

Original article:

A comparative study between various pain rating scales as response options in patients with diabetic neuropathy

Dr. Shraddha Tatkare¹, Dr. Nilesh Tatkare², Dr. Kalpesh Kavar³

¹MD, Assistant Professor, K. J. Somaiya Medical College, Sion, Mumbai, India.

² MD, Assistant Professor, K. J. Somaiya Medical College, Sion, Mumbai, India.

³MD, Physician, Gujrat, India.

Corresponding Author: Dr. Shraddha Tatkare

Abstract

Background: Optimal pain management requires appropriate assessment of pain which can be done with the help of various pain rating scales. This study was intended to choose more appropriate response option in assessment of chronic pain of diabetic neuropathy.

Aim: To Check Sensitivity and Simplicity of Pain Rating Scales as Response Options in Assessment of Chronic Pain Model.

Methods: A randomly chosen 60 patients of Diabetic Neuropathy attending medicine OPD were given a questionnaire containing three options of pain rating scales as Simple Visual Analogue Scale (VAS), Numerical Rating Scale (NRS) and Likert Scale (LS) to describe intensity of their pain. They were asked to comment about the simplicity and adequacy of the response options.

Results: Patients find NRS most easy to answer (63%), followed by LS (35%). Statistical analysis tells that VAS, NRS and LS have comparable findings and NRS is most sensitive. The median mark for VAS, NRS and LS were 4, 5.15 and 3 respectively.

Conclusions: The NRS is more preferred option by patients. In the LS there were limited options and simple VAS was slightly difficult to mark for the old poorly educated population of the study sample. Further studies into larger sample including various age groups and different educational background will help researchers and clinicians to choose appropriate scales in assessing pain.

Key words: pain rating scales, response options, sensitivity.

Introduction

Diabetes has acquired almost pandemic status in India. The population suffering from diabetes related complications is enormous. Hospitalization of the patient for nephropathy, retinopathy and increased chances of cardio-vascular complications due to diabetes has been increasing everyday. An equally incapacitating complication is diabetic neuropathic pain. Though patient may not be hospitalized for the same, the quality of life of the patient is seriously

affected by it. The American Pain Society and the Joint Commission on Accreditation of Healthcare Organizations have designated pain as the “fifth vital sign” in an effort to enhance the awareness and need of its assessment.¹ Pain screening is intended to improve the quality of pain management by systematically identifying patients with pain in clinical settings.² Thus, this study was planned to identify the most convenient, sensitive and accurate

pain rating scale for the appropriate analysis of the pain and thus its management.

Out of many available rating scales and questionnaires we shortlisted 3 most common rating scales keeping in mind characteristics of patient population, viz. Numerical Rating Scale (NRS), Visual Analogue Scale (VAS) and Likert Scale (LS).

The VAS is a commonly used scale consisting of a 100-mm horizontal line anchored with 2 extremes at either end. It has proven to be a valid and reliable measure for subjective feelings such as pain and function.^{3,4,5,6,7} Disadvantages of the VAS are that many patients experience difficulties in completing the VAS and that the VAS can only be administered in a written form, which is a limitation for illiterate or visually impaired patients^{8,9,10,11,12,13} Furthermore, there is a risk for measurement error: random errors that can occur during measuring the distance to the mark on the line, and systemic errors during the reproduction of the VAS questionnaires because photocopying may alter the length of the line.

The Likert scale (or verbal rating scale) consists of several categories, most commonly 5 or 7 with adjectives representing degrees of, for instance, functional ability. Subjects mark the adjective that best describes their impairment. Advantages of the Likert scale are that it is easy to understand, simple to complete, and it can be administered in either a written or verbal form¹⁰. Disadvantages are the potential discrepancy between the patient's feelings and the descriptions on the scale, the different interpretations that can be attributed to the adjectives of the scale, and the unequal intervals between the categories³.

Another type of scale is the numerical rating scale (NRS). The NRS is usually an 11-, 21- or (rarely) 101-point scale, with numbers in boxes that are

anchored with 2 extremes at either end. Subjects mark their answer by putting a cross through the appropriate number. The NRS is simple to complete and score, and can be administered in both written and verbal form¹⁰.

Materials & methods

The study was carried out at the Acharya Vinoba Bhave Rural Hospital, attached to the Jawaharlal Nehru Medical College, Sawangi, Wardha after obtaining approval of the Institutional Ethics committee. A total of 85 patients of Diabetic Neuropathy attending medicine OPD were recruited and studied over a period of 1 year. We also obtained permission from the treating physicians to approach their patients. After explaining about the study procedure, their written informed consent was obtained. After filling up their basic information like name, age, sex, address, contact details, diagnosis & treatment details, the patients were given a questionnaire containing three options of pain rating scales as *Simple Visual Analogue Scale (VAS)*, *Numerical Rating Scale (NRS)* and *5-point Likert Scale (LS)* to describe intensity of their pain. Patients were asked the following questions

1. What is the severity of the pain?
2. How often you take analgesic tablet for the pain?
3. Does the pain interfere with your day to day function?

The extremes of the rating scales were '**no pain**' or '**0**' at one end and '**10**' or '**excruciating pain**' at the other end. They were also asked to comment about the simplicity, adequacy and ease of answering of the response options. The patients were asked to fill the same questionnaire again after 2hrs. The answers were then analysed statistically using chi square test. The pain rating scales were compared for the ease of answering, sensitivity and consistency.

Results:

Out of 85 participants we could follow up 60 patients at the end of 1 hr, limiting our study population to 60.

The mean age of the patients was 48.7 years ranging from 35 to 70. There were 38 males and 22 females. 80% population had less than primary education.

Table 1: Comparison of rating scales

Parameters	NRS	VAS	LS
% of patients attempted response	100	93.33	91.66
Reproducibility (%)	98.33	96.66	98.33
Median mark for severity of pain	5.15	4	3

As shown in Table 1, all the patients could rate their responses on NRS but not on VAS and LS. Patients could mark the disability or effect on daily function accurately on NRS than LS. The answers marked in the first assessment were comparable to those marked in second round after 2 hrs; confirming reproducibility of responses.

The difference between the severity assessments of the pain by these rating scales, indicated by their median values, showed no statistical significance. This indicates the results of pain assessment by NRS, VAS and LS are comparable. But there is significant difference in the patient's choice with regards to these rating scales in terms of simplicity and accuracy of responses (Figure 1).

Table 2: Median scores of the parameters under study

Median marks for	NRS	VAS	LS
Severity of pain	5.15	4	3
Analgesic requirement	1.8	2	2
Effect on daily function	5.2	5	6

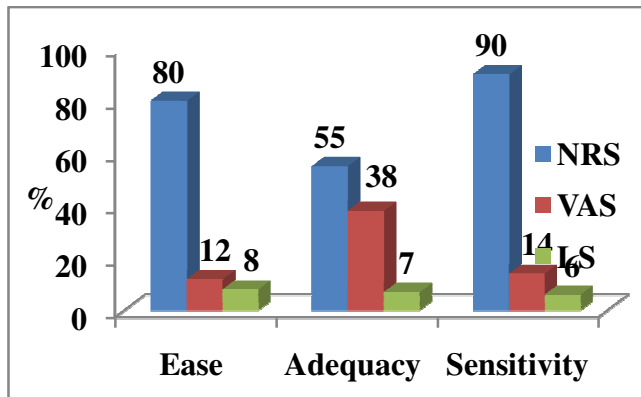


Figure 1: patient's preferences for the responses

Discussion:

In this study, more patients were found to have difficulties in completing LS than either the NRS or VAS. Hundred percent of the patients preferred to answer on an NRS. In a similar study done by Astrid van Tubergen and et al on ankylosing spondylitis patients the preference was NRS more than LS, more than VAS.¹⁴ A greater preference for the Likert scale was also described by Kremer et al in 57% of the patients studied.¹⁵

In few studies, VAS was considered to reduce the confounding effect of variation between individual interpretations of the graduations used for rating scales; and was preferred by participants who perceive their desired response as not corresponding with rating scale graduations and enables a finer distinction between subjective states to be made.^{16,17,18} However, it has also been found that patients find it difficult to judge how to rate their pain on the pain VAS line, finding it 'not very accurate', 'sort of random', 'almost guesswork' or having to 'work it into numbers first'.¹⁹

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In accordance to our study, Bolton and Wilkinson found that the responsiveness of patients was higher when using the NRS compared with VAS and Likert, although NRS and VAS were closely related.²⁰ Few studies were observed to compare other symptoms of neuropathy using the pain rating scales as well.

Conclusion:

We conclude that all the scales are sensitive for assessment of the diabetic neuropathic pain and are not different from each others. The most simple and preferred pain rating scale is neumerical rating scale for the regional population.

Limitations:

The sample size of our study was small and had rural, poor, illiterate background. New studies can be performed including large populations. Also the comparision of pain rating scale preferences in rural to urban population, uneducated to educated population along with other symptoms of neuropathy can be studied in the future.

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