Establishing the psychometric properties and preferences for the Northern Pain Scale

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ABSTRACT

Objectives. A culturally relevant, evidence-based pain assessment scale in Inuktitut is needed. Psychometric properties and preferences for the Northern Pain Scale (NorthPS), a revised version of the Wong-Baker FACES scale, were examined.

Study design. This repeated-measures, within-subjects study involved 2 face-to-face interviews held 2 weeks apart.

Methods. Participants were recruited from 2 schools and a community centre in Pangnirtung, Nunavut, Canada. Three pain scales (NorthPS, FACES and a numerical rating scale) were used to rate the pain portrayed in an adapted version of the Charleston Pediatric Pain Pictures (NorthCPPP, a series of 17 cartoon vignettes).

Results. The study involved 188 participants ranging in age from 5 to 83 years. Compared with the established FACES and numerical scales, the concurrent validity of the NorthPS was acceptable, with all 3 pain scales producing similar scores for the North CPPP vignettes. The youngest children were slightly more accurate during the second interview; otherwise, scoring accuracy was similar during both interviews. Accuracy was also similar across pain scales. Spearman correlations between NorthPS and other scales were lowest for the “No” pain vignettes, and for the youngest children. Internal consistency was acceptable for the NorthPS when compared with FACES and numerical scales. FACES was preferred by the majority of children and NorthPS was preferred by the majority of adults.

Conclusions. NorthPS, a pain scale adapted to Inuit language and culture, was validated using the NorthCPPP with children and adults. The NorthPS is a well-understood, culturally and linguistically adapted option for the assessment of pain for Inuktitut-speaking children and adults.

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INTRODUCTION

Approximately 150,000 Inuit live in the Arctic regions of Canada, Alaska, Greenland and Russia (1). The health status of the Inuit population is generally poorer than that of other Canadians, with greater frequency of chronic diseases such as diabetes, heart disease, certain cancers and HIV/AIDS (2). Inuit children have three times the rate of otitis media and are at greater risk for traumatic injury than children in the south (2,3). All of these conditions are associated with pain.

Unrelieved pain is associated with negative outcomes, including altered immune function, delayed healing, worsening patient conditions, higher levels of stress and anxiety, decreased patient satisfaction, longer hospital stays, decreased quality of life, higher rates of readmission to hospital and more frequent outpatient visits (4–6). However, no culturally relevant, evidence-based pain assessment scale is available for use with Inuit children and adults, putting Inuit children and adults at risk of unrelieved pain.

Among numerical, verbal, visual analogue and image-based pain assessment tools, or methods such as differently sized “poker chips,” there is no single “best” pain assessment tool across ages and cultures (7). Scales with faces are quickly and easily administered, particularly for children (7).

The Wong-Baker FACES scale (FACES) has been used successfully with children and adults from a number of cultural groups (8–11). However, when used with Inuktittut-speaking Yup’ik Eskimo adults to assess pain in a community-based palliative care program in the Bristol Bay region of Alaska, the scale met with limited success (12). The scale in English was not well understood, and family caregivers had difficulties assessing and communicating levels of pain to nurses over the telephone. Possible reasons include inadequate training and difficulties relating to cartoon pictures, but cultural and linguistic factors probably contributed to difficulties as well. For instance, Inuit people, when engaged in conversation, widen their eyes and raise their eyebrows to indicate agreement or “yes.” On the FACES scale, this eye configuration is associated with “no” pain. Building upon this experience, in recognition of and respect for cultural differences, a series of consultations with Yup’ik Eskimo elders in Alaska and Inuit children and elders in Pangnirtung, Nunavut, led to a redesign of the FACES scale. It was redrawn to reflect Inuk facial expressions and dress and was translated into Inuktitut. The resulting Northern Pain Scale (NorthPS) is the focus of this study.

The purpose of this study was to examine the psychometric properties of the NorthPS, compared with FACES or a numerical rating scale (NRS), among Inuit children, youth and adults. The study objectives were to investigate (1) the concurrent validity of the NorthPS, FACES and NRS; (2) the test-retest reliability of the 3 scales; and (3) the scale preferences, and factors influencing these preferences, of Inuit children and adults.

MATERIAL AND METHODS

Setting
The study was conducted in Pangnirtung (population approximately 1,400), Nunavut, on Baffin Island, north of the Arctic Circle in eastern Canada.

Study design
This test-retest, within-subjects study involved 2 face-to-face interviews conducted at least 2 weeks...
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apart. All interviews were conducted in Inuktitut. The study protocol was approved by the Nunavut Research Institute and the University of Ottawa research ethics board.

Participants
Families and elders were invited to a series of “town hall” meetings in Pangnirtung that introduced the study purpose and methods to the community. A convenience sample of adults was recruited, and samples of children and adolescents were selected using computer-generated random numbers from children aged 5 years and above and registered at the local primary school (191 students from kindergarten to Grade 6) or secondary school (255 students in Grades 7–12). Inuit who spoke Inuktitut as their first language and could give consent or assent were included, while people with any condition that made it difficult for them to understand and perform the tasks were excluded.

Measures
FACES consists of 6 cartoon faces depicting increasing pain (8). For the purposes of this study, each face had the same Inuktitut word descriptors as described below for the NorthPS and a letter from “a” to “f” printed below the face. The participant pointed to the face and the letter was entered on the data collection tool. For the purposes of data analysis, the letters were recoded as 0 to 5.

NorthPS is a version of the FACES scale, revised with permission, to more closely reflect Inuit expressions on the 6 faces. A graphic artist from Bristol Bay, Alaska, an artist from Pangnirtung and community children and elders assisted with its development. Two Inuktitut versions of descriptors reflect language that would be used by a young child, or by a youth or adult. Scale instructions were based on works of Wong and Baker (8) and Bieri et al. (13). No mention was made of emotions (e.g., “happy” or “sad”) that might confuse participants and confound results. Two Pangnirtung translators reached consensus with the translation and verified texts with the elders. In addition, Inuktitut translators working with Ottawa Health Services Network Inc. verified that the dialect would be understood in communities across the Canadian North.

The Numerical Rating Scale (NRS) consists of a horizontal line with even divisions marked from 0 to 5. The reliability and validity of numerical rating scales are well established with adults (14,15), and children as young as age 8 (16–19). The NRS used in this study did not have descriptors at the anchor points; however, the research assistant verbally described the anchors to the participants with the same Inuktitut words printed below the anchors on the NorthPS and the FACES scale.

Charleston Pediatric Pain Pictures (CPPP) served as the pain stimulus for testing the psychometrics of the pain scales. This series of 17 line drawings depict a young child engaged in activities associated with varying degrees of pain (20). Scenes depict medical, play and home situations, and relate to “No,” “Low,” “Moderate” or “High” levels of pain. Each pain level is associated with 4 drawings, with the exception of “Moderate,” which is associated with 5. The instrument was deemed to be a valid index of subjective pain experience (20,21). The children in the original drawings were wearing running shoes, shorts and T-shirts. These were redrawn as kamiks and parkas, but the activities depicted remained unchanged. In some cases, facial features such as eyes and a mouth were added to the drawings. The activities would be familiar to the participants. The revised CPPP will be referred to as the NorthCPPP.
Figure 1 shows a picture from the NorthCPPP. Figure 2 depicts the 3 pain scales used for data collection.

Procedures

Participant interviews. Two research assistants from Pangnirtung conducted all of the interviews. Pre-training included review of audio/visual recordings from 2 interviews. To pilot, and to ensure standardization of the interview format, both research assistants and the principal investigator attended the first 5 interviews. Children and youth were interviewed at school while adults were interviewed in the community centre.

The interview consisted of 3 tasks: (1) assignment of a pain intensity score to each of the 17 NorthCPPP vignettes using the 3 pain scales (FACES, NorthPS and NRS); (2) ranking of the 3 pain scales with regard to preference; and (3) explanation of pain scale preference. Participants
were initially shown the 3 pain scales and how to use them. Then, one at a time, each scale was used to rate the indicated pain intensity in all of the 17 NorthCPPP pain vignettes, before repeating the process with subsequent scales. The sequence of the pain scales was randomized, as was the order of the NorthCPPP vignettes. Finally, the 3 scales were placed in front of participants, and they were asked to rank them and explain their preferences. Responses were recorded by the research assistant on a data collection record. This procedure was repeated during the second interview.

Statistical methods

Sample sizes were calculated according to Walter et al. (22), with a power of 80% to detect a reliability of 0.94 compared with age-specific null hypothesis (H0) values of 0.71, 0.80, 0.88; probability of type I error fixed at 5%. Upon re-examination, we realized that this was a misapplication of Walter’s formula, as H0 should have been the lowest reasonable correlation. Streiner and Norman (23) suggest that correlations of 0.3 to 0.5 are acceptable when comparing 2 measures of the same construct. Using H0 of 0.3, the youngest group was under-represented with 11 rather than 20 participants; sample sizes were sufficient for the older groups.

In rating the accuracy of the use of pain scales, responses considered correct for the “No” pain pictures were 0 or 1; for the “Low” pain pictures, 1, 2 or 3; for the “Moderate” pain pictures, 2, 3 or 4; and for the “High” pain pictures, 4 or 5.

Data were not normally distributed, so medians and interquartile ranges are presented, and Spearman correlations were calculated. There were no missing data, and no data excluded as an outlier. Pain scores from the 2 sessions were compared using the Friedman test; accuracy of assigned pain scores to the NorthCPPP vignettes was compared using ANOVA; and pain scale preferences from the 2 interviews were compared using the McNemar test. All calculations were conducted using (SPSS) version 18.0.1.

RESULTS

Between October 2006 and May 2007, 188 people participated in the study; 124 females and 64 males, ranging in age from 5 to 83 years (Table I). All participants completed both interviews.

Median pain scores. On 2 separate occasions, participants assigned a pain score to each NorthCPPP picture using each of the 3 pain scales. There was no significant difference between responses in the 2 sessions so the scores for each picture and pain scale were averaged. The data were not normally distributed, so median pain intensity scores are presented here for each NorthCPPP subscale, assessed using each pain scale (Table II). The pain scores for each NorthCPPP subscale were generally similar for the NorthPS, FACES and the NRS, although teenagers and adults over 40 years old used the scales in a significantly different manner to assess NorthCPPP “No” pain images (Friedman p-values were less than 0.1). While the “No” pain pictures received very low scores, with an increase in scores for the “Low” and “Moderate” pictures, the “Moderate” and “High” pain pictures received similar scores to one another. Participants appeared to be reluctant to designate pictures with the highest pain score of 5.

Table I. Age of participants.

| Age (years) | Number | Percent |
|-------------|--------|---------|
| 5–7         | 11     | 5.9     |
| 8–12        | 30     | 16      |
| 13–17       | 60     | 31.9    |
| 18–40       | 29     | 15.4    |
| 41–65       | 41     | 21.8    |
| 66+         | 17     | 9       |
| Total       | 188    | 100     |
Accuracy. The number of times that participants rated each of the 17 NorthCPPP pictures correctly within each subscale was examined for each pain scale. The means and standard deviations of numbers of correct answers by participants of various ages at the 2 interviews are presented in Table III. One-way ANOVAs by age were performed for each pain scale to compare accuracy scores for session 1 and session 2. Results indicated there was no difference in accuracy that could be attributed to the type of pain scale. However, there was a difference in accuracy by age for session 1, and younger children tended to be less accurate than older children and adults. That effect weakened during the second session as the youngest age group became more proficient.

Concurrent validity of the NorthPS. The concurrent validity was examined using Spearman correlations between the NorthPS and the other scales (Table IV). Correlations were generally above 0.5, with 2 exceptions for FACES and 4 exceptions for NRS. The exceptions were all in the extremes of age ranges and/or the NorthCPPP subscale.

Preferences were not significantly different between the 2 sessions (McNemar p=0.31), so they were averaged (Figure 3). More children

| Table II. Median pain intensity scores of NorthCPPP subscales, by pain scale and age (scale ranges are from 0 to 5). |
| Age (years) | NorthCPPP | FACES | NorthPS | NRS | Friedman |
|-------------|------------|-------|---------|-----|----------|
|              | subscale   | median (IQR) | median (IQR) | median (IQR) | p-value |
| 5–7 No pain  | 0.13 (0.0, 1.1) | 0.50 (0.0, 0.75) | 0.50 (0.0, 0.75) | 0.96 |
| 5–7 Low pain | 2.0 (1.5, 3.4) | 2.8 (1.9, 3.3) | 2.8 (1.9, 3.3) | 0.98 |
| 5–7 Moderate pain | 2.9 (2.3, 4.3) | 3.4 (3.1, 4.3) | 3.4 (3.1, 4.3) | 0.22 |
| 5–7 High pain | 2.9 (2.6, 4.4) | 3.8 (2.6, 4.4) | 3.8 (2.6, 4.4) | 0.3 |
| 8–12 No pain | 0.13 (0.0, 0.63) | 0.25 (0.0, 0.53) | 0.13 (0.0, 0.4) | 0.83 |
| 8–12 Low pain | 3.0 (2.4, 3.5) | 2.8 (2.3, 3.4) | 2.9 (2.3, 3.6) | 0.58 |
| 8–12 Moderate pain | 4.0 (3.7, 4.4) | 4.0 (3.4, 4.3) | 4.0 (3.7, 4.3) | 0.54 |
| 8–12 High pain | 3.9 (3.5, 4.4) | 3.9 (3.5, 4.4) | 4.0 (3.3, 4.3) | 0.19 |
| 13–17 No pain | 0.0 (0.0, 0.13) | 0.0 (0.0, 0.13) | 0.0 (0.0, 0.13) | 0.04 |
| 13–17 Low pain | 1.9 (1.5, 2.5) | 1.9 (1.4, 2.5) | 1.9 (1.5, 2.5) | 0.72 |
| 13–17 Moderate pain | 3.2 (2.6, 3.9) | 3.2 (2.6, 3.9) | 3.3 (2.7, 3.8) | 0.84 |
| 13–17 High pain | 3.3 (2.9, 3.9) | 3.4 (2.9, 3.8) | 3.4 (2.9, 3.8) | 0.33 |
| 18–40 No pain | 0.1 (0.0, 0.19) | 0.0 (0.0, 0.19) | 0.0 (0.0, 0.1) | 0.60 |
| 18–40 Low pain | 1.4 (1.0, 2.1) | 1.5 (1.1, 2.4) | 1.6 (1.2, 2.3) | 0.58 |
| 18–40 Moderate pain | 3.3 (2.7, 4.0) | 3.3 (2.7, 4.3) | 3.6 (2.7, 4.0) | 0.61 |
| 18–40 High pain | 3.6 (3.1, 4.3) | 3.6 (3.2, 4.0) | 3.8 (3.2, 4.1) | 0.76 |
| 41–65 No pain | 0.0 (0.0, 0.38) | 0.0 (0.0, 0.19) | 0.13 (0.0, 0.25) | 0.11 |
| 41–65 Low pain | 1.8 (1.4, 2.6) | 1.9 (1.6, 2.6) | 1.9 (1.4, 2.7) | 0.39 |
| 41–65 Moderate pain | 3.5 (2.9, 4.3) | 3.6 (2.9, 4.3) | 3.6 (2.9, 4.4) | 0.11 |
| 41–65 High pain | 3.5 (3.2, 4.3) | 3.5 (3.2, 4.3) | 3.9 (3.3, 4.3) | 0.07 |
| 66+ No pain | 0.0 (0.0, 0.25) | 0.13 (0.0, 0.19) | 0.13 (0.0, 0.50) | 0.16 |
| 66+ Low pain | 1.5 (1.1, 2.3) | 1.8 (1.3, 2.1) | 1.9 (1.1, 2.8) | 0.36 |
| 66+ Moderate pain | 2.9 (2.0, 3.8) | 2.8 (2.3, 3.7) | 3.0 (2.2, 3.7) | 0.29 |
| 66+ High pain | 2.9 (2.0, 3.4) | 3.1 (2.6, 3.4) | 2.9 (2.3, 3.7) | 0.37 |

*a NorthCPPP = Revised Charleston Pediatric Pain Pictures.
*b FACES = Wong-Baker FACES Scale.
*c NorthPS = Northern Pain Scale.
*d NRS = Numerical Rating Scale.
*e IQR = Interquartile Range (25th and 75th percentiles).
preferred FACES than the NorthPS, while the NorthPS was increasingly preferred by adults. The strongest preference for the NorthPS (71%) was found in the 66+ years age group, which would be considered the elders. Responses to the question “Why did you like that scale best?” were frequently recorded as a shrug of the shoulders or a brief comment, yielding limited data. Typical comments from adults regarding the NorthPS were “they are northern images” or “northern faces were easiest to understand.” The children frequently stated that they found the FACES “fun” and “easy to understand.”

Table III. NorthCPPP pictures correctly scored at first and second sessions, by age group and pain scale.

| Age (years) | Session | Pain scale | FACES mean (SD) | NorthPS mean (SD) | NRS mean (SD) | p-value |
|-------------|---------|------------|-----------------|-------------------|---------------|---------|
| 5–7         | 1       | 10.5 (1.3) | 10.1 (1.9)      | 10.7 (1.8)        | 0.30          |
|             | 2       | 11.5 (1.8) | 10.3 (2.3)      | 10.9 (2.0)        | 0.19          |
| 8–12        | 1       | 11.7 (1.9) | 12.0 (1.8)      | 12.3 (2.4)        | 0.22          |
|             | 2       | 11.5 (2.5) | 12.1 (2.6)      | 11.9 (2.2)        | 0.16          |
| 13–17       | 1       | 13.0 (1.8) | 12.6 (2.1)      | 13.1 (2.0)        | 0.20          |
|             | 2       | 12.6 (2.0) | 12.7 (2.0)      | 13.0 (1.6)        | 0.28          |
| 18–40       | 1       | 12.2 (2.2) | 12.3 (2.2)      | 12.4 (2.1)        | 0.89          |
|             | 2       | 12.0 (2.6) | 11.9 (2.6)      | 12.2 (2.5)        | 0.70          |
| 41–65       | 1       | 12.2 (2.1) | 12.6 (2.0)      | 12.6 (2.1)        | 0.33          |
|             | 2       | 12.3 (2.3) | 12.2 (2.3)      | 12.3 (2.4)        | 0.76          |
| 66+         | 1       | 11.5 (2.1) | 11.4 (2.3)      | 11.7 (2.6)        | 0.83          |
|             | 2       | 11.6 (1.7) | 12.2 (1.9)      | 12.3 (2.1)        | 0.42          |

ANOVA p-value 1 <0.01 <0.01 0.01 2 0.18 0.06 0.04

Plain text – first session.
Italics – second session.

Table IV. Spearman correlation (r) between NorthPS and other pain scales, by age group and NorthCPPP subscale.

| FACES Pain Scale and NorthPS | Age (years) | No pain r | Low pain r | Moderate pain r | High pain r |
|------------------------------|-------------|-----------|------------|-----------------|-------------|
| 5–7                          | 0.88        | 0.42      | 0.68       | 0.86            |
| 8–12                         | 0.75        | 0.63      | 0.81       | 0.69            |
| 13–17                        | 0.54        | 0.74      | 0.74       | 0.67            |
| 18–40                        | 0.70        | 0.73      | 0.69       | 0.63            |
| 41–65                        | 0.62        | 0.71      | 0.84       | 0.85            |
| 66+                          | 0.49        | 0.65      | 0.68       | 0.51            |
| Numerical Pain Scale and NorthPS |             |           |            |                 |
| 5–7                          | 0.65        | 0.56      | 0.43       | 0.38            |
| 8–12                         | 0.70        | 0.55      | 0.53       | 0.63            |
| 13–17                        | 0.77        | 0.77      | 0.78       | 0.75            |
| 18–40                        | 0.82        | 0.78      | 0.69       | 0.78            |
| 41–65                        | 0.46        | 0.80      | 0.83       | 0.82            |
| 66+                          | 0.43        | 0.61      | 0.83       | 0.74            |

Italics – r values <0.5.
DISCUSSION

To provide a culturally sensitive pain assessment scale in Inuktitut for use with Inuit children and adults, the NorthPS was adapted for the northern culture and context from the Wong-Baker FACES scale. FACES has been used in previous work (12), and is used by both children and adults (24–26). Two sets of Inuktitut descriptors were devised for the NorthPS, with language appropriate for children and adults. A psychometric evaluation of the NorthPS was undertaken in Pangnirtung, Nunavut.

Concurrent validity

Examining the extent to which children and adults used the 3 pain scales in a similar manner to rate the pain in the NorthCPPP vignettes, the NorthPS was compared to the well-established FACES and NRS. Participants used all 3 scales in a similar manner to rate pain; NorthPS scores were not consistently higher or lower than those using the other scales.

Generally, the vignettes in the “No” pain subscale were problematic and seemed to be least understood by the participants, irrespective of age. The pictures that comprised this subscale depicted pleasurable situations. For example, 1 of the vignettes shows 2 children sitting on the floor playing a game. Participants may have had difficulty assigning a pain rating to a picture that was not associated with pain. All 3 pain scales performed equally poorly on the “No” pain vignettes, which likely reflects on the NorthCPP and not the pain scales. We cannot say whether redrawing the NorthCPP with more detailed facial features may have inadvertently incorporated elements that decreased accuracy in the lower pain subscales.

Internal consistency. The accuracy of participants’ ratings of the pain depicted in NorthCPPP vignettes was related to their age.
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but not the pain scale they used. Younger children had greater difficulty than older children or adults in accurately assigning a pain rating. This finding is in agreement with a number of studies indicating that younger children do not use pain rating scales as accurately as older children. For example, Stanford, Chambers and Craig (27) reported that 3-year-olds made errors 60% of the time when asked to rate the pain portrayed in a set of previously validated pain vignettes. Two studies that used pain vignettes reported that younger children were able to rate pain intensity but in a cruder fashion than older children (20,21) and that younger children tended to use rating scales by choosing the scale extremes (28).

The pattern of correlations indicated that the internal consistency was generally acceptable for the NorthPS when compared with the FACES scale and the NRS. However, for the “No” pain subscale of the NorthCPPP, correlations and internal consistency were weaker across all age groups and all 3 pain scales. Nevertheless, all correlations were within the upper range and higher than 0.30 to 0.50, which Streiner and Norman (23) suggest are acceptable correlations when comparing 2 measures of the same construct.

The FACES scale and the NorthPS were generally well correlated, with a few exceptions. The “No” pain subscale was moderately correlated for the adults aged 41–65 years (r=0.49), and the “Low” pain subscale was moderately correlated for the 5–7-year-old children (r=0.42). Overall, the pattern of correlations for all age groups indicated that both scales are comparable and that the NorthPS performed as well as the FACES scale.

The NorthPS and the NRS were also generally well correlated, although the youngest age group had lower correlations for 2 NorthCPPP subscales. This finding may be related to young children’s limited ability to understand the concept of order – which is essential for understanding numerical rating scales (29) – as well as the small sample size.

Test-retest reliability. With the exception of the youngest children, whose responses tended to be marginally more accurate in the second session, accuracy of pain assessment was unchanged from the first to the second session.

Preference. Children generally preferred the FACES scale, while adults preferred the NorthPS. The NRS was preferred by a minority of participants below 41 years of age. Although children’s preference for the FACES scale is a finding that has been replicated in a number of studies examining preferences and pain scales (30–32), we had expected the children to prefer the NorthPS because its images incorporate elements of their culture.

Familiarity with southern culture may have affected children’s comfort with the FACES cartoon images that, to the elders, are not “northern images.” Children living in the North are exposed to southern culture in many ways, with easy access to television, the Internet, computer games and movies at home, school and the hamlet community centre. Importantly, the school curriculum in Pangnirtung, where the study took place, incorporates the philosophy and activities from the Tribal Learning Communities (33). Classroom materials include cartoon facial scales that resemble the features and line drawings of the FACES scale, and children are often prompted to identify their emotions by choosing a face on these scales that represents how they feel. On the other hand, perhaps FACES is in keeping with
the tradition of a cartoon face that transcends culture. In multicultural research with FACES, many cultures found the scale easy to use and understand (9,11). Nevertheless, in this study adults preferred the NorthPS, which uses culturally relevant dress and facial expressions. In fact, no Inuit participants over 40 years of age preferred the NRS over the facial scales.

The explanation for why Inuit adults would prefer a cartoon facial scale may relate, in part, to the competencies or intelligences that compose key human abilities (34,35). Gardner describes spatial intelligence as “the potential to recognize and manipulate the patterns of wide space (those used, for instance, by navigators and pilots) as well as the patterns of more confined areas (such as those of importance to sculptors, surgeons, chess players, graphic artists, or architects)” (35, p. 42).

Inuit have well-developed spatial abilities and observational skills that enable them to survive and prosper on the land (34,36,37), as evidenced in activities such as map reading, navigation, visual knowledge, geographic knowledge, sculpture, printmaking and sewing without the benefit of pre-cut patterns (34,36).

The complexity and detail in the cartoon faces likely provide a more visually rich experience than the relative starkness and linearity of the NRS. Together with cues from the word descriptors, both FACES and the NorthPS facilitate the communication of information about pain intensity. This is an area for future study that might provide new information about how individuals use pain intensity scales to describe the perceptual experience of pain. This also has implications for clinical practice, as it is important to provide adult patients with a pain intensity scale that they find easy to understand and to use in order to complement clinical pain assessment, and for use in settings distant from health professionals. Typical practice – using a numerical rating scale or a visual analogue scale for adult patients – may not be adequate or acceptable for Inuit adults.

**Limitations**

Our study has some limitations. The pain vignettes from the original CPPPP were redesigned and the children’s clothes were altered to reflect northern styles of dress. In addition, facial expressions were added to some of the children’s faces in the northern version. The psychometric properties of the NorthCPPPP were not established, so it is unknown to what extent the redesign of the drawings influenced participants’ pain scores as compared to the original tool.

Although one aim of the research was to establish a tool that could be used by very young children, we did not have adequate numbers of 5–7-year-old children for this study. The sample size calculation was done incorrectly for this age group and should have been 20 children instead of 11 children. These young children were asked to use a numerical rating scale to rate the pain vignettes. However, there is little evidence indicating that children in the 5-to-7-year age group are able to reliably use a numerical rating scale (17–19). In addition, the numerical rating scale did not have word descriptors at the 0 and 5 numerical anchors, which may have affected its comparability with the other 2 scales. When describing how to use the NRS the research assistant used the same Inuktitut words that appeared in the FACES and the NorthPS, but they were not printed on the scale.
Conclusion
This first psychometric study of the Northern Pain Scale took place in a northern context, with children and adults using hypothetical pain scenarios. In this context, the tool had acceptable concurrent validity, internal consistency and test-retest reliability.

The preference by the children for the Wong-Baker FACES Scale and the preference by the adults for the Northern Pain Scale presented us with a dilemma. The tool was initially conceptualized so that Inuit children had better access to pain assessment in their own language. We did not anticipate that children would prefer the Wong-Baker FACES scale. In addition, many Inuktitut-speaking adults receive care in Ottawa with limited access to translators and could benefit from the Northern Pain Scale. In order to respect the preference of both children and adults, a 2-sided card the size of a bookmark was created. The translated Wong-Baker FACES scale is on one side and the Northern Pain Scale on the reverse. Although there are 6 faces, both scales are scored from 0–10 to respect the need for a common metric among the many established pain scales currently in clinical practice settings. Although the primary reasons to select a clinical tool would be sound psychometrics, ease of use and accuracy, a culturally relevant pain tool is respectful, and may be more acceptable, to some Inuit children and adults.

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