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## Translation, Cross-Cultural Adaptation, and Validation of the Adolescent Pediatric Pain Tool (APPT) for Multidimensional Measurement of Pain in Children and Adolescents

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### ABSTRACT

**Background:** Pain is subjective and multidimensional in nature. Its assessment is very challenging especially in the pediatric population. Adequate assessment of pain in children is the keystone for effective management. Accurate and comprehensive evaluation of the child's pain experience requires the use of multidimensional pain assessment tools such as the Adolescent Pediatric Pain Tool (APPT) which measures the intensity, location and quality of pain.

**Aims:** The aim of this study was to translate and culturally validate the APPT for use in Lebanese children and adolescents with cancer.

**Methods:** The instrument was translated and culturally adapted following the WHO four steps; 1) forward translation and back-translation, 2) expert panel, 3) pre-testing and 4) cognitive interviewing. The semantic validation of the pain quality descriptors was performed by healthy children and children with cancer aged 8–17 years, using the Q-sort method.

**Results:** A final Arabic version with 31 pain descriptors equivalent to the original tool was produced based on the results from the pilot study and the children's interviews. Children were able to differentiate between the different words they use to describe their pain.

**Conclusion:** Our results showed that the Lebanese version of the APPT is a culturally sensitive tool to assess the location, intensity and quality of pain in Lebanese children with cancer. Health professionals are encouraged to use this tool to assess the pain characteristics in Lebanese children with cancer, hence leading to effective pain management.

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Pain was highlighted as the most common and devastating symptom reported by children with cancer (Dupuis et al., 2010; Hinds et al., 2013; International Association for the Study of Pain [IASP], 2009; Jibb et al., 2018; Stinson et al., 2015; Wright, 2011). Prevalence studies have generally and concordantly indicated a high prevalence of pain among the pediatric oncology population (Grout, Thompson-Fleming, Carroll, & Downs, 2018; Jacob, Hesselgrave, Sambuco, & Hockenberry, 2007; Jacob, McCarthy, Sambuco, & Hockenberry, 2008; Madi & Clinton, 2018; Miller, Jacob, & Hockenberry, 2011). Children with cancer remain undertreated and suffer unrelieved pain, with 12.9% of them suffering from severe pain (Jacob et al., 2007; Madi & Clinton, 2018; Phillips & Davis, 2015). The intensity of pain remains the main reported pain characteristic in

### Key Practice Points

- Cultural and ethnic differences in the perception and expression of pain in children are documented in the literature.
- The Adolescent Pediatric Pain Tool (APPT) is a multidimensional self-report pain tool that measures the different dimensions of pain.
- The APPT has been widely used in the United States and Europe; to date its use in Middle Eastern countries is nonexistent.
- The World Health Organization guidelines were adopted in the translation of the APPT.
- This study has resulted in the availability of the Arabic version of the APPT, which can be used by health care professionals to assess cancer pain in children.

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most studies. However, a comprehensive evaluation of the pain experienced by the children with cancer, such as the location, quality, and duration of pain, is more informative (Fillimgim, Loeser, Baron, & Edwards, 2016). These additional characteristics are important to be measured because they help the health care professionals evaluate and manage the child's experience of pain adequately (Breivik, Curatolo, Niemi, E.K.H. Breivik, & Shipley, 2007; World Health Organization [WHO], 1998; Yazde, Gómez, Majdalani, Pigliapoco, & Santos Chocler, 2018).

The assessment of pain location using body diagrams has been found valuable; children are more able to communicate through drawings than through verbal responses (Linder, Bratton, Nguyen, Parker, & Wawrzynski, 2018). The use of body diagrams to assist children in describing the location of their pain could be an important differentiating indicator of the sources of pain. It can also provide a clear documentation of pain location in the medical records. The successful use of body diagrams for the assessment of cancer pain in children has been previously reported in different populations and ethnicities, African-Americans, Caucasians, Hispanics, and Asians (Angell, Alexander, & Hunt, 2015; Jacob et al., 2008; Pope, Tallon, Leslie, & Wilson, 2018). In addition, although the location hints to about the source of pain, the pain quality will provide information about the nature of that pain. The use of a list of word descriptors will help children with cancer qualify their pain and will assist health care providers to identify the type of pain suffered. Alternatively, assessing pain quality might suggest the most substantial dimensions of pain for the child (sensory, emotional, evaluative, and temporal). Thus adequate routine pain assessment and reassessment using standardized, age- and developmentally related multidimensional tools are advocated.

The Adolescent Pediatric Pain Tool (APPT) is a multidimensional self-report pain tool that measures the different dimensions of pain, including the location, intensity, quality, and temporal pattern, as well as the sensory, affective, and evaluative dimensions. It is used for children and adolescents between the ages of 8–17 years and is based on the McGill Pain Questionnaire (MPQ) (Melzack, 1975). The APPT includes a body outline to determine three components of pain: (1) location; (2) intensity; and (3) quality (Jacob et al., 2014; Savedra, Tesler, Holzemer, & Ward, 1989). The three components of the tool have had considerable reliability and validity and have been widely used on hospitalized multiethnic children and adolescents between the ages of 8 and 17 years (Jacob et al., 2014; Savedra et al., 1989; Savedra, Holzemer, Tesler, & Wilkie, 1993; Savedra, Tesler, Holzemer, Wilkie, & Ward, 1990; Tesler et al., 1991; Wilkie et al., 1990).

The age-appropriate body outline consists of two line drawings representing the front and back of the body. The right and left sides of the body outlines are labeled. The Word Graphic Rating Scale is a 10-centimeter horizontal line with word anchors ranging from *no, little, medium, and large to worst possible pain*. The word descriptors list contains 67 words representing four dimensions: sensory (37 words), affective (11 words), evaluative (8 words), and temporal (11 words).

Although the APPT has been widely used in the United States and Europe (Geisinger, 1994; Jacob et al., 2014), to date its use in Middle Eastern countries is nonexistent. Research studies have documented cultural and ethnic differences in the perception and expression of pain in children (Jongudomkarn, Aungsupakorn, & Camfield, 2006; Orhan et al., 2018; Yeh, 2001). Hence, the use of such tools in a different culture requires adaptation to the context of that culture. Thus the aim of this study was to translate and validate the APPT for use in Lebanese children with cancer (Fig. 1).

To validate the APPT in Arabic, it was necessary to follow specific guidelines because flaws in translation may alter the original intention of the instrument and jeopardize the reliability and validity of the ensuing instrument (Chang, Chau, & Holroyd, 1999; Gjersing, Caplehorn, & Clausen, 2010). Thus conceptual rather than literal

meaning is the goal when translating an instrument for cross-cultural use (Chang et al., 1999; Gjersing et al., 2010). A culturally appropriate translated measure is defined as a measure equivalent to the source language conceptually and linguistically, with a culturally appropriate fit to the target population (Guillemin, Bombardier, & Beaton, 1993; Mason, 2005; Wang, Lee, & Fetzer, 2006). Linguistic equivalence is the literal, word-for-word, translation from the original to the target language. It is the equivalent in grammar and syntax. However, words or items may be semantically but not conceptually equivalent (Guillemin et al., 1993; Mason, 2005; Wang et al., 2006). Different terms may have dissimilar meanings and distinct uses in the target culture. As such, appraisal of conceptual equivalence in the translation of measures is essential (Guillemin et al., 1993; Mason, 2005; Wang et al., 2006). Conceptual equivalence means the translated instrument measures the same construct in the target culture (Flaherty et al., 1988; Gjersing et al., 2010).

## Methods

### Design

The translation and cultural adaptation of the APPT were part of a larger study that measured the characteristics of pain in Lebanese children with cancer (Madi & Clinton, 2018). Permission to translate the APPT was sought from the author. The instrument was translated and culturally adapted following the World Health Organization (WHO) four-step process of translation and adaptation of instruments: (1) forward translation, (2) back-translation, (3) expert panel, and (4) pretesting and cognitive interviewing (WHO, 2010).

### Ethical Consideration

The study was approved by the American University of Beirut Institutional Review Board (IRB ID NUR.DM.01).

### Translation and Adaptation Process of the APPT

#### Step 1: Forward Translation

A higher quality of translation is ensured when undertaken by two independent translators (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Brislin, 1970). Thus two independent bilingual translators (a pediatric registered nurse [RN] and an RN working at the Children Cancer Centre of Lebanon [CCCL]), blind to each other and fluent in English, translated the original tool into Arabic. Emphasis on conceptual rather than literal translations was advocated, in addition to the use of clear and simple words. The forward translation resulted in two different versions (A-v<sub>a</sub> and A-v<sub>b</sub>) of the APPT tool. Agreement on a unified version was the next stage after the translation. The researcher, with the help of the two forward translators, reviewed and discussed the discrepancies between the two versions until a consensus Arabic version (A-v<sub>1</sub>) was reached.

#### Step 2: Back Translation and Expert Panel

Following the same approach delineated in the first step, the first consensus Arabic version (A-v<sub>1</sub>) was back-translated by two bilingual independent back-translators (the nurse manager of the CCCL and an English teacher) who were blind to each other and to the original English version of the APPT. Two back-translated versions (E-v<sub>a</sub> and E-v<sub>b</sub>) were generated. The translators, the back-translators, and the researcher produced a new consensus English-version (E-v<sub>1</sub>).

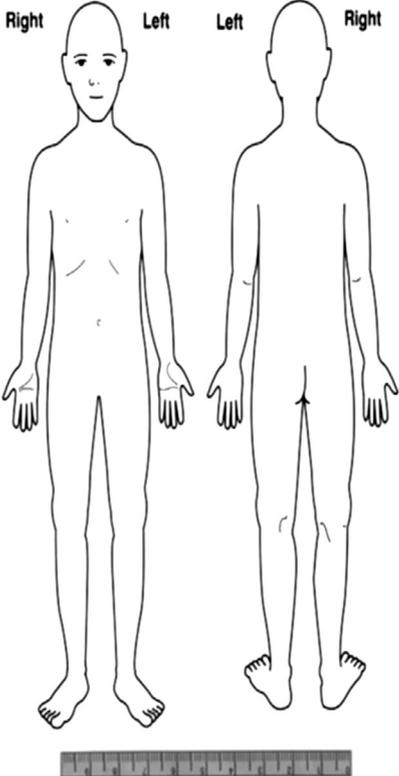
To evaluate the quality of translation of the instrument for clarity and cultural appropriateness, two panel of experts were asked to assess the two versions (A-v<sub>1</sub>) and (E-v<sub>1</sub>). The original instrument and an evaluation form were mailed independently to a panel of four bilingual professionals that formed a panel of experts

CODE \_\_\_\_\_  
DATE \_\_\_\_\_

**ADOLESCENT PEDIATRIC PAIN TOOL (APPT)**

**INSTRUCTIONS:**

1. Color in the areas on these drawings to show where you have pain. Make the marks as big or small as the place where the pain is.



2. Place a straight, up and down mark on this line to show how much pain you have.

No Pain      Little Pain      Medium Pain      Large Pain      Worst Possible Pain

3. Point to or circle as many of these words that describe your pain.

1 annoying bad horrible miserable terrible uncomfortable	2 aching hurting like an ache like a hurt sore	3 beating hitting pounding punching throbbing	4 biting cutting like a pin like a sharp knife pin like sharp stabbing	5 blistering burning hot	6 cramping crushing like a pinch pinching pressure	7 itching like a scratch like a sting scratching stinging	8 shocking shooting splitting	9 numb stiff swollen tight	10 awful deadly dying killing	11 crying frightening screaming terrifying	12 dizzy sickening suffocating	13 never goes away uncontrollable	14 always comes and goes comes on all of a sudden constant continuous forever	15 off and on once in a while sneaks up sometimes steady
--	---	--	---	-----------------------------------	---	--	--	--	---	--	---	---	--	---

If you like, you may add other words:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For office use only.

BSA:	_____
IS:	_____
#S (2-9)	_____/57 = ____%
#A (10-12)	_____/11 = ____%
#B (1,13)	_____/8 = ____%
#T (14,15)	_____/11 = ____%
Total	_____/67 = ____%

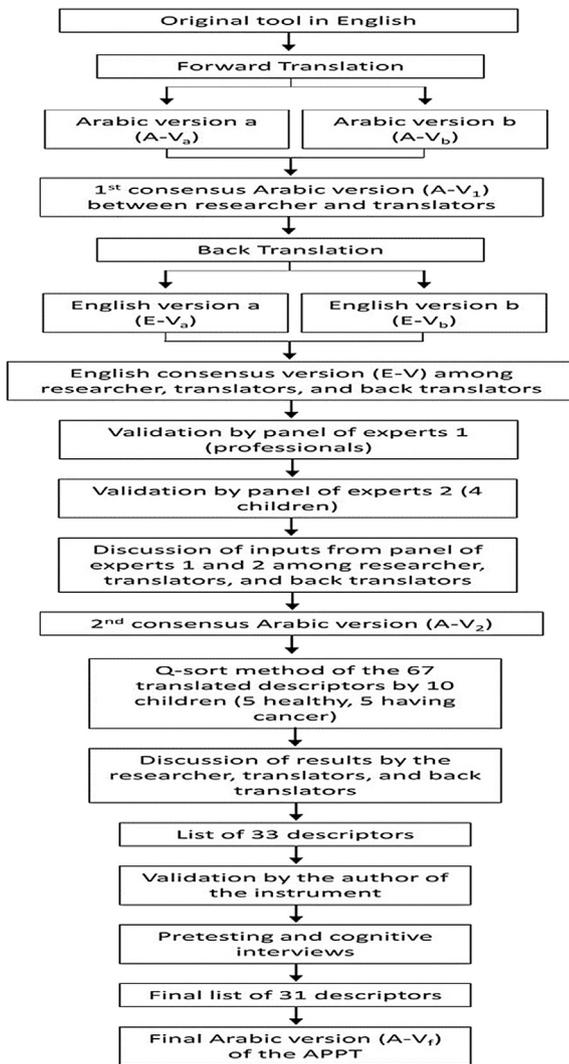
Figure 1. The Adolescent Pediatric Pain Tool (APPT), the English version.

(panel 1): (1) a pediatric pain specialist (RN), (2) a child psychologist (Ph.D.), (3) a psychometrician, and (4) an advanced practice pediatric nurse. Separately, the researcher sought the opinion of the author of the APPT and a second pediatric pain researcher. Experts reached consensus over the cultural appropriateness, the adequacy for the envisioned purpose, and the clarity of the different items of the tool, except for the list of word descriptors. However, concerns were raised with regard to some translated words that might be confusing and not child friendly. The perspective of the children was taken into consideration, adding richness, validity, and relevance to the research methodology (Harcourt & Einarsdottir, 2011; Lewis & Lindsay, 2000; Wilkins, 2000). Therefore the researcher decided to involve the children. Thus a second panel of experts (panel 2) consisting of four Lebanese children (bilingual, two boys and two girls, healthy, attending school, from different geographic areas, aged 8-17 years) was formed. Children were provided mainly with the Arabic list of word descriptors from A-v<sub>1</sub> to check if they understood the translated words; if they did not, they were asked to suggest another word that is friendlier to their vocabulary. Analysis of the children's input

was conducted by the researcher. The results of both panels were then discussed with the forward and backward translators to reach consensus on a new Arabic version (A-v<sub>2</sub>). Some words that were not in the child's language were changed and others that were found challenging therefore were given the most appropriate conceptual translation by the group.

Given the subjectivity of the pain experience and the challenge faced by the group of translators when choosing the most appropriate conceptual translation of some words from the list of descriptors, the researcher decided to resort to the Q-sort method to complete the cultural validation. This was in line with the work of Savedra et al. (1990). The objective behind this process was to generate an Arabic version (A-v<sub>3</sub>) of the tool that includes the most appropriate list to be used with Lebanese children. The Q-methodology is "a scientific approach which is systematic examination and understanding of individual's subjectivity could be achieved" (Barker, 2008, p. 918).

Ten Lebanese children bilingual and aged 8-17 years, five healthy children attending school and five with a cancer diagnosis and experiencing pain recruited from the CCCL inpatient



**Figure 2.** Translation and cultural adaptation process of the Adolescent Pediatric Pain Tool (APPT).

department, were involved in the Q-sorting. Each word of the 67 Arabic word descriptors from the APPT list was hand printed on a card, and all cards were put into a pile. The researcher approached every child separately and asked him or her to Q-sort each word according to three categories: (1) I use this word to describe pain; (2) I don't use this word to describe pain; or (3) I don't know this word. Children were also instructed to identify other words they use to describe their pain. Following the classification developed by Lois Van Cleve et al. (2001), the established norm for retention of a word was the identification "I use this word" to describe pain by three or more children. If identified by fewer than three children, the word would be eliminated. Completed data sheets were then put into a table and analyzed by the researcher. The results were then discussed with the translators and shared with the author of the tool.

### Step 3: Pretesting and Cognitive Interviews

The pretesting step consisted of a pilot study. Cognitive interviews were completed using the Q-sort method. The pilot testing helped establish the validity of the tool (Kortessluoma, Hentinen, & Nikkonen, 2003). The final Arabic version (A-V<sub>3</sub>) was pilot tested on 10 children with cancer recruited from the CCCL. The children's age ranged between 8–17 years. Children

assented and their parents consented to the participation of their children after they were provided information about the study. The cognitive interviews were essential during the process of adaptation (Mehrotra, 2007; Peterson, Peterson, & Gilmore Powell, 2017). They ensured the content validity of the Arabic version of the tool. The concurrent/think-aloud approach was used for cognitive interviewing. In this approach, children were encouraged to ask questions for clarification and think out loud. Children's body language was also monitored, and probes were interjected based on a change in their body language. The cognitive interviews were conducted with the same 10 patients with cancer who were part of the pilot study.

### Step 4: Final Version

The results from the pilot study and the cognitive interviews were discussed with the translators and incorporated in the final translated version of the APPT tool (A-v<sub>f</sub>). The process of translation is summarized in Figure 2.

## Results

### Forward Translation

In the versions forward-translated into Arabic, no major comments were raised by the two translators about the instructions of the tool, the intensity scale, the body diagram, and 25 of the 67 word descriptors. As for the remaining 42 words, 40 were translated differently and 2 were given a different meaning than the original list. Consensus over the translation of the 40 remaining words was reached after a careful analysis, based on two major references: the dictionary as a guide to check the synonyms of words, and the translation work of the MPQ list of word descriptors into Arabic by Harrison (1988) for comparison. The MPQ list of words consists of 72 verbal descriptors of pain, of which 25 are also on the APPT list of descriptors. Out of the 25 common MPQ and APPT descriptors, 20 were translated exactly the same and 5 were synonyms. As for the other 42 words from the APPT list, 40 were found to be synonyms after checking the dictionary and 2 (*sore* and *shooting*) could not be translated adequately to Arabic. This finding was consistent with Harrison's findings for the word *shooting*. The word *sore* was not among the MPQ list. Additionally, in the list there were six English words and two similes that had the very same meaning in Arabic (e.g., *aching/hurting* and *like an ache/like a pain*). At this point it was decided not to eliminate any word. The researcher and the two forward translators selected the best culturally, semantically, age-related, and child-friendly words and similes to form the first consensus Arabic version. This final version was sent to the author of the instrument, who forwarded it to a professor who knew Arabic. The latter confirmed that the meaning of the initial words was retained.

### Back-Translation and Expert Panel

The two back-translated versions were reviewed by the translation team, the researcher, the two translators, and the two back-translators to reach consensus over one back-translated version. The original and the back-translated versions were comparable. The instructions and the intensity scale were agreed on by the two back-translators. As for the descriptors, no major discrepancies were noted among the original version and the back-translated version and the two back-translated versions from the other side. If any word was not back-translated similarly, it was either a synonym of the word (e.g., *horrible* was back-translated to *awful* or *aching* or *painful*), or given the conceptual meaning (e.g., *shocking* as *surprising*, and

**Table 1**  
Results of the Q-sort Method

Participants	I Use This Word	I Don't Use This Word	I Did Not Understand This Word	Eliminated
Healthy children (n = 5)	32	30	2	3
Cancer children (n = 5)	15	47	2	3

*splitting* as *tearing*). The results of the back-translation confirmed the high-quality work of the researcher and the two translators.

Panel 1 agreed to the clarity of items and cultural appropriateness; however, they raised questions about a number of descriptors they viewed as confusing or not child friendly. For instance, words such as *blistering* and *constant* are not child friendly, and similes such as *aching* and *like an ache* might confuse a child. Also, the translation of the two words *sore* and *shooting* did not make sense to the experts because the word *shooting*, if translated into Arabic, may indicate actual gun shooting.

Results from panel 2 indicted that four children marked the three words *blistering*, *sore*, and *shooting* as “not understood,” but only two gave alternative, more friendly words. Also, children gave an alternative to some words that were marked as “understood.”

Results of the Q-sort method are summarized in Table 1.

The 15 words used by the children with cancer were also used by healthy children. These were *annoying*, *uncomfortable*, *aching*, *burning*, *hot*, *cramping*, *itching*, *like a sting*, *numb*, *crying*, *dizzy*, *comes and goes*, *comes all of the sudden*, *once in a while*, and *sometimes*. Twenty-nine words were commonly not used by healthy children or children with cancer. These were *bad*, *like an ache*, *like a hurt*, *hitting*, *punching*, *throbbing*, *biting*, *cutting*, *pin like*, *crushing*, *pressure*, *like a scratch*, *scratching*, *stinging*, *shocking*, *splitting*, *stiff*, *tight*, *awful*, *screaming*, *terrifying*, *sickening*, *suffocating*, *uncontrollable*, *constant*, *continuous*, *off and on*, *sneaks up*, and *steady*. Two words were not understood by both groups. These were *sore* and *shooting*. Healthy children eliminated three words. These were *stabbing*, *blistering*, and *stinging*, which were classified under not used by children with cancer. *Miserable*, *terrible*, and *pounding* were eliminated by children with cancer. These same words were not used by healthy children, except for *terrible*. In consultation with the author of the tool, the final list of words used consisted of the following 33 words: *annoying*, *horrible*, *terrible*, *uncomfortable*, *aching*, *hurting*, *beating*, *like a pain*, *like a sharp knife*, *sharp*, *burning*, *hot*, *cramping*, *like a pinch*, *pinching*, *itching*, *like a sting*, *numb*, *swollen*, *deadly*, *dying*, *killing*, *crying*, *frightening*, *dizzy*, *never goes away*, *always*, *comes and goes*, *comes on all of the sudden*, *forever*, *once in a while*, and *sometimes*. These words were used by both children groups.

#### Pretesting and Cognitive Interviews

The pilot testing and the cognitive interviews revealed minor changes needed for the A-v3 Arabic version. Children were satisfied with the probing techniques and the open-ended questions. They all reported understanding of the instructions, scale, and descriptors except for the three words *forever*, *never goes away*, and *always*, which they described as synonyms, and all suggested to eliminate the first two and keep *always*. The final list of descriptors included 31 words.

#### Final Version

A final Arabic version A-v<sub>f</sub> was produced based on the results from the pilot study and the cognitive interviews. This final Arabic version included 31 descriptors and was used to collect data from participants in the initial study.

## Discussion

To our knowledge this is the first study to translate the AAPT to the Arabic language in a sample of children with cancer in Lebanon. The most challenging aspect of the translation process was the list of word descriptors used to assess the quality of pain. These challenges were attributed to four factors: a rich Arabic vocabulary of words to describe the different dimensions of pain; the difference between the spoken and written Arabic; the lack of some terminology in the target language (i.e., Arabic); and the cultural validation of the words into Arabic.

First, the Arabic language is rich in vocabulary with different words to describe the same concept (Harrison, 1988). One descriptor in English can have more than one equivalent word in Arabic, thus leading to a lengthy process of translation to choose the most appropriate and exact equivalent word for the Arabic version. For example; the word *hurting* has five equivalent words in Arabic: *يـجـحـح*–*يـؤـذـي*–*يـضـر* – *يـؤـلم* – *يـوجـع*; and *bite* has six synonyms in Arabic: *يـعـص*–*يـقـضـم*–*يـلـدع*–*يـلـسـع*–*يـقـطع*–*يـمـزق*. Also, a number of word descriptors and similes were eliminated given their similarities to another word or simile in the list. For example, the words *forever*, *never goes away*, and *always* and the similes *like an ache* and *like a pain*. Similarly, Van Cleve et al. (2001) eliminated one word because it was found to have an analogous word in the list.

A second challenge encountered when translating the APPAT to Arabic was the contrast between the spoken (colloquial) and the written (classical) forms of the language. Children and adolescents may not be acquainted with the classical form and usually prefer the colloquial one. Spoken Arabic is usually more child friendly. For example, *punching*, translated into *يـلـكـم* (written Arabic), was replaced by panel 2 with *بـيـضـرب بـوكـس*, which is the spoken form for *punching*. It is worth noting that although written Arabic is the same in all 22 counties of the Middle East, spoken Arabic differs among countries. Thus the present translation is valid for Lebanon, Syria, Jordan, and Palestine, the only four countries that have similar colloquial language.

A third challenge was related to the absence of meaning of certain words in the Arabic language. Two words, *sore* and *shooting*, did not have a meaning in the target language and thus they were eliminated from the list. This finding was consistent with Harrison's findings for the word *shooting*, for which she also could not find a satisfactory term in Arabic. The word *sore* is not a word in the MPQ list. This was consistent with Franck et al. (2004), who validated the list of APPT words in Mandarin. Some descriptors were eliminated because they did not have a meaning in Chinese culture.

A fourth challenge was related to the cultural validation of the words in Arabic. For this, the Q-sort method was adopted because it is simple to understand and complete by children. This method allows examining and understanding the participants' individual perception of the task. The list generated based on the Q-sorting supported the comments and suggestions made by the translation team and the panel of experts. The words that were unknown to children could not be part of their pain vocabulary or did not match their previous pain experience and illness process.

#### Limitations

The strength of this study is that it is the first to use a valid approach to translate an English tool to the Arabic language;

however, there are a few limitations worth noting. The children who took part in the Q-sort method and the pilot study might not have been experiencing pain at that time. Another limitation is that the present translation can only be used in Middle Eastern countries that have the same spoken dialect as Lebanon, which includes Syria, Jordan, and Palestine, because there are more than 20 Arabic dialects.

## Conclusions

This study has resulted in the availability of the Arabic version of the APPT, which can be used by health care professionals to assess cancer pain in children. The WHO process for translation, including the Q-methodology, yielded a list of 31 descriptors that Lebanese children with cancer can choose from to describe their pain experience. With the use of this tool, focused interventions may be applied to treat cancer pain in children. It is recommended that future studies be conducted to validate the use of this tool in children with other forms of chronic pain and to test and modify certain words to fit other colloquial Arabic languages.

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