

THE MEASUREMENT OF MUSCULOSKELETAL PAIN INTENSITY: a comparison of four methods^a

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ABSTRACT

The aim of this study was to evaluate the reliability of four scales of pain intensity measurement in patients with musculoskeletal disorders and low educational level. Verbal rating scale, face scale, visual analogy scale, and numeric scale were used. Reliability was evaluated by the stability (test-retest) using Intraclass Correlation Coefficient, and the participant's perception on understanding and completing the scale forms. Numerical scale presented the highest reliability value ($r = 0,99$), and verbal rating scale, had the lowest reliability value ($r = 0,88$). The numerical scale was considered the easiest to understand and to complete, while the most difficult was the visual analogy scale.

Descriptors: Human engineering. Cumulative trauma disorders. Pain measurement.

RESUMO

O objetivo do presente estudo foi avaliar a confiabilidade de quatro escalas de avaliação de intensidade da dor em pacientes com distúrbios osteomusculares com baixa escolaridade. Foram selecionadas as escalas de descritores verbais, de faces, visual analógica e numérica. Avaliou-se a confiabilidade por meio da estabilidade (teste-reteste) utilizando o Coeficiente de Correlação Intraclass, além da percepção quanto à facilidade de compreensão e preenchimento desses instrumentos. A escala numérica apresentou o maior valor de confiabilidade ($r = 0,99$), e a de descritores verbais o menor valor ($r = 0,88$). A escala numérica foi considerada a mais fácil em relação à compreensão e preenchimento, enquanto a escala visual analógica a mais difícil.

Descritores: Engenharia humana. Transtornos traumáticos cumulativos. Medição da dor.

Título: Escalas de avaliação de intensidade da dor: uma comparação entre quatro métodos.

RESUMEN

El objetivo del estudio fue evaluar la confiabilidad de cuatro escalas de medida de la intensidad del dolor, en pacientes con desórdenes músculo-esqueléticos con baja escolaridad. Se seleccionaron las escalas de descriptores verbales, de expresiones faciales, visual-analógicas y numéricas. La confiabilidad fue evaluada por medio de la estabilidad (examen, reexamen) utilizando el Coeficiente de Correlación Intraclass y la opinión del participante para entender y para completar las escalas. La escala numérica presentó el valor más alto de confiabilidad ($r = 0,99$), y la escala de grado verbal tenía el valor más pequeño de confiabilidad ($r = 0,88$). La escala numérica fue considerada la más fácil de entender y completar, mientras que la más difícil fue la escala visual analógica.

Descritores: Ingeniería humana. Trastornos de traumas acumulados. Dimensión del dolor.

Título: La medida de la intensidad del dolor músculo-esquelético: una comparación de cuatro métodos.

^a Study presented in the 56^o Congresso Brasileiro de Enfermagem (2004) and IX Coloquio Panamericano de Investigación en Enfermería "La investigación articulando docencia y asistencia de enfermería para el cuidado humano" (2004).

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1 INTRODUCTION

Musculoskeletal disorders, especially back pain, are an important public health problem, being one of the most important causes of worker disability and absenteeism⁽¹⁻³⁾. Great efforts have been made to evaluate the treatment of patients with musculoskeletal diseases. Reports in the literature have presented questionnaires and scales to evaluate aspects of musculoskeletal disorders, including: prevalence, location and intensity of symptoms, disability and quality of life⁽⁴⁻⁶⁾. These instruments are very important since they provide standardized data, which can be used in clinical practice, research and in public health programs. Pain measurement is extremely important in clinical practice. With appropriate pain assessment, it is possible to determine if the treatment risks overcome the damages caused by the clinical problem and also to choose which is the best and safer among different types of therapy, and it's easier to investigate the nature, origins and clinical correlations of the same, concerning the emotional, motivational and cognitive characteristics and the customer's personality.

The literature has supported the use of different instruments and scales for pain evaluation⁽⁷⁾. It is important to emphasize that pain represents an essential point to choose medical and rehabilitation interventions⁽⁸⁾ and ergonomic programs for patients with musculoskeletal symptoms. These ergonomic programs need to be appraised using internationally respected validated instruments⁽⁹⁾. However, one of the greatest difficulties in Brazilian clinics is the enormous contingent of patients with difficulty in understanding and filling out the scales of pain measurement, due to their poor education level.

The purpose of this study was to evaluate and compare the reliability of four scales of pain intensity measurement in patients with musculoskeletal symptoms and with a poor education.

2 METHODS

In the development of this study, the methodological steps were supported by internationally recognized publications.

2.1 Subjects and setting

Patients attended in the physiotherapy section of a State University Health Center during a minimum period of three months were eligible for entry to the study. The Community Health Center has the objective of offering integrated health care to the employees, teaching staff and students, through nursing, medical clinic, dentistry and physiotherapy appointments. Inclusion criteria for the study included to be in physiotherapy treatment due to musculoskeletal symptoms, age between 18 and 70 years, and education of no more than up to completion of middle school level. Exclusion criterion was illiteracy.

2.2 Instruments

Four commonly used pain measurement tools were included in the study. The faces pain scale and the visual analogue scale have been the most studied scales in the literature and the numeric scale is commonly used in clinical practice⁽⁸⁾. The verbal rating scale and the visual analogue scale are still indicated for old people and adults with poor educational level⁽¹⁰⁾. These tools are illustrated in Figure 1.

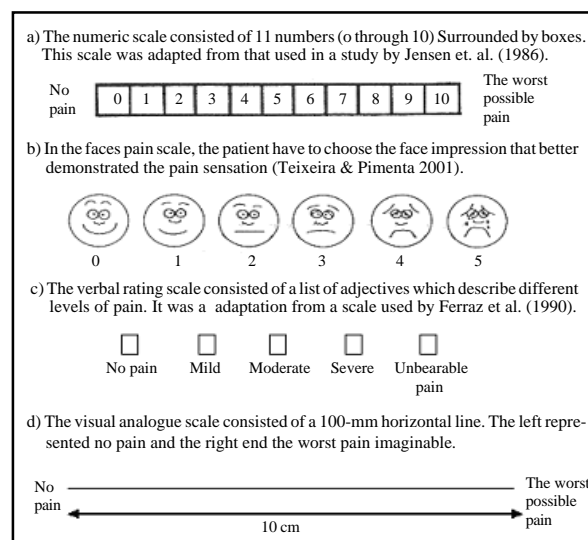


Figure 1 - Four pain intensity measures.

For the qualitative analysis of the scales, an adapted questionnaire from the literature⁽¹⁰⁾ was used to evaluate the participants' perception in relation to understanding and to fill out the scales.

2.3 Study design

The subjects received a standard explanation concerning of the objectives of the study and each scale used. After that, they were asked to score their pain levels in the previous day on four scales, presented in random order twice, before and after the physiotherapy session. The patients also responded the qualitative questionnaire that asked to evaluate two aspects of the scales: perception about understanding and filling out the tolls. One of the authors was responsible for data collection.

2.4 Statistical evaluation

The data were inserted into a database (Microsoft Excel® 2002, version 7.0) and analyzed under the orientation of the Statistics Service of the Faculty of Medical Sciences. Reliability was assessed by using test-retest method. The Intraclass Correlation Coefficient (ICC) was used to describe correlation between pain scales assessment^(11,12). Statistical analysis was performed by means of the “The SAS System for Windows” (Statistical Analysis System), version 8.02, and “SPSS for Windows”, version 10.0.5.

2.5 Ethical considerations

Participation in this study was voluntary, and all patients who agreed to participate were asked to provide written consent. The existing pattern of clinic visits was not altered for the purpose of this study. The study design was approved by the Faculty of Medical Sciences’ Ethical Committee.

3 RESULTS

Thirty-two patients with a mean age of 51 years (range 33-69 years) were studied, with a participation rate of 94.1%. The most frequent diagnoses were osteoarthritis (18.8%), tendonitis (15.6%) and low back pain (12.5%). Among the interviewees, the educational level appeared in a diversified way. The percentage of patients who

completed the 4th grade (37.5%) and the 8th grade (28.2%) are highlighted.

3.1 Qualitative evaluation of scales

The subjects mentioned that the easiest to understand were the faces scale (38.71%) and the numeric scale (32.26%). The numeric scale and the verbal rating scale were considered the easiest to fill out (37.5% and 32.2%, respectively). The visual analogue scale was considered the most difficult to understand (58.0%) and to fill out (67.8%).

3.2 Correlations analysis

The analysis evaluated for each scale is described below.

3.2.1 The verbal rating scale

The answers obtained in the verbal scale for the two moments are described in Figure 2. The Intraclass Correlation Coefficient (ICC) indicated a value $r = 0.88$.

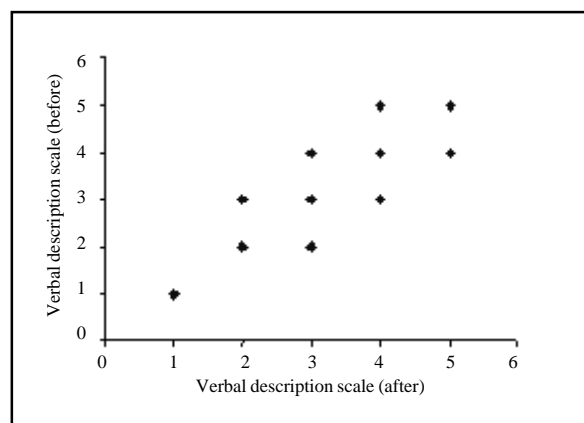


Figure 2 - Distribution of the Verbal Rating Scale's ICC results.

The verbal rating scale was the one which presented smaller ICC.

3.2.2 The faces pain scale

The answers obtained with the faces pain scale are described in Figure 3. The ICC presented a value $r = 0.96$.

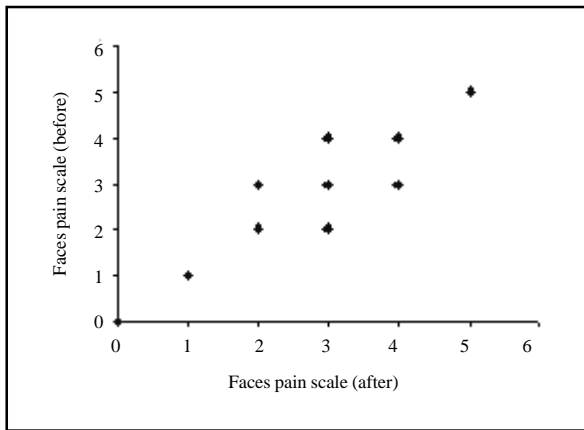


Figure 3 - Distribution of the Faces Scale's ICC results.

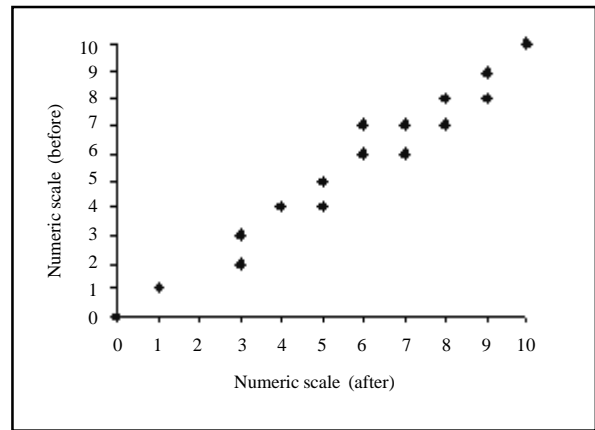


Figure 5 - Distribution of the Numeric Scale's ICC.

In this case, ICC provides excellent interpretation.

3.2.3 The visual analogue scale

The answers obtained in the visual analogue scale (VAS) can be observed in Figure 4.

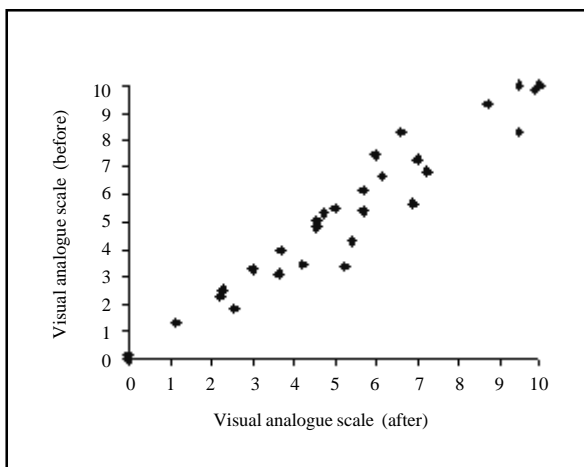


Figure 4 - Distribution of the Visual Analogue Scale's ICC.

The Intraclass Correlation Coefficient of this instrument obtained the second highest value among the used instruments, with $r = 0.97$.

3.2.4 The numeric scale

The answers obtained in the numeric scale can be appraised in Figure 5. The numeric scale ICC obtained a value $r = 0.99$, the highest value obtained among the scales.

4 DISCUSSION

The present study was designated to evaluate four scales for assessing pain among persons with musculoskeletal disorders.

The subjects had a mean age of 51 years, with a range of 33 to 69 years. It is important to consider the age of the patient when applying a pain measurement instrument, since the elderly patient tends to be more cautious when informing painful symptoms⁽¹³⁾.

In developing countries the poor educational level is still high. Research about the trajectory of adult life's intellectual development points the importance of the combination of individual abilities' acquisition and favorable environmental contexts, including educational opportunities⁽¹⁴⁾. It is known that the individual's cognitive development includes educational, social, cultural, linguistic and neurological factors, the latter determined by the presence or absence of pathologies. The educational development is a decisive aspect for the correct filling out of the instruments used in this research. The fact that millions of Brazilians are excluded from school, either for having no access to it or for grade retention and dropping out installs a vicious circle in which the lack of institutionalized schooling, considered as the instance of basic abilities acquisition in a scholarly world, ends up by jeopardizing personal development⁽¹⁴⁾.

Although the four scales chosen for the research are considered as easy to understand

and to fill out⁽¹⁵⁾, the subjects mentioned that the easiest to understand were the faces and the numeric scales. In another study⁽¹⁵⁾, 62.5% of the interviewees expressed preference for the faces scale, regardless of their schooling. Certain characteristics presented by the person, such as language or educational level, defines if the instrument as appropriate or not. Factors such as age, morbidity and physical characteristics also collaborate to this differential⁽¹⁶⁾.

The verbal rating scale was the one which presented smaller value. The verbal description scale presents the advantage of being familiar to the subjects as the words used are from the routine vocabulary, qualitatively expressing pain. This instrument has obtained more satisfactory results when applied to patients with better conditions of intellectual development⁽¹⁷⁾.

The face scale also presented an excellent value ($r = 0,96$). An important aspect to be considered in the use of the faces scale is the fact that patients associate not only the intensity of pain, but also depressive or euphoric symptoms, to the visualized illustrations. Data obtained using the faces scale in patients with lower degrees of cognitive development may have their reliability decreased by reflecting, in addition to the intensity of the pain, the affective response associated with it⁽¹⁸⁾. During the development of this study, it was necessary to remember the subjects that the picture was about pain and not about their affective responses.

The visual analogue scale obtained the second highest value ($r = 0,97$). This tool is considered trustworthy, promoting easy analysis, and being also valid and sensitive to the effects of the treatments. Factors such as the need to wear glasses or faulty illumination hinder the process of filling out the visual analogue scale⁽¹⁹⁾. It should be pointed out that the patients presented, during data collection, a high demand for orientation concerning instrument filling out, particularly for the visual analogue scale. Therefore, it is suggested that new studies be carried out, with the objective of evaluating specifically that scale, when applying it to subjects with poor educational level, considering other criteria such as being easy to answer and understand, possible mistakes in filling out, sensitivity and frequency of correct answers.

The numeric scale presented the highest reliability value ($r = 0,99$). When analyzing the reliability of three scales in two groups of literate and illiterate patients, it was verified that the numeric scale presented the highest agreement rate in these two groups⁽²⁰⁾. That scale presents the advantage of being familiar, since human beings start using numbers in early childhood⁽¹⁸⁾. The numeric scale was already classified before among the easiest scales for use by the elderly or people with lower intellectual development, by using test-retest analysis⁽¹⁴⁾. In home care nursing, the numeric scale is one of the favorite ones among nursing professionals⁽¹⁹⁾.

5 CONCLUSIONS

When comparing the use of four intensity of pain measurement scales in patients with musculoskeletal disorders and poor educational level, using test-retest reliability evaluation, it was verified that the numeric scale presented the highest value, with an Intraclass Correlation Coefficient of $r = 0.99$.

In relation to the evaluation of filling out easily, it was found that the numeric scale took also first place. The verbal rating scale presented the lowest reliability value related ($r = 0.88$), and the visual analogue scale was considered the most difficult to understand and fill out.

One limitation of this study was perhaps the sample size. However, with little guidance to be found in the literature for patients with poor educational level, it was estimated that a sample size of 30 would be sufficient for generating future hypotheses.

The results suggest that the numeric scale is recommended for health centers with a significant number of customers with musculoskeletal disorders and poor educational levels.

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ACKNOWLEDGEMENTS

This research was funded by a grant from National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq*) from Brazil.

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Recebido em: 10/05/2006

Aprovado em: 29/09/2006