



# Translation and Cross-Cultural Adaptation of Gujarati Version of Revised Neurophysiology of Pain Questionnaire for Individuals with Chronic Musculoskeletal Pain: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** Understanding pain neurophysiology is vital for effective pain education and management, especially in populations with chronic musculoskeletal pain. The Revised Neurophysiology of Pain Questionnaire (RNPQ) is a widely used tool to assess patients' conceptual understanding of pain. However, no validated Gujarati version currently exists. Aim/Objectives: To translate and culturally adapt Gujarati version of the Revised Neurophysiology of Pain Questionnaire (RNPQ-G) for use among Gujarati-speaking individuals with chronic musculoskeletal pain.

**Method:** This cross-sectional methodological study followed established guidelines for cross-cultural adaptation, including forward translation, synthesis, backward translation, expert committee review, and pretesting via cognitive interviews with 30 participants. The pre-final version was pilot-tested for clarity and cultural relevance. Subsequently, the final RNPQ-G was administered to a sample of 50 individuals with chronic musculoskeletal pain.

**Results:** The translation and adaptation process was completed successfully. Minor linguistic and cultural adjustments were made during expert review and pretesting to ensure clarity and relevance. Participants reported good understanding of the questionnaire items, and no significant difficulties in comprehension were noted.

**Conclusion:** The Gujarati version of the RNPQ has been successfully translated and culturally adapted. It is comprehensible and culturally appropriate for Gujarati-speaking populations. Further studies are recommended to evaluate its psychometric properties, including reliability and validity.

**Key Words:** Pain neuroscience education, Questionnaire translation, Chronic musculoskeletal pain, RNPQ, Gujarati, Cross-cultural adaptation, Validation

## INTRODUCTION

Chronic musculoskeletal pain is a major public health problem worldwide. It is associated with significant physical, psychological, and socioeconomic burdens. Understanding pain mechanisms through educational interventions has emerged as a key strategy in modern pain management. Pain neuroscience education (PNE) aims to alter pain perceptions by teaching patients about the neurobiology and neurophysiology of pain.<sup>1,2</sup> PNE helps reduce pain catastrophizing, kinesiophobia, and disability while improving self-efficacy and engagement in active management strategies.<sup>3</sup>

The Revised Neurophysiology of Pain Questionnaire (RNPQ) is a brief, validated tool designed to assess patients'

knowledge of pain neurophysiology.<sup>4</sup> Although originally developed in English, its utility across diverse populations requires careful translation and cross-cultural adaptation to preserve conceptual equivalence.<sup>5</sup>

Gujarati is one of the most spoken languages in India, with over 55 million native speakers.<sup>6</sup> Despite the high burden of chronic pain in this population, there are no validated tools in Gujarati to assess knowledge about pain mechanisms. Therefore, it is essential to translate and culturally adapt the RNPQ into Gujarati using rigorous methodology. This study describes the systematic process of translation and cross-cultural adaptation of the RNPQ into Gujarati, ensuring that the instrument is conceptually equivalent and comprehensible to Gujarati speakers.

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This study aims to translate and cross-culturally adapt the RNPQ into Gujarati, using established guidelines to ensure linguistic accuracy and cultural relevance.<sup>5,7</sup>

## METHODS

### Study Design

This cross-sectional study was conducted to translate and cross-cultural adaptation study, based on the guidelines proposed by Beaton et al.<sup>8</sup>, which are internationally recognized frameworks for translating health-related instruments. Participants were recruited using a convenience sampling method from outpatient physiotherapy departments of tertiary care hospitals and private clinics in Gujarat, India. Inclusion criteria were: adults aged 18-65 years, native Gujarati speakers, and individuals experiencing chronic musculoskeletal pain (defined as pain lasting more than 3 months). Individuals with cognitive impairments, diagnosed neurological disorders, or communication difficulties were excluded.

### Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of SPB Physiotherapy College, reference number EC/SPB/184. All participants provided written informed consent prior to data collection.

### Translation and Adaptation Procedure

**Step 1: Forward Translation:** Two bilingual translators, fluent in both English and Gujarati, independently translated the original English version of the RNPQ into Gujarati. One translator had a background in physiotherapy and was aware of the study objectives, while the other was a professional linguist with no medical background. This approach ensured the incorporation of both clinical accuracy and lay language appropriateness.

**Step 2: Synthesis of Translations:** The two forward translations were compared in detail by the research team. Differences were reconciled, and a synthesized version was developed after thorough discussion. This version combined the best elements of both initial translations and served as the basis for the next step.

**Step 3: Backward Translation:** Two different bilingual translators, who were blind to the original RNPQ, independently translated the synthesized Gujarati version back into English. These translators had no clinical background and were unfamiliar with the RNPQ to avoid bias. The back-translations were then reviewed to assess whether the original meaning of each item had been retained.

**Step 4: Expert Committee Review:** An expert committee was formed comprising pain specialists, physiotherapists, linguists, a methodology expert, and a cultural expert. The

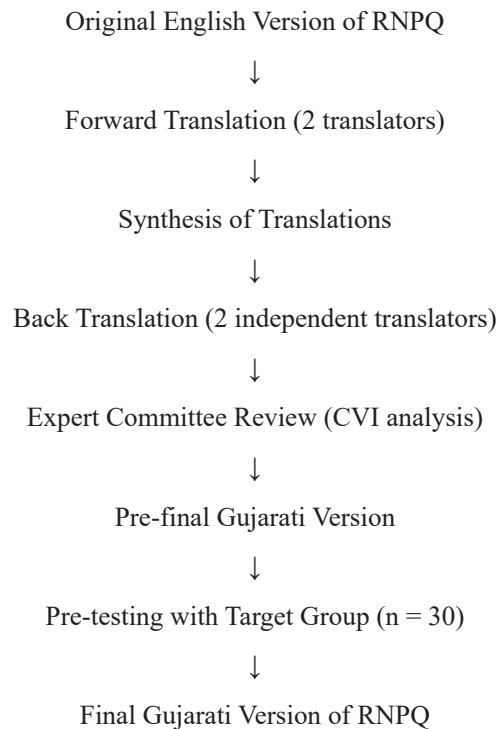
committee reviewed all the translations (original, forward, synthesized, backward) to evaluate semantic, idiomatic, experiential, and conceptual equivalence. They also ensured that culturally appropriate terms were used. Discrepancies were resolved by consensus, resulting in the pre-final version.

**Pretesting through Cognitive Interviews:** The pre-final version was pilot-tested on 30 individuals suffering from chronic musculoskeletal pain, selected through convenience sampling. Each participant completed the questionnaire, followed by a structured cognitive interview. The interviews were designed to explore how respondents understood each question, the reasoning behind their answers, and whether any terms or phrases were confusing or inappropriate.

Interviewers used open-ended questions such as:

- “Can you explain what this question is asking in your own words?”
- “Were any words or sentences difficult to understand?”
- “Would you suggest a better way to phrase this question in Gujarati?”

Participants’ feedback was recorded and analysed. Based on the results, minor modifications were made to improve clarity.



**Figure 1:** Flowchart of the Translation and Cross-Cultural Adaptation Process.

## Statistical analysis

Descriptive statistics (mean, standard deviation, frequencies) were used to summarize participant demographics. All statistical analyses were performed using SPSS version 23 (IBM Corp., Armonk, NY), with significance set at  $p < 0.05$ .

## RESULTS

The Gujarati version of the Revised Neurophysiology of Pain Questionnaire (RNPQ-G) was developed through a structured process of translation and cross-cultural adaptation. All 12 items of the questionnaire were evaluated by a panel of bilingual experts. The item-level content validity index (I-CVI) for each item was found to be 1.0, indicating complete agreement among experts regarding relevance and clarity. The overall scale-level content validity index (S-CVI) was 0.9 (Table 1), confirming excellent content validity for the Gujarati version.

Expert suggestions led to minor wording changes aimed at enhancing clarity and maintaining cultural and linguistic appropriateness. However, none of the items required removal or major modification, and all retained their original conceptual integrity.

The pre-final version of the Gujarati RNPQ was administered to 30 individuals diagnosed with chronic musculoskeletal pain. Table 1 presents the demographic characteristics of the participants involved in the pretesting phase. The sample included a range of ages, educational levels, and affected pain regions, reflecting the diversity typically seen in individuals with chronic musculoskeletal pain. The mean age of the participants was 47.3 years ( $SD \pm 8.9$ ) (Table 2). All participants completed the questionnaire independently and without difficulty. Feedback indicated that the items were clearly worded, easy to understand, and appropriate to the participants' pain experiences. None of the participants reported any confusion or discomfort while completing the questionnaire. As no item was found to be problematic, no further revisions were required.

The translated Gujarati version of the Revised Neurophysiology of Pain Questionnaire (RNPQ-G) is available upon reasonable request from the corresponding author. Due to copyright considerations and to preserve appropriate academic use, it is not included as a freely accessible appendix in this publication.

**Table 1: Demographic Characteristics of Pretesting Participants (n = 30)**

| Characteristic   | Value                |
|------------------|----------------------|
| Mean age (years) | 47.3 $\pm$ 8.9       |
| Gender           | 18 females, 12 males |

| Characteristic            | Value                                                       |
|---------------------------|-------------------------------------------------------------|
| Educational status        | 10 primary, 11 secondary, 9 graduate                        |
| Employment status         | 14 employed, 10 homemakers, 6 retired                       |
| Duration of pain (months) | Mean 18.6 $\pm$ 6.3                                         |
| Affected body region      | 12 lower back, 8 knee, 5 shoulder, 3 neck, 2 multiple sites |

**Table 2: Content Validity Indices of Gujarati RNPQ Items**

| Item No.      | Concept Assessed                  | I-CVI |
|---------------|-----------------------------------|-------|
| 1             | Pain and tissue damage            | 1.0   |
| 2             | Pain and brain involvement        | 1.0   |
| 3             | Chronic vs. acute pain mechanisms | 1.0   |
| 4             | Role of the spinal cord           | 1.0   |
| 5             | Pain without tissue damage        | 1.0   |
| 6             | Pain sensitivity and modulation   | 1.0   |
| 7             | Central sensitization             | 1.0   |
| 8             | Pain and emotion                  | 1.0   |
| 9             | Protective nature of pain         | 1.0   |
| 10            | Descending inhibition             | 1.0   |
| 11            | Biopsychosocial model of pain     | 1.0   |
| 12            | Neuroplasticity and chronic pain  | 1.0   |
| Overall S-CVI | —                                 | 0.9   |

## DISCUSSION

This study reports the successful translation and cross-cultural adaptation of the Revised Neurophysiology of Pain Questionnaire (RNPQ) into Gujarati, contributing to the limited availability of validated tools to assess pain-related knowledge among Gujarati-speaking individuals with chronic musculoskeletal pain. The adapted version demonstrated strong cultural and linguistic equivalence, making it a suitable resource for clinical and educational use in this population. The results of content validation were highly encouraging. All items demonstrated excellent item-level content validity (I-CVI = 1.0), and the overall scale-level content validity index (S-CVI = 0.9) indicated strong agreement among the expert panel regarding the relevance, clarity, and cultural appropriateness of the Gujarati version. These values are consistent with findings from other language adaptations, such as the Spanish<sup>9</sup>, Turkish<sup>10</sup>, and Italian<sup>11</sup> versions of the RNPQ, which also reported high levels of expert agreement. The consistency across adaptations suggests that the core principles of pain neuroscience embedded in the RNPQ — such as central sensitization, neuroplasticity, and the

disconnect between tissue damage and pain — are universally relevant, provided they are presented in a linguistically and culturally accessible format. Our findings also support the growing recognition of the need for culturally adapted assessment tools in pain education. The positive reception of the pre-final version among Gujarati-speaking participants aligns with observations from other studies, which noted that even abstract neurophysiological concepts could be understood by patients when language and context are carefully adapted. This is particularly important in populations where low health literacy or language barriers might otherwise limit the effectiveness of educational interventions. The availability of a Gujarati RNPQ thus creates new opportunities for physiotherapists and pain educators to engage patients in evidence-based pain neuroscience education (PNE), which has been shown to reduce pain catastrophizing, fear of movement, and disability, while enhancing self-efficacy.<sup>12</sup> Compared to previous adaptations, this study's findings reaffirm the RNPQ's potential to be a culturally versatile tool. For instance, Ayhan et al.<sup>10</sup> observed strong agreement in the Turkish version, and Lluch-Girbés et al.<sup>9</sup> reported similarly favourable outcomes in the Spanish version, despite contextual differences. Our adaptation process also confirmed the need for minor language modifications to improve experiential equivalence — a step commonly reported across studies — but no substantial changes were required to the original conceptual content, underscoring the questionnaire's robustness.

A key strength of this study lies in the rigorous and standardized adaptation process, which enhances the credibility and usability of the translated instrument. However, as this study focused only on translation and cross-cultural adaptation, further psychometric evaluation is needed to establish the reliability and validity of the Gujarati RNPQ in clinical and research settings. Future studies should assess test-retest reliability, internal consistency, and construct validity to confirm its measurement properties. In addition, further work could explore how PNE and the RNPQ-G influence long-term patient outcomes in Gujarati-speaking populations.

## CONCLUSION

In conclusion, the Gujarati version of the RNPQ demonstrates excellent content validity and conceptual equivalence with the original instrument. Its development marks a critical step toward making evidence-based pain education accessible to Gujarati-speaking individuals. It is now ready for psychometric testing in Gujarati-speaking populations and supports the integration of neuroscience-informed strategies into routine pain management across linguistic boundaries.

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**Conflict of Interest** The authors declare no conflict of interest.

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## List of Abbreviations

| Abbreviation | Full Form                                                             |
|--------------|-----------------------------------------------------------------------|
| PNE          | Pain Neuroscience Education                                           |
| RNPQ         | Revised Neurophysiology of Pain Questionnaire                         |
| RNPQ-G       | Gujarati Version of the Revised Neurophysiology of Pain Questionnaire |

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