle remained in 0 degree of dorsiflexion.
2. **Therapist Position:** Therapist applied pressure into cervical spine flexion to the point where the symptoms were reproduced.
3. The position was held for 30 seconds.
4. 5 repetitions each for 30 seconds.

Outcome Measures

Numerical Pain Rating Scale

It is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of a subjects pain.

0 No Pain

1–3 Mild Pain (nagging, annoying, interfering little with ADLs)

4–6 Moderate Pain (interferes significantly with ADLs)

7–10 Severe Pain (disabling; unable to perform ADLs)

Lumbar flexion and extension (Schober method)

- Two-mark method for measuring spinal flexion, in which one mark is made at the lumbosacral junction, and a second mark is made 10 cm above the first mark, while the subject stands with the spine in a neutral position.
- After the standing subject bends forward as far as possible, the increase in distance between the first and second marks provides an estimate of the amount of flexion that is present in the spine.
- Because the tape measure technique relies on stretching or distraction of the skin overlying the spine, this technique (and modifications of the technique) is sometimes referred to as the skin distraction method.
- Bony landmarks for LUMBAR FLEXION- midline of spine in line with PSIS, 15 cm above base line mark.
- Bony landmarks for LUMBAR EXTENSION -midline of spine in line with PSIS, 15 cm above base line mark.

Fig 1

Fig 2

Fig 3

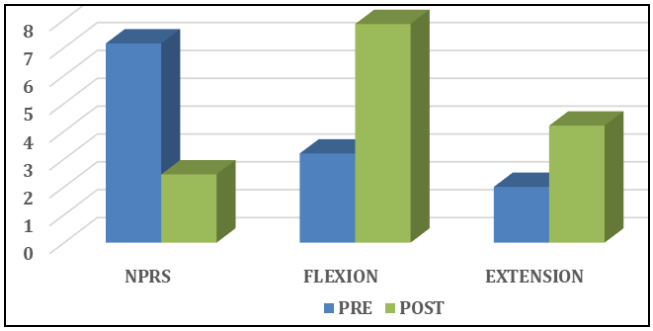
Fig 4

Fig 5

5. Data analysis and results

Table 1: Pre-Intervention, Post-Intervention and Student's Paired "t" test Scores of Outcome measures

Outcome measures	Pre-intervention Mean ± sd	Post-intervention Mean ± sd	Student's paired "t" test	Result
NPRS	7.15 ± 1.30	2.45 ± 0.82	6.67	p=0.001; significant
Lumbar Flexion	3.2 ± 1.10	7.85 ± 0.74	5.58	p=0.001; significant
Lumbar Extension	2 ± 0.72	4.2 ± 0.61	8.16	p=0.001; significant



Graph 1: Pre-Intervention, Post-Intervention and Student's Paired "t" test Scores of Outcome measures

By applying the Student's Paired "t" test, there is a significant decrease in the mean values of Numerical Pain Rating Scale (NPRS) from Pre- Intervention to Post-Intervention (p=0.001)

By applying the Student's Paired "t" test, there is a significant increase in the mean values of Lumbar Flexion and Lumbar Extension from Pre- Intervention to Post-Intervention (p=0.001).

6. Discussion

The study was designed to check the effectiveness of slump stretching on chronic low back pain in nurses working in the ICU. The results of the present study suggest that slump stretching is effective and significant in the improvement of chronic low back pain in the nurses working in the ICU. It was effective in reducing the pain intensity and increasing the lumbar flexion and extension Range of Motion (ROM). Previous studies also suggest that when slump stretching added to a treatment program, tremendous improvement is seen.

Flexibility is a key component of rehabilitation. Insufficient muscle extensibility remains a commonly accepted factor for musculoskeletal disorders. Neurodynamic treatment technique results in changes of the mechanical and psychological function of nerve tissues. There is no strong evidence till now to explain about mechanical and neurophysiologic mechanisms of slump stretching exercise. The first mechanism suggested that slump stretching could be due to intraneural edema, relieving hypoxia and improving associated symptoms in neurogenic pain syndromes and thus restoring pressure gradients. Adhesions of neural tissue (eg: dura, dural sleeve, nerve root etc) to surrounding structures can prevent them from freely gliding and may result in local increase in strain. Thus producing irritation symptoms such as pain, burning, numbness and tingling sensations. Slump stretching can effectively reduce adhesions between the neural tissues and surrounding connective tissues. There were improved outcomes by reducing the antidromic impulses generated in C-fibers at the dysfunctional site. They result in the release of

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Slump stretching was effective in increasing both Lumbar Flexion and Extension Range of Motion (ROM). But it was more effective in increasing in increasing the Lumbar Flexion Range was concluded after the study.

7. Study limitations

1. The study included smaller sample size.
2. The intervention was done only for 1 month i.e a short-term study.
3. Limited age group (35-45 yearsS)

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