



# ASSOCIATION BETWEEN SYMPTOMS OF CENTRAL SENSITIZATION WITH QUALITY OF LIFE IN PATIENTS WITH CHRONIC LOW BACK PAIN –A CROSS SECTIONAL STUDY

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**Abstract:** **BACKGROUND:** Low back pain (LBP) is one of the most common musculoskeletal issues experienced by the adults in their life time. People with age 35-55 are more prone to Low Back Pain. This persistent pain condition may include the central sensitization (CS) phenomenon, which implies a wide range of symptoms and that may be taken into account in LBP treatment. CS symptoms can be measured by the Central Sensitization Inventory (CSI). **OBJECTIVE:** The aim of the study was to explore association of CS with quality of life. **METHODOLOGY:** In present cross-sectional study total of 100 Gujarati participants aged 33-55, suffering from LBP were included. CS symptoms were measured with the Gujarati Version of the CSI and quality of life was measured by WHOQOL BREF Gujarati version. Statistical analysis was done by using SPSS 20 version. Spearman's rank correlation coefficient test was applied for co-relation. Significance level was set at  $p < 0.05$ . **RESULT:** The mean CSI total score for the whole sample was  $35.49 \pm 5.26$  points. CSI total score had subclinical values in the whole sample; There were statistically significant strong negative correlation between CSI score and WHOQOL-BREF domain 1, moderate negative correlation between CSI score and WHOQOL-BREF domain 2, 3 and 4. **CONCLUSION:** Present study concludes that there was strong negative correlation between CSI score with WHOQOL-BREF domain 1 (physical), moderate negative correlation between CSI score with WHOQOL-BREF domain 2 (psychological), WHOQOL-BREF domain 3 (social) and WHOQOL-BREF domain 4 (environment) for quality of life. In light of these results, it is recommended that clinicians supplement their assessment with the CSI in low back patients for improved decision-making during treatment.

**KEY WORDS:** Central Sensitization, LBP, Frequency, Association, Quality of life.

## INTRODUCTION

Low back pain (LBP) is one of the most common musculoskeletal issues experienced by the adults in their life time.<sup>1,2</sup> In industrialized countries the prevalence of non-specific LBP is 60-70% i.e. The prevalence rate of adult is higher than child and adolescent. People with age 35-55 are more prone to LBP.<sup>3</sup> The occurrence of Low Back Pain in India is also alarming with nearly 60% of the people in India have suffered from low back pain at some time during their lifespan.<sup>4</sup> Between 60% and 80% of the population will experience LBP during their lives and up to 15% becomes chronic.<sup>5</sup> Sometimes, relief of light pain is achieved naturally within two months. If the pain persists for longer than three months, it develops as chronic pain.<sup>6</sup> LBP is not only heterogeneous but also contradictory. LBP patients suffer not only from physical discomfort but also from functional disabilities that may cause impairment and interfere with their quality of life.<sup>7</sup> The natural history of LBP has been observed to be extremely variable and may last a few days or persist for many years.<sup>8</sup>

The natural history of LBP has been observed to be extremely variable and may last a few days or persist for many years.<sup>8</sup> physical health consequences of CLBP, individuals with CLBP are at risk of a range of other adverse outcomes, including depression, anxiety, strained interpersonal relationships, financial difficulties and a reduced overall quality of life.<sup>5</sup>

Central sensitization (CS) can be defined as a process of abnormal and intense enhancement of pain caused by increased neuronal responses to stimuli in the central nervous system.<sup>9</sup> Our study aims to find out the association between symptoms of CS with pain and QOL in patients with CLBP in Gujarat.

## RESEARCH METHODOLOGY

**STUDY DESIGN:** Cross sectional study, **STUDY POPULATION:** Patients with Chronic Low Back Pain, aged between 35-55 years of age group<sup>3</sup>, **SAMPLING TECHNIQUE:** Convenient sampling, **STUDY DURATION:** 1 Year

### Population and Sample

Sample size calculation for the present study, using G\*Power 3.1 version. Effect size, based on the correlation analysis between CSI and pain intensity was assumed to be moderate ( $r = 0.5$ ) (taken from results of the study done by Eva Huysmans, MSc, in 2017), the significance level was set at  $\alpha = 0.05$  and power at 0.95. Two tailed calculation revealed that the total sample should include 100 patients.

### Data and Sources of Data

SPB Physiotherapy College OPD and other Physiotherapy OPDs of Surat.

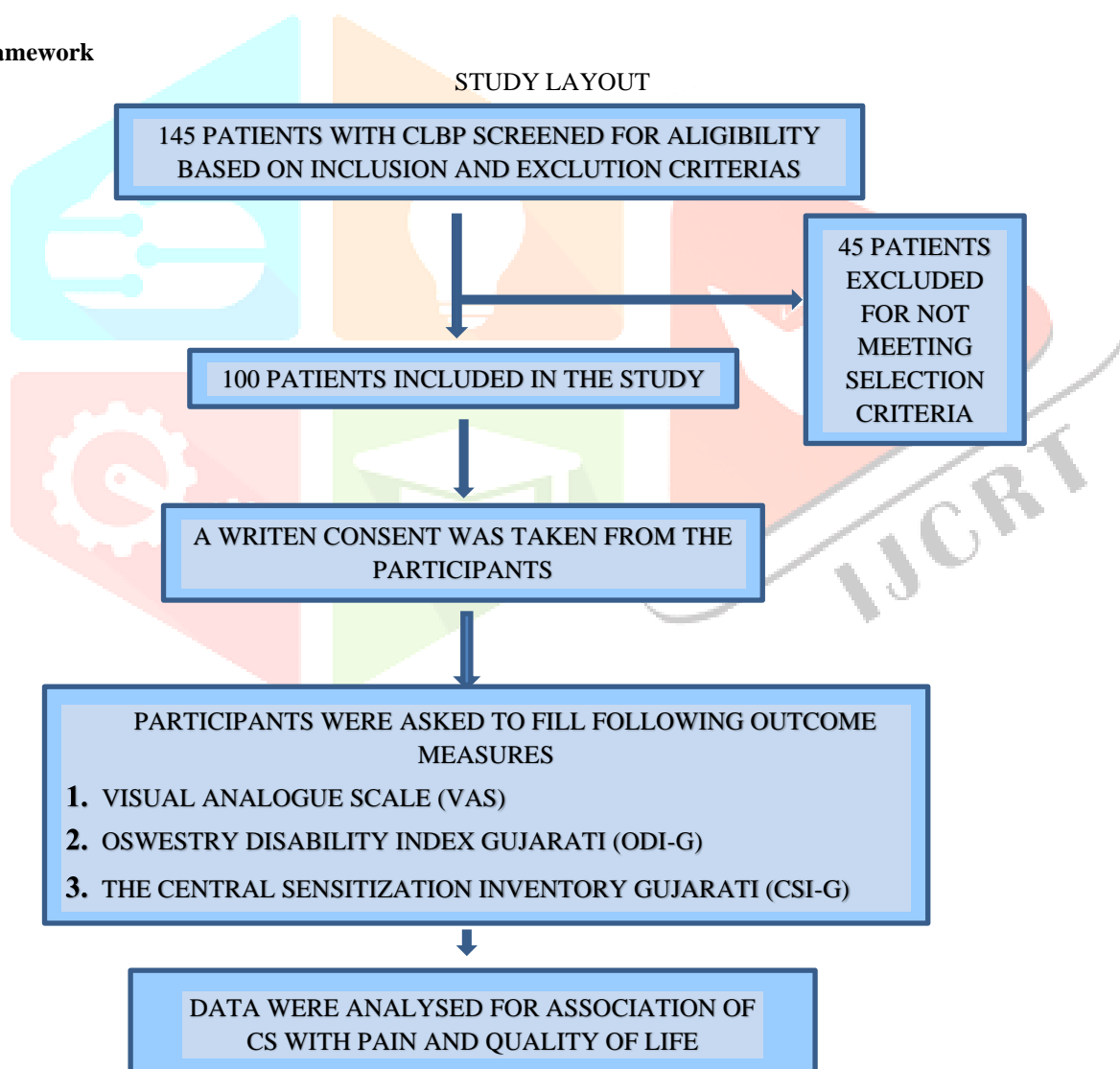
#### INCLUSION CRITERIA:

- Both male and female with age group 35 to 55 years.<sup>3</sup>
- Subjects with nonspecific low back pain and non-radicular back pain.<sup>9</sup>
- Subject with duration of LBP: More than or at least 3 months.<sup>9</sup>
- Subject who are willing for participate.
- Subject who can read and write Gujarati.

#### EXCLUSION CRITERIA: <sup>9</sup>

- Acute low back pain and with a known cause.
- Serious or progressive neurologic deficits.
- Symptoms of serious underlying conditions such as Tumor, Infection, Vertebral Compression Fracture, Ankylosing Spondylitis, or Clinically Significant Spinal Stenosis.
- Skin inflammation or edema in lower back.
- Pregnant or until 1 year Postnatal.
- Epilepsy, Cancer, Arthritis, major Psychiatric disorders.
- Awaiting Surgery or having had surgery in the past 6 months.

### Theoretical framework



Ethical approval was taken by institutional ethical committee at SPB Physiotherapy College. Participants of the study was approached through various HODs of respective study setting places. Patients with chronic low back pain was asked informally to participate in the study and their willingness. Prior to the commencement of the study, detailed procedure of the study was explained to the patients and a signed informed consent form was taken from them. The patient was screened on the basis of inclusion and exclusion criteria and their age, sex, working status, educational level, medical health history, body mass index, duration of symptoms and impact of their symptoms on activities of daily living was taken by an assessment Performa. Total numbers of participants were 100 as calculated by G\*power software. The patients were assessed with following outcome measures. i.e., the

visual analogue scale, WHOQOL-BREF Scale, central sensitization inventory scale Gujarati. The patients were given the scales and asked to read and tick the scores as per the instructions are given into the forms.

### Statistical tools and econometric models

The data was entered using Microsoft Excel 2017 and it was analyzed using SPSS 20 version. data were analyzed by non-parametric tests i.e., spearman's rank correlation coefficient test. The level of significance was set at  $\alpha = 0.01$ .

### Descriptive Statistics

**TABLE 1: PATIENT'S DEMOGRAPHIC VARIABLES (N=100)**

| VARIABLES                | MEAN±SD    | MEDIAN | MIN   | MAX    |
|--------------------------|------------|--------|-------|--------|
| Age(years)               | 43.52±5.58 | 43     | 35    | 55     |
| BMI (kg/m <sup>3</sup> ) | 26.53±2.53 | 26.3   | 19.20 | 32.200 |
| Duration (months)        | 14.22±7.74 | 12     | 4     | 36     |

A total of 145 patients with CLBP were screened for this study out of those 100 participants were included in the study and 45 patients were excluded for not meeting selection criteria. The mean age was 43.52 (SD=5.589) years, mean BMI was 26.53 (SD=2.53) kg/m<sup>2</sup> and Mean duration of symptoms was 14.22 (SD=7.74) months of all participants. Median, MIN, MAX values were seen in TABLE 1.

**TABLE 2: MEAN, STANDARD DEVIATION, MEDIAN, MIN AND MAX OF OUTCOMES:**

| VARIABLES                     | MEAN±SD     | MEDIAN | MIN | MAX |
|-------------------------------|-------------|--------|-----|-----|
| Total CSI score               | 35.49±5.26  | 36     | 10  | 45  |
| VAS score(cm)                 | 6.51±0.96   | 6.1    | 4   | 8.2 |
| WHOQOL-BREF<br>Domain 1 score | 44.51±14.98 | 38     | 19  | 69  |
| WHOQOL-BREF<br>Domain 2 score | 49.56±11.29 | 44     | 31  | 69  |
| WHOQOL-BREF<br>Domain 3 score | 58.46±7.62  | 56     | 50  | 75  |
| WHOQOL-BREF<br>Domain 4 score | 55.66±8.86  | 56     | 44  | 75  |

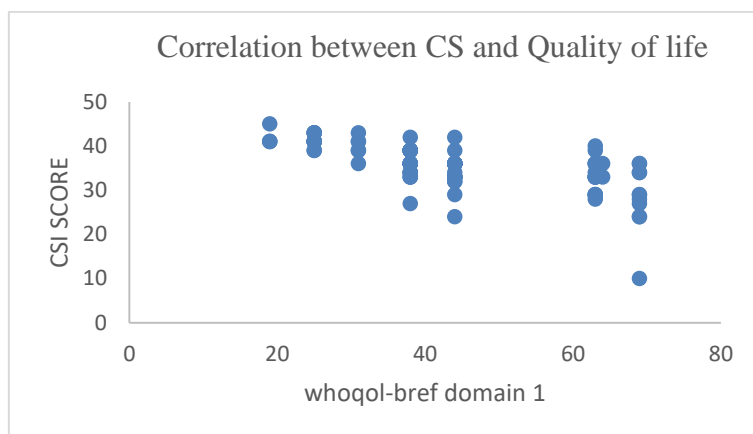
The mean total CSI score was 35.49 (SD=5.268) points. Mean pain intensity measured by VAS was 6.51(SD=0.96) cm, quality of life measured by WHOQOL score, in that mean of Domain 1 was 44.51(SD=14.98) points, mean of Domain 2 was 49.56(SD=11.29), mean of Domain 3 was 58.46(SD=7.62) and mean of Domain 4 was 55.66(SD=8.86). MEDIAN, MIN and MAX of all outcomes were seen in TABLE 2.

**TABLE 3: ANALYSIS INCLUDING CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 1 SCORE:**

|                   |              |                            | WHOQOL-BREF<br>DOMAIN 1<br>score |
|-------------------|--------------|----------------------------|----------------------------------|
| Spearman's<br>Rho | CSI<br>score | Correlation<br>Coefficient | -0.723**                         |
|                   |              | Sig. (2-tailed)            | 0.000                            |
|                   |              | N                          | 100                              |

\*\* Correlation is significant at the 0.05 level (2-tailed).

As normality of WHOQOL-BREF DOMAIN 1 score was 0.000. Non parametric correlation test was used. i.e., Spearman’s rho was used. P value is 0.000 and the correlation between WHOQOL-BREF domain 1 and central sensitization is -0.723 and so there is strong negative significant correlation.<sup>18</sup>



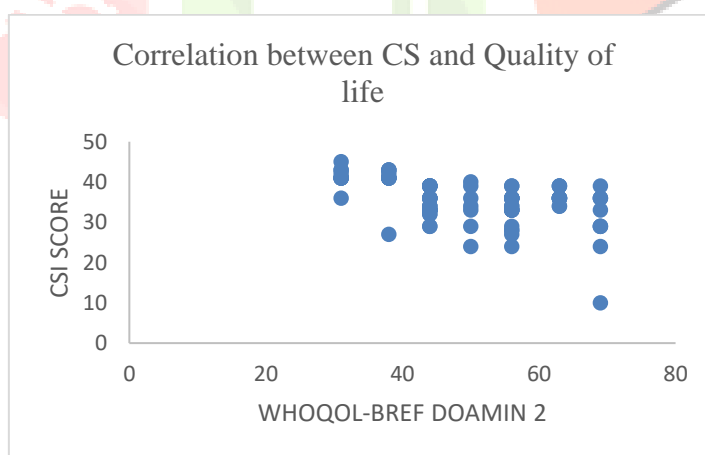
**GRAPH 1: CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 1.**

**TABLE 4: ANALYSIS INCLUDING CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 2 SCORE:**

|                |           |                         | WHOQOL-BREF DOMAIN 2 score |
|----------------|-----------|-------------------------|----------------------------|
| Spearman’s Rho | CSI score | Correlation Coefficient | -0.497**                   |
|                |           | Sig. (2-tailed)         | 0.000                      |
|                |           | N                       | 100                        |

\*\* . Correlation is significant at the 0.05 level (2-tailed).

As normality of WHOQOL-BREF DOMAIN 2 score was 0.000. Non parametric correlation test was used. i.e., Spearman’s rho was used. P value is 0.000 and the correlation between WHOQOL-BREF domain 2 and central sensitization is -0.497 and so there is negative moderate significant correlation.<sup>18</sup>



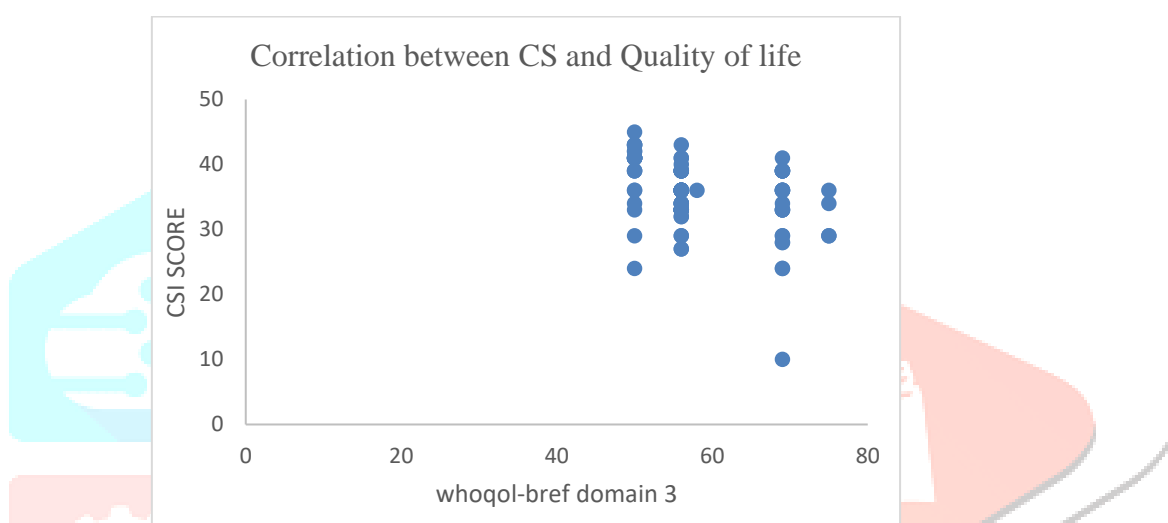
**GRAPH 2: CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 2.**

**TABLE 5: ANALYSIS INCLUDING CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 3 SCORE:**

|                |           |                         |                            |
|----------------|-----------|-------------------------|----------------------------|
|                |           |                         | WHOQOL-BREF DOMAIN 3 score |
| Spearman's Rho | CSI score | Correlation Coefficient | -0.433**                   |
|                |           | Sig. (2-tailed)         | 0.000                      |
|                |           | N                       | 100                        |

\*\* . Correlation is significant at the 0.05 level (2-tailed).

As normality of WHOQOL-BREF DOMAIN 3 score 0.000. Non parametric correlation test was used. i.e., Spearman's rho was used. P value is 0.000 and the correlation between WHOQOL-BREF domain 3 and central sensitization is -0.433 and so there is moderate negative significant correlation.<sup>18</sup>



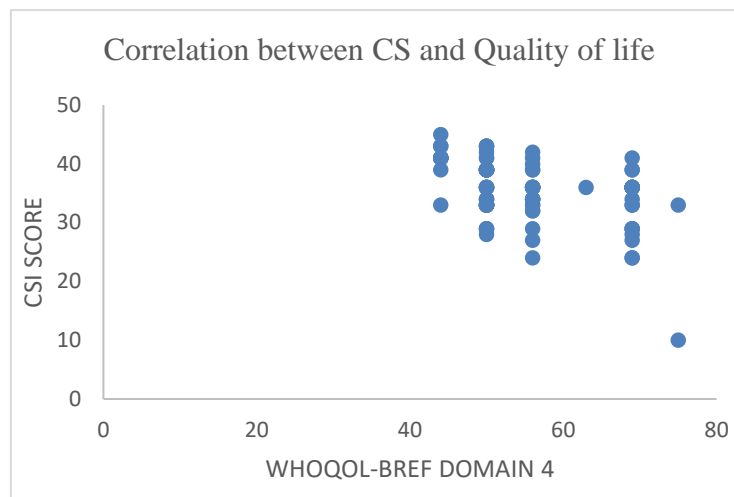
**GRAPH 3: CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 3.**

**TABLE 6: ANALYSIS INCLUDING CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 4 SCORE:**

|                |           |                         |                            |
|----------------|-----------|-------------------------|----------------------------|
|                |           |                         | WHOQOL-BREF DOMAIN 4 score |
| Spearman's Rho | CSI score | Correlation Coefficient | -0.429**                   |
|                |           | Sig. (2-tailed)         | 0.000                      |
|                |           | N                       | 100                        |

\*\* . Correlation is significant at the 0.05 level (2-tailed).

As normality of WHOQOL-BREF domain 4 score was 0.000. Non parametric correlation test was used. i.e., Spearman's rho was used. P value is 0.000 and the correlation between WHOQOL-BREF domain 4 and central sensitization is -0.429 and so there is moderate negative significant correlation.<sup>18</sup>



**GRAPH 4: CORRELATION BETWEEN CSI SCORE AND WHOQOL-BREF DOMAIN 4.**

## DISCUSSION:

Total 100 patients with CLBP without radiculopathy were included. Patients with CLBP, aged between 35-55 years of age group were included. In those 43 males and 57 females were assessed for this study. Duration of this study was 1 year. This study shows association of central sensitization with pain, disability and QOL in patients with CLBP. This study showed CSI total scores and their distributions based on a 40-point cut off<sup>31</sup> in different gender suffering from CLBP.

Patients with significant CS symptoms are likely to have poor response to local treatment in cases of LBP. Regarding LBP, symptoms of CS have been proposed as a possible moderator of therapeutic effects.<sup>12</sup> For these reasons, CS has recently been proposed as a new diagnosis label that allows patient treatment to be redirected from traditional local therapies (such as electrotherapy, exercise, or surgery) to targeting lifestyle factors (including illness beliefs, stress, sleep, physical activity, and diet).<sup>13</sup> For example, interventions such as pain neuroscience education (PNE) are effective in patients with chronic diseases such as spinal pain, regardless of CS.<sup>14</sup> However, PNE combined with cognition targeted motor control training has significantly superior effects, lowering CS symptoms compared with current best-evidence physiotherapy for individuals with chronic spinal pain.<sup>15</sup> Moreover, a “McKenzie exercise program” has been shown to be more effective in reducing CS than conventional physiotherapy in patients with chronic nonspecific LBP.<sup>16</sup> Therefore, under the same diagnoses as LBP, patients may be stratified clinically as experiencing predominantly CS pain or not in order to direct treatment.<sup>9,11</sup>

As result shows that if the CSI score increases pain intensity was increases so there was positive moderate significant correlation between CSI score and Pain. For assessing Quality of Life 4 domains are there: In that first domain (physical) score decreases with increases score of CSI. Second domain (psychological) decreases with higher score of CSI. Third domain and Forth domain (social relationship and environment) shows the same result with CSI score. There was negative strong significant correlation between CSI score and WHOQOL-BREF Domain 1 score (physical), there was negative moderate significant correlation between CSI score and WHOQOL-BREF Domain 2 score (psychological), CSI score and WHOQOL-BREF Domain 3 score (social relationship), CSI score and WHOQOL-BREF Domain 4 (environment) as these shows if CSI score increases physical component score, psychological component, social relationship and environmental component were decreases.

Kregel et al. reported that higher CSI total scores showed a moderate correlation with current higher pain intensity and strong correlations with lower physical and emotional quality of life. Higher CSI total scores showed moderate correlations with higher pain disability and higher pain catastrophizing in a nonspecific chronic spinal pain population.<sup>17</sup>

## CONCLUSION:

Present study concludes that there was moderate positive correlation between CSI score with disability and strong negative correlation between CSI score with WHOQOL-BREF domain 1 (physical), moderate negative correlation between CSI score with WHOQOL-BREF domain 2 (psychological), WHOQOL-BREF domain 3 (social) and WHOQOL-BREF domain 4 (environment) for quality of life.

## LIMITATION AND FUTURE RECCOMENDATIONS:

- In this study sample size was limited with only 100 patients and samples were collected from Surat City only. In future studies larger sample size can be taken.
- CSI is a patient-reported outcome, as used to assess a patient’s symptoms or functional status at a specific time. However, this information is subjective. Future research should supplement CSI data with objective measures.
- This study includes correlation of VAS and ODI outcomes with CSI. So, Correlation with other outcomes also can be included in further studies.

## ETHICAL APPROVAL:

Ethical approval was taken by institutional ethical committee at SPB Physiotherapy College.

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