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Original Article

Comparison of Two Pain Scales in Indian Children

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ABSTRACT

Objective. To compare the Faces Pain Scale and Color Analogue Scale among children aged 6-12 years undergoing selected procedures (Venipuncture, Intravenous cannulation, Intramuscular injection, Lumbar puncture, Bone marrow aspiration) and to compare the procedural pain in a child as perceived by the child, parents and health care professionals using the above mentioned scales.

Methods. This was a prospective, descriptive correlational study of children aged 6-12 years, who had undergone selected procedures. Children were assessed for their pain severity using Faces Pain Scale and Color Analogue Scale. Parents and health care professionals also independently assessed the child's pain using the same scales.

Results. 181 children who fulfilled the eligibility criteria were enrolled in the study. There was a significant positive correlation (r = >0.8) between both the pain scales. There was fair to moderate positive correlation (r = 0.29 to 0.58) of pain perception of child with parents and health care professionals.

Conclusion. Faces Pain Scale and Color Analogue Scales seem to be appropriate instruments for measuring pain intensity among Indian children aged 6-12 years undergoing selected procedures. **[Indian J Pediatr 2008; 75 (9) : 891-894]** *E-mail: mvatsa2001@yahoo.co.in*

Key words : *Color Analogue Scale; Faces Pain Scale; Pain assessment*

Pain is referred to as the fifth vital sign and is an important reason patient seeks health care. Subjective in nature, pain is "whatever the person says it is, whenever she or he says it does."[1] Pain has also been defined as an "unpleasant sensory and emotional experience associated with actual or potential tissue damage.[2]

In children, inadequately treated procedural pain may lead to higher pain ratings during subsequent procedures, even when efficacious pain relief measures are used.[3] Pain can be measured by self-report (what children say), biological markers (how their bodies react), and behavior (what children do). Because pain is subjective, self-report is best if it is available.[4]

Even though there are recommended guidelines for assessment of pain in children,[5,6] in India there is still limited data, on use of pain scales in children. It will be useful to know which pain assessment scale is more appropriate in Indian children. At the same time, there is need to evaluate how the parents and the health care professionals perceive the pain in a child undergoing a procedure. In view of paucity of data in Indian children, we have undertaken this study to compare the effectiveness of two pain assessment scales and to compare child's, parental and health care professionals' perception of procedure related pain in the child.

MATERIAL AND METHODS

This was a prospective, descriptive correlational study conducted at a tertiary care hospital in north India. Children undergoing selected procedures aged between 6 – 12 years and their parents, and the health care professionals attending the children were evaluated for the perception of pain after obtaining informed consent from the parents. Children with altered sensorium, clinically unstable, developmentally delayed and post-operative children were excluded from the study. We planned to enroll 30 children from each selected procedure. Ethical clearance was obtained from Institute's Ethics Committee and written informed consent was obtained from parent prior to enrollment in the study.

Data collection was done during a 7-month period from June 2006 to December 2006. After enrollment,

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details of demographic and procedural characteristics were recorded in subject datasheet. Pain was assessed by using two validated and standardized pain scales, the Faces Pain Scale (FPS)[7] and Color Analogue Scale (CAS)[8] from child, parents and health care professionals independently 5 minutes before for all the procedures, for assessing feasibility of administration of tool and, after the procedure, the measurement was taken as soon as the procedure was completed, except for children who were sedated. Faces Pain Scale is a six-point scale that shows the faces of children who have different severity of pain scored from 0, indicating "no pain", to 10, which signifies "the worst pain you can imagine". The Color Analogue Scale provides gradations in color and area as well as length so it is easy to see how different scale positions would reflect different levels in pain intensity. This instrument has a numerical rating scale on the back to convert the grading in color to a numerical score ranging from 0 to 10 in 1/8 increments. The study procedures and data collection were the same for those who had venepunture, intravenous cannulation, intramuscular injections and for children who were not sedated in lumbar puncture and bone marrow aspiration procedure. Pain scores from children who were sedated in lumbar puncture and bone marrow aspiration procedure were assessed when the child recovered from the sedation and was able to respond.

SPSS software (version 10) was used for the statistical analysis. Descriptive and inferential statistical method was used. Intra-class correlation coefficient was calculated to check the linear association between two continuous variables i.e. the pain ratings on both the scales. Paired 't' test was used to test the significant difference between two related continuous variables. ANOVA was used to test the significant difference between pain ratings of children in selected procedures. Two sided significance tests were used throughout, and the level of significance was set at $p < 0.05$.

RESULTS

During the study period, 45 children who had undergone venepuncture, 33 children who had undergone intravenous cannulation, 36 children who received intramuscular injection, 31 children in lumbar puncture and 36 in bone marrow aspiration procedure were studied. Of 181 children, 127 (70.2%) were boys and 54 (29.8%) were girls. The mean age of children was 8.9 ± 2 years.

Of the 181 children enrolled, 179 (98.8%) were able to respond to FPS and 174 (96.1%) to CAS (p= 0.091). Table 1 shows the scores for Faces Pain Scale and Color Analogue Scale for all children and also by procedure. Overall, the Faces Pain Scale score was higher (5.06 ± 2.77) than Color Analogue Scale score (4.63 ± 2.63) ($p < 0.001$). Statistically significant higher scores were obtained on Faces Pain Scale for intravenous cannulation and lumbar puncture procedure. There was no significant difference of mean pain scores of children between selected procedures on FPS ($p = 0.44$, $F = 0.93$) and also on CAS ($p = 0.41$, $F = 1$) by ANOVA.

Intra-class correlation was also calculated to assess the correlation between two pain scales and to correlate the pain rating of child with parents and health care professionals. A strong positive correlation ($r = 0.88$, $p<0.001$) was found between the pain ratings by children on both the FPS and CAS. A similar findings ($r = 0.85$ to 0.88, $p<0.001$) were also found from parents and health care professionals.

The pain rating by parents and health care professionals were higher than children's pain rating on FPS (Table 2). Comparisons of the mean pain scores of child with mothers, fathers, doctors and nurses using paired 't' tests were significant only for mothers and doctors.

The pain rating by mothers, fathers and doctors were higher than children's pain rating, where as nurses pain rating is lower than child's pain rating on CAS (Table 3). The difference was statistically significant only for doctors.

However, the intra-class correlation coefficient showed fair to moderate positive correlation ($r = 0.29$ to 0.58) of pain perception of child with that reported by parents and health care professionals on FPS (Table 2) and CAS (Table 3). It was also evident that nurses were able to rate pain more closely to child's pain on both FPS ($r = 0.587$) and

Table 1. Mean Pain Scores of Children in Selected Procedures Using Two Pain Scales

Selected Procedures	N	FPS* Mean pain score ± SD	CAS* Mean pain score ± SD	'p' value
Venepuncture	43	4.74 ± 2.43	4.32 ± 2.13	0.089
Intravenous cannulation	31	5.43 ± 2.47	4.56 ± 2.33	0.001
Intramuscular injection	35	5.14 ± 2.71	4.95 ± 2.70	0.426
Lumbar puncture	29	4.62 ± 3.02	4.09 ± 2.53	0.003
Bone marrow aspiration	36	5.55 ± 3.31	5.20 ± 3.35	0.068
All children	174	5.06 ± 2.77	4.63 ± 2.63	<0.001

*FPS- Faces Pain Scale, *CAS- Color Analogue Scale

Table 2. Mean Pain Score and Intra Class Correlation of Child's, Parents' and Healthcare Professionals' Scores Using Faces Pain Scale

	Mean pain score (SD)	Child's Corresponding Mean pain (SD)	p value for difference in mean	'ρ' value	p value for intra-class correlation
Mothers (107)	5.81 (2.77)	5.20 (2.84)	0.048	0.358	<0.001
Fathers (101)	5.09 (2.55)	4.87 (2.67)	0.449	0.401	<0.001
Doctors (127)	6.19 (2.12)	5.02 (2.68)	0.001	0.454	<0.001
Nurses (83)	5.57 (2.34)	5.54 (2.94)	0.928	0.587	<0.001

'p'- Intra-class correlation coefficient

Table 3. Mean Pain Score and Intra Class Correlation of Child's, Parents' and Healthcare Professionals' Scores Using Color Analogue Scale

	Mean pain score (SD)	Child's Corresponding Mean pain score (SD)	p value for difference in mean	'ρ' value	p value for intra-class correlation
Mother (104)	5.19 (2.71)	4.69 (2.65)	0.090	0.377	<0.001
Father (101)	4.48 (2.38)	4.47(2.48)	0.980	0.290	0.003
Doctor (123)	5.49 (2.22)	4.55 (2.48)	<0.001	0.443	<0.001
Nurse (81)	4.83 (2.6)	5.08 (2.84)	0.424	0.518	<0.001

'p'- Intra-class correlation coefficient

CAS (r = 0.518). This pain rating was followed by doctors (r = 0.454) and fathers (r = 0.401) on FPS and doctors (r = 0.443) and mothers (r = 0.377) on CAS. The pain rating by mothers (r = 0.358) was least close to child's rating on FPS and the pain rating by father (r = 0.290) was least close to child's rating on CAS. As all the intra-class correlations are significant, both parents and health care professionals are able to assess child's pain on both FPS and CAS. There was also significant positive correlation between the pain rating by father and mother (r = 0.71) and doctor and nurse (r = 0.68).

DISCUSSION

Results of the present study suggest that both Faces Pain Scale and Color Analogue Scale can be used for pain assessment in children. Of the 181 children enrolled, 2 children were not able to respond to FPS and 7 children to CAS. This shows a trend towards greater acceptance of FPS than CAS (statistically insignificant). Parents' and health care professionals' assessment of child's pain correlates well with child's pain report.

The intensity of pain ratings of children was similar in all selected procedures on FPS and CAS. This finding may be associated due to pain management in lumbar puncture and bone marrow aspiration procedure. There was a strong positive correlation (r = 0.88) between both the pain scales among children. The children scored more on the faces pain scale. This may be due to the fact that there was 2-point gradation in the FPS compared with 0.25 in the CAS. While, FPS could also assess the distress leading to higher scores, we had administered the scale to assess pain and the same was explained to the participants. Thus, it seems both the Faces pain scale and Color analogue scale to be an appropriate instrument for measuring pain intensity among Indian children age 6-12 years undergoing selected procedures.

There was a fair to moderate positive correlation (r = 0.29 to 0.58) of pain perception of child with that reported by parents and health care professionals. On comparison with the mean pain scores, there was statistically significant difference in pain rating of child with mothers on only FPS, and with doctors (p = <0.001) on both FPS and CAS (p = <0.001). This suggests that mothers and doctors overestimate child's perception of pain. Manne *et al*[9] in 1990 reported poor correlation between parent's and child's assessment of needle pain. Chambers *et al*[10] reported overestimation of child's pain by parents. Some studies had shown that parents were accurate in their estimates of children's pain. [11, 12, 13] Underestimation of children's pain by parents has also been documented in some studies.[14, 15] Doctor's overestimation of child's pain was surprising as none of the studies found this finding to the present knowledge. The finding of the effect may be due to response bias. It was evident that nurses were able to rate pain more closely to child's pain on both FPS and CAS. This finding is in conflict with Schneider EM *et al*,[12] who have reported no significant correlation between child and nurse. There was also significant positive correlation between the scores reported by father and mother (0.71) and doctor and nurse (0.68). Zernikow B *et al*[16] also reported that there was a significant correlation between pain score reported by nurses and doctors.

It is important to acknowledge the limitations of this study. Pain related to distress was not identified and non-invasive procedure related pain was not assessed. Children undergoing lumbar puncture and bone marrow aspiration had received sedation/analgesia, which are likely to have affected the pain scores.

To conclude, the present study findings supports the utility of obtaining child self- report of pain and show that both Faces pain scale and the Color analogue scale were appropriate tools use for assessment of pain among children age 6-12 years undergoing selected procedures among Indian population. The parents and health care professionals are reliably able to assess the procedure related pain among children by using the same pain scales (FPS and CAS).

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