“Science is simply common sense at its best, that is, rigidly accurate in observation, and merciless to fallacy in logic.”

— Thomas Henry Huxley

This thesis has three studies; which includes two studies pertaining to translation and validation of ‘Central sensitization inventory’ and ‘Fear-avoidance beliefs questionnaire’ into Gujarati language. The third study is the main study which deals with central sensitization issue in chronic non-specific low back pain. The translated and validated version of CSI-G and FABQ-G was used in the main study as outcome measures.

2.1 Objectives of the Study

The main objective of the thesis was to investigate whether McKenzie exercise program is more beneficial in centrally sensitized CNSLBP patients in terms of various outcome measures such as pain, central sensitization, pressure pain threshold, disabilities, fear avoidance beliefs, trunk flexors, trunk extensors endurance, and patient satisfaction.

2.1.1 Preparatory Objectives

(a) To translate and culturally adapt Central Sensitization Inventory (CSI) into Gujarati language and check test-retest reliability and content validity of Gujarati version of CSI.

(b) To translate and culturally adapt Fear Avoidance Belief Questionnaire (FABQ) into Gujarati language and check test-retest reliability and content validity of Gujarati version of FABQ.

2.1.2 Primary Objectives

(a) To review the literature for patients with chronic non-specific low back pain to examine to what extent subgrouping and targeted treatment
have been used previously, and furthermore examine if the use of classification systems [CS+ & CS-] influenced the outcome.

(b) To identify the proportion of patients with CNSLBP experiencing central sensitization in terms of severity classification by using CSI-G.

(c) To find the presence of CS in CNSLBP patients in terms of, those who display lower pressure pain thresholds (PPT) by pressure algometry.

(d) To establish a scientific evidence to use McKenzie exercise program for benefits of patients having CS in CNSLBP patients.

(e) To establish a scientific base for future research for CS in CNSLBP patients.

2.1.3 Secondary Objectives

(a) To find the presence of fear-avoidance beliefs in CNSLBP patients in terms of, those who display higher score on FABQ-G and does it correlates with presence of CS in terms of CSI-G scores among CNSLBP patients?

(b) To find presence of disabilities in CNSLBP patients in terms of, those who display higher score on RMDQ-G and does it correlates with presence of CS in terms of CSI-G scores among CNSLBP patients?

2.1.4 Hypothesis
Comparisons are made between following two groups, based on these eight outcome measurements at the end of 4th week and 8th week after implementation of the respective intervention: 1) Numerical pain rating scale, 2) Pressure pain threshold, 3) CSI-G scores, 4) Roland Morris Disability Questionnaire-G, 5) Fear-avoidance Beliefs Questionnaire-G, 6) Trunk flexor endurance, 7) Trunk extensor endurance scores, and 8) GROC scores.
CHAPTER-2 OBJECTIVES OF THE STUDY

Group A: - McKenzie Exercise Program [MEP]

Group B: - Conventional Physiotherapy Program [CPP]

(1) Central Sensitization Inventory-Gujarati

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on CSI-G scores in reducing pain sensitization in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on CSI-G scores in reducing pain sensitization in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on CSI-G scores in reducing pain sensitization in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on CSI-G scores in reducing pain sensitization in patients with CNSLBP not having the presence of CS.

(2) Numerical Pain Rating Scale:

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on NPRS scores in reducing pain in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on NPRS scores in reducing pain in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on
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NPRS scores in reducing pain in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on NPRS scores in reducing pain in patients with CNSLBP not having the presence of CS.

(3) **Pressure pain threshold:**

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on PPT scores in improving the perception of mechanical pressure pain in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on PPT scores in improving the perception of mechanical pressure pain in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on PPT scores in improving the perception of mechanical pressure pain in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on PPT scores in improving the perception of mechanical pressure pain in patients with CNSLBP not having the presence of CS.

(4) **Roland Morris Disability Questionnaire-Gujarati**

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on RMDQ-G scores in reducing disability in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on.
CHAPTER-2 OBJECTIVES OF THE STUDY

RMDQ-G scores in reducing disability in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on RMDQ-G scores in reducing disability in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on RMDQ-G scores in reducing disability in patients with CNSLBP not having the presence of CS.

(5) Fear-Avoidance Beliefs Questionnaire-Gujarati

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on FABQ-G and its subscales FABQ-W-G & FABQ-PA-G scores in reducing FABs in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on FABQ-G and its subscales FABQ-W-G & FABQ-PA-G scores in reducing FABs in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on FABQ-G and its subscales FABQ-W-G & FABQ-PA-G scores in reducing FABs in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on FABQ-G and its subscales FABQ-W-G & FABQ-PA-G scores in reducing FABs in patients with CNSLBP not having the presence of CS.
(6) Trunk Flexor Endurance

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk flexors endurance scores in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk flexors endurance scores in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk flexors endurance scores in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk flexors endurance scores in patients with CNSLBP not having the presence of CS.

(7) Trunk Extensor Endurance

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk extensors endurance scores in patients with CNSLBP having the presence of CS.

- **Null Hypothesis (H₀):** There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk extensors endurance scores in patients with CNSLBP not having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on trunk extensors endurance scores in patients with CNSLBP having the presence of CS.

- **Alternative Hypothesis (H₁):** There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on
trunk extensors endurance scores in patients with CNSLBP not having the presence of CS.

(8) Global Rate of Change Scale (GROC)

- **Null Hypothesis (H₀)**: There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on GROC scores in demonstrating an overall improvement in patients with CNSLBP having the presence of CS at the end of 8th week.

- **Null Hypothesis (H₀)**: There is no difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on GROC scores in demonstrating an overall improvement in patients with CNSLBP not having the presence of CS at the end of 8th week.

- **Alternative Hypothesis (H₁)**: There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on GROC scores in demonstrating an overall improvement in patients with CNSLBP having the presence of CS at the end of 8th week.

- **Alternative Hypothesis (H₁)**: There is a difference in the effectiveness of ‘McKenzie program’ and ‘Conventional physiotherapy program’ on GROC scores in demonstrating an overall improvement in patients with CNSLBP not having the presence of CS at the end of 8th week.