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Exploring Pain Intensity Measurement of Low Back Pain in Late Adolescence with a Painometer v2 App

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KEYWORDS

NPRS –Numerical rating scale, Painometer app, LBP- Low back pain

ABSTRACT:

Background: Fewer studies have examined the reliability and agreement of Android applications (Painometer). Further research has examined the validity of pain rating scales in painometer applications conducted on the pediatric population, but the condition was not specified. Research to find the generalizability of previous findings should be done in different age groups and conditions where pain is a vital symptom. Further with the era of modernisation and focus on paperless documentation it would be a boom making assessment just at the tap of a finger and retrieval easier in online platforms for follow-up.

Purpose: The purpose of this study was to evaluate 1) the inter and intra-reliability of the NRS scale of the Painometer app vs. traditional NRS.

2) To check the agreement for measurement of the NRS Pain scale using an application (Painometer) in adolescent low back pain patients.

Materials & Methods: It is an observational study design. 31 patients falling into the age group (15-19) with nonspecific low back pain were recruited for the study. They were asked to rate their current pain - average, worst, and least pain intensity in the past week, 0–10 Numerical Rating Scale (NRS-11) both in Painometer and traditional Method. This research evaluated the reliability and validity by examining the agreement and correlation between the two versions of the NRS scale.

Results: The results showed the agreement and reliability of the NRS scale of the Painometer app with the traditional scale.

Conclusion: This study indicates that the NRS-11 of the Painometer application has strong agreement and intra –inter tester reliability in our sample which is with adolescent patients having nonspecific chronic pain. Research in additional samples in specific conditions is needed to evaluate the generalizability of the current findings.

Introduction

Around the world, low back pain (LBP) is the main factor in disability. It frequently starts in adolescence, laying the groundwork for later in life.[1] Numerous studies have followed the progression of LBP from 14 years old through early adulthood. It frequently coexists with other forms of musculoskeletal pain. For some teenagers, LBP has minimal effect; for others, it can cause them to seek medical attention, take medications, miss school or employment, or change their physical and functional

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activities.[2] The rising incidence of LBP, which has an effect on adolescents and develops into adult rates by the age of 22, is concerning. Adolescent LBP disability predictors come in many different forms, they consist of female sex, unfavorable mental health attitudes, somatic symptoms, participation in sports, and altered stress reactions. Genetics also has an impact. Adolescents who spend a lot of time sitting or engaging in activities that demand a lot of forward bending tend to develop back pain.[3] The patient is always the most important person since suffering is such a very personal experience. A correct and accurate assessment of pain is required for the establishment of an effective protocol for a patient with persistent low back pain.[4] The American Pain Society recognized pain to be the fifth vital indicator of a medical evaluation in the 1990s.[5]

Numerical rating scales (NPRS) is one of the few assessment methods that have been created to measure the intensity and impact of pain .[6] Information and communication technologies (ICTs) have been proved by numerous researchers to be effective in the management of pain in young adults during the past few decades.[7] The availability of internet-based assessment tools in young people's smartphones encourages the use of ICTs for real-time data collection for assessing and treating patients.

This study aims to explore the agreement, intra, and inter-reliability of a pain assessment tool called Painometer v2 application, which has a numerical rating scale-11 (NRS-11), for pain intensity measurement of low back pain in late adolescence.

Materials and Methods

A cross-sectional, observational study design was used. The subject must have had significant nonspecific low back pain for at least three months to be considered for the evaluation, and a convenient sample method is taken into account. The age group selected was 15 years to 22 years. The patients were carefully monitored to ensure that there was no history of cardiovascular disease, IVDP, spinal cord disorders, infectious diseases, OA, or other traumatic diseases. The patients were chosen based on who arrived with the aforementioned requirements. The Oswestry Disability Index (ODI), the traditional Numerical Rating Scale (NRS-11), and an Android phone running the Painometer applications NRS scale were all used as outcome measures. The selected patients were given a consent form so they could state whether they were willing to take part in the study. The patient's pain assessment was assessed using the conventional NRS scale as well as the NRS scale of the Painometer app. The patient was given instructions by the therapist on how to utilize the scale and its application. The data was collected after a practice session using both the conventional method (NPRS) and the Painometer app (electronic NPRS), (Figure 1& 2). The purpose of the practice and demonstration was to familiarize patients with how to use the scale when taking it manually on paper and while using the application.

The 11-Point Numerical Rating Scale (NRS-11), which spanned from 0 (no pain) to 10 (very painful), was used to gauge pain intensity. The classic version (NRS-11) has been demonstrated to have high psychometric properties when used with children aged 6 and older.[8,9] The Painometer version of the NRS-11 was administered using an Android phone, which showed a body graphic with dots denoting painful places. After choosing the area, participants could select the number at the top of the screen that best described their level of discomfort. (Figure1 & 2)

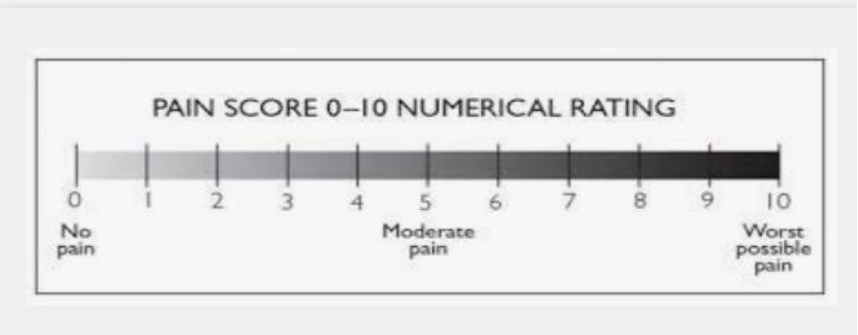

Figure 1. Conventional/traditional NRS-11 scale for measuring Pain Intensity

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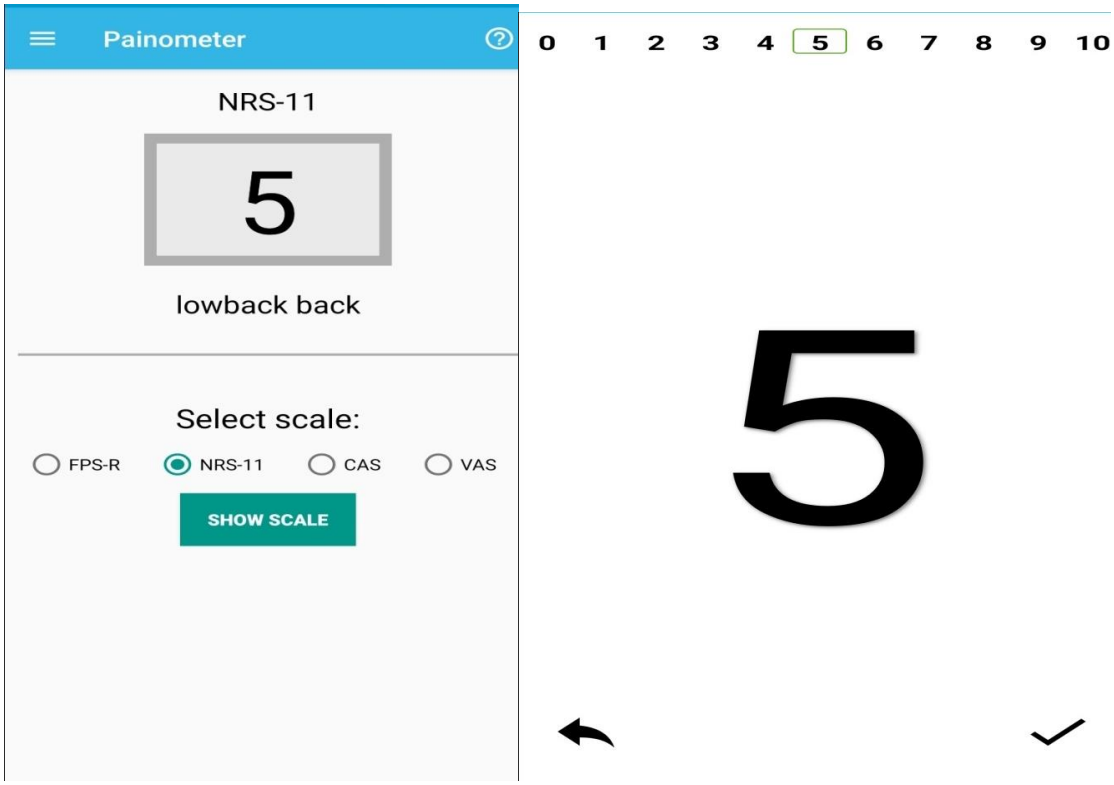

Figure 2 Shows the NRS-11 scale of Painometer v2 application for measuring Pain Intensity

Statistical analysis

For both versions of the NRS scale (conventional vs. Painometer), the descriptive data, including mean pain intensity with standard deviations (SD), are shown in Table 1.

Participants Descriptive statistics	
Participants (N)	31
Mean age(SD)	18.16±1.12
Gender (%)	
Male	45%
Female	48%
Pain status	
Mean pain NPRS (SD)	3.96±1.9
Mean Pain Painometer NPRS(SD)	4.19±2.0

Table 1- Shows the Descriptive statistics of Participants

We utilized the Bland-Altman approach to check if the reports produced by the Painometer version of the NPRS scale were consistent with those provided by the conventional NPRS. (Graph 1). Earlier by different researchers The Bland-Altman approach has been used to assess the degree of agreement between data from pain

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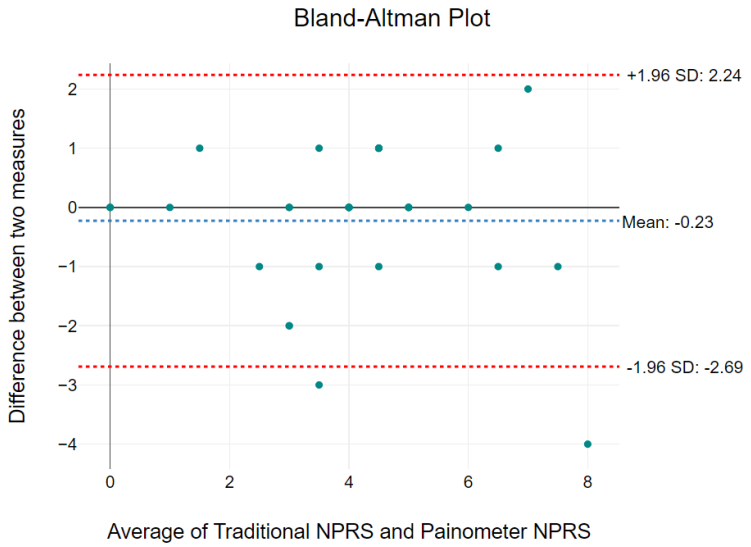
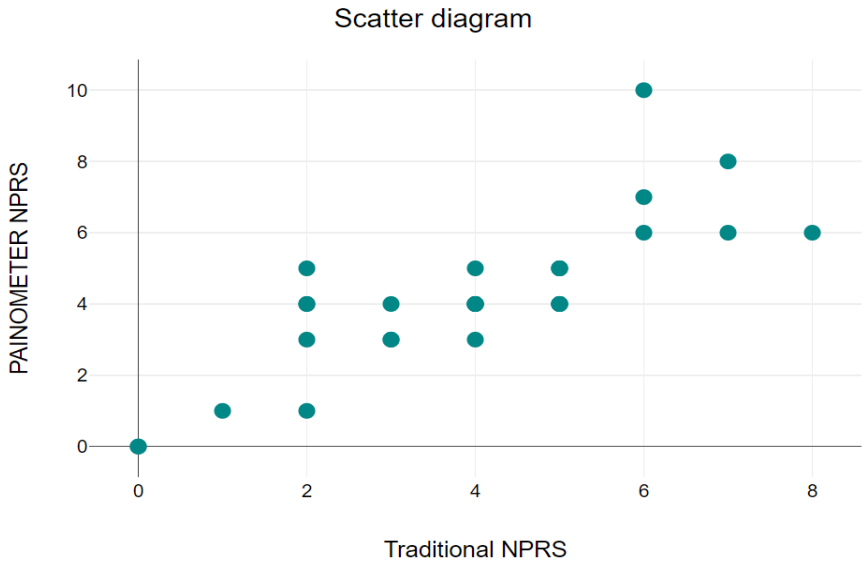
intensity measures.[10] The Bland-Altman approach analyses the difference between the scores recorded by each subject using two distinct scales or methodologies to the average of these two scores using a scatter plot. To ascertain whether the scores given on conventional NRS-11 and Painometer NRS-11 agreed, analyses were performed. Thus the maximum limit of agreement for comparison between NPRS & Painometer NPRS was ± 4.



Graph 1 :Bland and Altman graphs showing Aggrement between traditional NRS vs Painometer NRS

To evaluate the linear relationship and reliability between traditional/conventional NRS and Painometer NRS, a Pearson correlation coefficient was generated. The two variables had a positive association (0.810) at a confidence interval of 0.01 level (2tailed).(Graph 2)



Graph 2 shows the correlation between traditional NPRS and Painometer NPRS

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Results

For this study, 31 LBA participants were enrolled, with 14 men and 17 women. The participant's descriptive information is compiled in Table 1. The major goal of this study was to compare the reliability and viability/agreement of the Painometer app (NRS-11) with the classic version to determine whether, in adolescent low back pain patients it could be used to assess their pain intensity. When data were taken into consideration while maintaining a 99% confidence interval, the Pearson correlation between the traditional NRS and the Painometer NRS was 0.810, indicating a positive association. Additionally, this study demonstrated consistency between the reports generated by the traditional NRS and the Painometer NRS.

Discussion

The study was undertaken to gather crucial data on the app Painometer's (NRS-11) validity and reliability as a tool for gauging pain severity in the adolescent age group with low back pain. Earlier studies in the pediatric group were conducted to examine the viability of electronic versions of pain scales. Results from earlier research also showed that the scores produced by the traditional and electronic versions of the scales used in the Painometer were in agreement.[10]

As predicted, the agreement and reliability between the traditional and painometer NRS scales was found to be statistically significant, indicating that the scales can be used interchangeably. The study's findings are consistent with those made by Castarlenas et al.[6,11] who discovered consistency between the verbally administered NRS-11 and its electronic version reports.

Future research plans will take into account this constraint by measuring pain intensity twice before measuring it after recovery to determine the scales' adequate validity. Further, a bigger sample size should be used to demonstrate the same because it could not be an accurate representative of adolescents with low back pain given that a sedentary lifestyle and increased screen time are contributing to an increase in musculoskeletal problems.

The findings of our study also show the validity and reliability of the pain intensity reports produced by Painometer and the agreement, at a 99% confidence interval, between the reports provided by the traditional and electronic versions of the 0-10 Numerical Rating Scale.

This study demonstrates how digital applications (Painometer v2 application) can help researchers and clinicians working with pain reports for low back pain, save real-time assessment

Implications on Physiotherapy Practice

This article serves three purposes:

(1) To establish a foundation for understanding that, in adolescents with non-specific low back pain, the painometer application can be used to record pain intensity;

(2) To make assessment processes paperless and promote digitalization; and

(3) To discuss challenges and opportunities related to integrating the application in assessment processes.

Abbreviation

NRS, Numerical Rating Scale; LBP, Low back pain

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