AGREEMENT AMONG FOUR MEASURES OF PAIN INTENSITY IN CHILDREN

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INTRODUCTION

The assessment of pain intensity in children has advanced enormously in the last twenty years, but there still are some gaps in the literature. An important issue that deserves further analysis is the agreement between the different scales used to report the intensity of pain: are all these self-report measures equivalent? Might these tools be used interchangeably? Very few studies have analysed this topic in pediatric population, and the agreement of the scales remains a controversial issue [1,4].

The aim of this work was to analyze the agreement between four widely used tools to measure pediatric pain intensity: Visual Analogue Scale (VAS), Coloured Analogue Scale (CAS), Numerical Rating Scale – 11 (NRS-11), and Faces Pain Scale – Revised (FPS-R).

METHODS

Participants

A sample of 72 school-children participated in this study. Participants’ age was between 6 and 8 years old (mean = 6.68; sd = 0.62). The sample included 43 boys (59.7%) and 29 girls (40.3%).

Procedure

First of all, participants underwent some numerical testing to make sure that they had the ability to inform about their pain intensity with a NRS and/or a VAS. These tests consisted in: counting from 0 to 10; making comparisons between numbers and, a seriation task. All participants successfully fulfilled the tests thus demonstrating their capability to use the scales in this study. After that, children were asked to identify the most frequent pain problem experienced during the last three months (prior to the interview) and report the maximum intensity of that pain using all four scales. Finally they were also asked to choose the instrument they preferred the most to report the intensity of their pain.

Data analysis

To test the agreement of the four rating scales a series of analysis with the Bland – Altman method [2] were conducted. We posed a priory the maximum limit of agreement at ±20mm. This limit corresponds to the coefficient of repeatability for adults, when using the VAS [3].

RESULTS

As can be seen on Table 1 the comparison between the scales did not result in any agreement.

Table 1. Limits of agreement between scales according to the Bland-Altman method

<table>
<thead>
<tr>
<th>Scales</th>
<th>N</th>
<th>Mean difference (95% CI)</th>
<th>Lower limit</th>
<th>Upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS/VAS</td>
<td>72</td>
<td>1.0 (-1.9 to 3.6)</td>
<td>-9.6 (-25.2 to -36.3)</td>
<td>22.8 (10.3 to 27.2)</td>
</tr>
<tr>
<td>VAS FPS-R</td>
<td>72</td>
<td>-2.7 (-7.4 to 2.3)</td>
<td>-42.1 (-92.0 to -34.0)</td>
<td>36.8 (28.6 to 44.0)</td>
</tr>
<tr>
<td>NRS-11/VAS</td>
<td>72</td>
<td>5.9 (5.5 to 6.2)</td>
<td>-30.7 (-23.2 to -38.2)</td>
<td>42.4 (40.9 to 34.9)</td>
</tr>
<tr>
<td>CAS FPS-R</td>
<td>72</td>
<td>-1.7 (-6.0 to 2.6)</td>
<td>-37.5 (-45.0 to -30.2)</td>
<td>34.2 (38.6 to 41.6)</td>
</tr>
<tr>
<td>NRS-11 FPS-R</td>
<td>72</td>
<td>-4.9 (-8.5 to -1.17)</td>
<td>-35.6 (-41.9 to -29.2)</td>
<td>25.9 (16.6 to 32.2)</td>
</tr>
<tr>
<td>NRS-11 FPS-R</td>
<td>72</td>
<td>3.2 (-1.1 to 7.4)</td>
<td>-32.2 (-39.5 to -24.9)</td>
<td>38.6 (31.3 to 45.9)</td>
</tr>
</tbody>
</table>

Figures 1 to 6 show the results of the Bland and Altman method.

Fig. 1. Agreement between CAS – VAS

Fig. 2. Agreement between CAS – NRS

Fig. 3. Agreement between CAS – FPS-R

Fig. 4. Agreement between NRS – VAS

Fig. 5. Agreement between VAS – FPS-R

Fig. 6. Agreement between NRS – FPS-R

CONCLUSIONS

✓ The results of this study showed a lack of agreement among pain intensity reports as they are provided by the four scales. Clearly, these scales cannot be used interchangeably.
✓ Our findings suggested that the NRS-11 tends to overestimate the intensity of pain, in comparison with the other scales.
✓ Above 60% of the participants preferred the CAS to report the intensity of their pain.
✓ Future studies should profitable examine which response system is the most appropriate one, or whether there is one alternative method that suits all situations and samples.

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