Original Article

Validity and Reliability Testing of the E-san version of the Short-form McGill Pain Questionnaire in Musculoskeletal, Neuropathic and Odontogenic Pain

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Objective: to translate the short-form McGill Pain Questionnaire (SF-MPQ) into E-san language (SF-MPQ-E) and to test its reliability and sensitivity in patients suffering from 3 different types of pain.

Materials and Methods: Beaton's guidelines for cross-cultural translation and adaption of health-related measures were used. Subsequently, the questionnaire was administered to a sample of 186 diverse pain patients (40 neuropathic pain, 103 musculoskeletal pain and 43 inflammatory odontogenic pain). Index of Item Objective Congruence (IOC) was used to test the content validity. Pearson Coefficient was used to test predictive validity. The test–retest reliability between the first and second interview was calculated by the intraclass correlation coefficient (ICC) and Cronbach's alpha was used to assess the internal consistency of the SF-MPQ-E.

Results: Most of the pain descriptors in the SF-MPQ-E has high score of IOC >0.5. The results for test and retest predictive validity and reliability demonstrated good correlation in all 3 pain groups. The internal consistency of the test using Cronbach's alpha was found to be high in the musculoskeletal and odontogenic pain group (>0.8) and moderate in the neuropathic pain group (0.512).

Conclusion: SF-MPQ-E is a reliable and valid instrument for the measurement for pain in E-san speaking patients with neuropathic, musculoskeletal and odontogenic origin.

Keywords: Short-form McGill Pain Questionnaire, E-san language, Translation, Pain, Musculoskeletal pain, Odontogenic pain, neuropathic pain

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Pain is defined by the International Association for the Study of Pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage"[1]. Several of the orofacial pain conditions including trigeminal neuralgia, temporomandibular disorders and headaches, the diagnoses are made entirely on the history alone, based on characteristic features of the pain. The inability of patients to communicate verbally to their health care providers which therefore resulted in the possibility of misdiagnosis and inadequate pain-relieving treatment. Each patient learns the application of the word through experiences related to injury or emotional disturbances in early life. Cross-cultural differences, commonly found in multiethnic societies, are evident in many aspects of human behavior and in the prevalence of illness and in healthcare usage. Several reports confirmed that patients who have different ethnic and cultural backgrounds from their health care providers normally experience inadequate pain management due to the barrier in language, belief, attitude and lack of understanding in behavioral response to pain[2].

Since pain is totally subjective and is not only the product of a primary sensory modality, but a complex human experience with functional, emotional, and social components, multidimensional pain measurement tools (PMT) is more appropriate to measure pain compared to unidimensional PMT which only limit to the pain intensity dimension alone. McGill Pain Questionnaire (MPQ) was one of the most widely used, capable of assessing the sensory, affective and evaluative dimensions of pain[3]. Unfortunately, the MPQ takes a significant amount of time for patients and research subjects to complete as the questionnaire is long and composed of 78 pain descriptors. To provide a more efficient alternative to the original questionnaire, the simplified version

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of the short-Form McGill Pain Questionnaire (SF-MPQ) was developed and included 15 descriptors (11 sensory and 4 affective) scored as none, mild, moderate or severe; a visual analogue scale with endpoints no pain and worst possible pain; and a verbal scale for pain using the words no pain, mild, discomforting, distressing, horrible or excruciating[4]. It was translated and adapted into many different languages including Swedish[5], Greek[6], Norwegian[7], Brazilian Portuguese[8], Iranian[9], Japanese[10], Korean[11] and Thai[12] languages. However, the Thai version of SF-MPQ has its limitation when used in northeastern Thailand where the majority of population, especially the older generation, use E-san language as their mother tongue, resulting in misinterpretation of words and phrases used.

E-san, also written as Isan, Isaan, Isarn or Esarn, is the native language spoken in upper part of northeastern part of Thailand with 21 million native speakers, a third of the population of Thailand and 80 percent of all Lao speakers worldwide. It is closely related and mutually intelligible to Lao language in the neighboring People's Democratic Republic of Laos. Moreover, it is spoken to some extent in nearby northern and eastern Thailand. Finally, in diverse ethnic groups in different parts of northeastern Thailand whose native languages include Phu Thai, Khmer, Korat Thai, E-san is the lingua franca of most of these groups. However, outside of Thailand, the language is classified as either its own Lao language due to social and historical reasons or generally as just a distinct subset of the Lao language, mostly by linguists and often E-san speakers themselves[13].

The aims of the present study were to develop an E-san version of SF-MPQ (SF-MPQ-E) that is cross culturally equivalent to the original English version (study 1) and to examine whether the SF-MPQ-E is a valid and reliable tool to assess pain and to be used as a clinical and research instrument (study 2). The study protocol was reviewed and approved by the Ethics Committee for Human Research of Khon Kaen University (Number HE552324) and was conducted at the Orofacial Pain Clinic, Faculty of Dentistry, Khon Kaen University, Thailand. All participants provided written informed consent prior to starting the study.

Materials and Methods

Study 1 Translation of the short-form McGill Pain Questionnaire to the E-san version

Four steps of translation procedures were performed according to Beaton's guidelines that have been used for cross-cultural adaptation of health-related questionnaires for clinical outcome measures[14].

Step 1: Forward translation from English to E-san language

The original English version of SF-MPQ was independently translated to 2 primary E-san versions (version 1 and version 2) by 2 translators; one is a PhD graduate in education and the other is a dentist specializing in orofacial pain management.

Step 2: Synthesis of the translation

The third translator who is an expert both in English and E-san languages then produced the third reconciled E-san version (version 3) based on a comparison of the former two versions.

Step 3: Back translation to English language

The fourth version was a translation of the E-san version back into 2 English versions (version 4 and version 5). This step was independently produced by two additional translators, who had no knowledge of the contents of the original SF-MPQ.

Step 4: Expert committee and pain management professional meeting on the final E-san version

The forward and backward translations were then reviewed and consolidated by the workgroup to confirm linguistic equivalence. The discrepancies in the fourth and fifth version by two translators in step 3 were then resolved in the fifth version (the final SF-MPQ-E used in the present study) by an expert workgroup meeting comprised of all 5 translators from previous steps, research team and 2 pain specialists from the Neuroscience Research and Development Group of Khon Kaen University in order to determine the readability and understandability of the preliminary SF-MPQ-E, it was eventually distributed to chronic pain patients in Orofacial Pain Clinic, Faculty of Dentistry, Khon Kaen University, who were asked about any unclear words, phrases, or concepts. The results showed that the SF-MPQ-E was easily understood by the subjects without significant complaints, except the word 'aching' which no equivalent E-san word was agreed upon. To ensure that the E-san version still retains its equivalence in an applied situation, the last stage of the adaptation process is to test its content validity by another 3 experts in E-san language and pain management.

Study 2 Validity and Reliability Testing of the E-san version of Short-form McGill Pain Questionnaire

Content and predictive validity including reliability properties of the SF-MPQ-E derived from study 1 were tested in 3 groups of E-san speaking patients who had neuropathic pain, musculoskeletal pain or odontogenic pain from pulpal inflammation. In the present study, 186 patients aged >20 years were recruited from the Orofacial Pain Clinic, Faculty of Dentistry, Khon Kaen University, Thailand by the consecutive method between April and August 2013. The inclusion criteria included: pain patients who were diagnosed with neuropathic pain, musculoskeletal pain or odontogenic pain, patients who are understand and fluent in speaking E-san language. Exclusion criteria were those who had history of intellectual disability or psychological disturbances, patients who used Thai version of SF-MPQ before and those with difficulties to communicate in E-san language. To test the validity and reliability, patients were interviewed by one researcher twice with 15 minutes interval. The main component of the SF-MPQ consists of 15 pain

descriptors for the pain sensation (11 sensory and 4 affective), which are self-rated by the patient according to their intensity level on a point rating scale (0 = none, 1 = mild, 2 = moderate, 3 = severe). Three pain scores are derived from the sum of the intensity rank values of the words chosen for sensory, affective and total descriptors. The sensory and affective scores are calculated by adding the sensory and affective intensity values. The total score is the sum of the intensity values. The second part of SF-MPQ is a pain intensity measure shown by the visual analogue scale (VAS) and the evaluative total pain intensity (ETPI) index of the standard MPQ. The third part of the SF-MPQ is present pain intensity (PPI), which is a six-point verbal rating scale. In this scale, patients were asked to choose between six words, from none (0) to the worst excruciating (5); choosing the word that best describes the overall intensity of their pain at the time of completing the questionnaire.

Statistical analysis

The demographic data of patients and their duration of pain were analyzed using means and standard deviations. Index of Item Objective Congruence (IOC) was used to test the content validity. Pearson Coefficient was used to test predictive validity. The test-retest reliability between the first and second interview was calculated by the intraclass correlation coefficient (ICC). Cronbach's alpha was used to assess the internal consistency of the SF-MPQ-E. All statistical analysis was done with standard software package (SPSS v20.0; SPSS Inc. (IBM), Chicago, IL, USA). A probability value of $p<0.05$ was considered to indicate a significant effect.

Results

Study 1

The translation of the Short-form McGill Pain Questionnaire (SF-MPQ) to the E-san version (SF-MPQ-E) is shown in the Appendix 1. The content validity of each pain descriptor in the SF-MPQ-E was tested by Index of Item Objective Congruence (IOC) by 3 experts, most pain descriptors have score higher than 0.5 except 4 pain descriptors; moderate pain, gnawing, sickening and distressing, that have score lower than 0.5 on the IOC test. Table 1 summarizes IOC score for each pain descriptor.

Study 2

Table 2 summarized the clinicodemographic data of all patients recruited in the study. Of all 186 patients participated in the study, 40 had neuropathic pain, 103 had musculoskeletal pain and 43 had odontogenic pain. The mean age of patient in each pain group was 59.18 ± 10.63, 57.30 ± 14.39 and 49.30 ± 16.03 respectively.

Correlation between the total score of SF-MPQ-E and the VRS was tested for predictive validity. The resulting for test and retest demonstrating good correlation in all 3 pain groups as shown in Table 3. In the neuropathic pain group, the resulting correlation was r = 0.69 ($p<0.001$) for

Table 1. Results of content validity assessed by Index of Item Objective Congruence (IOC) by 3 experts

Pain descriptors	Expert score			ΣR	IOC
	Expert 1	Expert 2	Expert 3		
None	+1	+1	+1	3	1
Mild	+1	+1	+1	3	1
Moderate	+1	-1	+1	1	0.3
Severe	+1	+1	+1	3	1
Throbbing	+1	+1	+1	3	1
Shooting	+1	+1	+1	3	1
Stabbing	+1	+1	+1	3	1
Sharp	+1	0	+1	2	0.6
Cramping	+1	+1	+1	3	1
Gnawing	+1	0	0	1	0.3
Hot-burning	+1	+1	+1	2	0.6
Aching	0	+1	+1	2	0.6
Heavy	+1	+1	0	2	0.6
Tender	+1	+1	+1	3	1
Splitting	+1	+1	+1	3	1
Tiring/exhausting	+1	+1	+1	3	1
Sickening	+1	+1	-1	1	0.3
Fearful	+1	+1	+1	3	1
Punishing-cruel	+1	+1	0	2	0.6
Worse possible pain	+1	+1	+1	3	1
Discomforting	+1	+1	+1	3	1
Distressing	+1	+1	-1	1	0.3
Horrible	+1	+1	+1	3	1

Table 2 Characteristics of participating pain patients (n = 186)

Group	Neuropathic pain group (n = 40)	Musculoskeletal pain group (n = 103)	Odontogenic pain group (n = 43)
Mean age (years)	59.18±10.63	57.30±14.39	49.30±16.03
Gender ratio (M: F)	3:37	26:77	9:34
Duration of pain (month)	41.55±31.95	51.61±64.00	2.82±5.46

test and r = 0.68 (p<0.001) for retest. In the musculoskeletal pain group, the resulting correlation was r = 0.79 (p<0.001) for test and r = 0.90 (p<0.001) for retest and in the odontogenic pain group the resulting correlation was r = 0.73 (p<0.001) for test and r = 0.73 (p<0.001) for retest.

Test–retest reliability in the neuropathic pain group was found to be ICC = 0998 for total score, 0.997 for sensory score, 0.990 for affective score, 0.991 for the VAS and 1.0 for PPI score. In the musculoskeletal pain group was found to be ICC = 0996 for total score, 0.992 for sensory score, 0.998 for affective score, 0.997 for the VAS and 0.999 for PPI score. In the odontogenic pain group was found to be ICC = 0.998 for total score, 0.997 for sensory score, 0.999 for affective score, 0.991 for the VAS and 1 for PPI score. The results demonstrated good test-retest reliability for all value of ICC greater than 0.70 (Table 4).

The internal consistency of the test using Cronbach's alpha was found to be high in the musculoskeletal and odontogenic pain group (>0.8) and moderate in the neuropathic pain group (0.512) as shown in Table 5.

Discussion

In the present study the authors performed a translation of the SF-MPQ into E-san language. We then tested the validity and reliability of the translated SF-MPQ-E in the group of patients with 3 types of different pain. Translation into other languages and subsequent validation of questionnaires are enable them to be used in different cultural settings and to be utilized with confidence in cross cultural comparative research trials. In study 1, SF-MPQ-E was translated and adapted by a rigorous forward and backward translation method based guidelines by Beaton et al[14] and was equivalent to the original questionnaire as confirmed by the translation technique used for the Japanese[10] and Iranian[15] version of the SF-MPQ. In the content validity by 3 experts, we were not able to find E-san word that were reliably back-translated to the English words "aching", as there is no direct translation of this word in E-san language. However, both experts committee finally agreed to the final E-San term and when shown to patients, this term is widely understood.

In the present study 2, three different tests were used to evaluate the SF-MPQ-E. The Cronbach's alpha coefficient for internal consistency (IC) was higher than 0.8 for musculoskeletal and odontogenic pain group, similar IC estimate to other translated versions[16,17]. The test-retest reliability was excellent in all pain group for sensory, affective and total more than 0.9, which was comparable with the Thai version[12]. Our results in the test-retest reliability also confirm the similar finding from other translated versions (ranging from 0.71 to 0.89)[5,6,18]. A diverse group of pain patients with different pain etiologies were selected to test the reliability and validity of this SF-MPQ-E. In previous studies[6,17]. total ICC in musculoskeletal pain participants was reported about 0.75; therefore, it seems that the ICC in the present study (r>0.90) is acceptable and concordant with previous studies.

Several limitations existed in the present study. First, the sample size was relatively small, and this might not represent the general population. Second, the analyzed sample included only patients with certain types of pain; therefore, comparisons with other types of pain were not possible. Further assessment of the SF-MPQ-E's reliability, validity and sensitivity should be done in larger sample of patients with other type of pain conditions including cancer pain, postsurgical and posttraumatic pain, headache and visceral pain.

Conclusion

The results of the present study indicate that the E-san version of the SF-MPQ is a reliable and valid instrument for the measurement of pain in E-san speaking patients with neuropathic, musculoskeletal and inflammatory odontogenic pain.

What is already known on this topic?

SF-MPQ is widely used as the multidimensional pain assessment tool and have been validated to use in different types of pain.

What this study adds?

The E-san version of SF-MPQ is a reliable and valid multidimensional measure to assess neuropathic, musculoskeletal and inflammatory odontogenic pain in E-san speaking patients.

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Table 3. Results of predictive validity testing between total score and the VAS

	Pearson coefficient between Total score ($\bar{X}$) and VAS ($\bar{X}$)					
	First interview			Second interview		
	Total score ($\bar{X} \pm$ SD)	VAS ($\bar{X} \pm$ SD)	r (*p*-value)	Total score ($\bar{X} \pm$ SD)	VAS ($\bar{X} \pm$ SD)	r (*p*-value)
Neuropathic pain group	2.97±0.15	2.94±0.22	0.69 (<0.001)	2.98±0.16	2.93±0.22	0.68 (<0.001)
Musculoskeletal pain group	2.54±0.53	2.61±0.47	0.79 (<0.001)	2.55±0.54	2.60±0.50	0.90 (<0.001)
Odontogenic pain group	2.41±0.70	2.48±0.57	0.73 (<0.001)	2.42±0.67	2.47±0.55	0.73 (<0.001)

Table 4. Test-retest reliability using Intraclass Correlation Coefficient (ICC)

	Intraclass Correlation Coefficient (ICC)				
	Sensory	Affective	Total score	VAS	PPI
Neuropathic pain group (n = 40)	0.997	0.990	0.998	0.991	1
Musculoskeletal pain group (n =103)	0.992	0.998	0.996	0.997	0.999
Pulpitis group (n = 43)	0.997	0.999	0.998	0.991	1

Table 5. The results of internal consistency test using Cronbach's alpha coefficient

	Cronbach's alpha coefficient					
	Test			Re-test		
	Cronbach's alpha coefficient	Item ($\bar{X} \pm$ SD)	Item	Cronbach's alpha coefficient	Item ($\bar{X} \pm$ SD)	Item
Neuropathic pain (n = 40)	0.512	5.28±2.12	4.51	0.510	5.28±2.12	4.50
Musculoskeletal pain (n =103)	0.801	5.16±2.93	8.62	0.808	5.21±2.96	8.76
Pulpitis (n = 43)	0.805	3.98±2.81	7.93	0.826	4.07±2.96	8.78

Potential conflicts of interest

The authors declare no conflicts of interest.

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Appendix 1. The E-san version of McGill Pain Questionnaire (SF-MPQ-E)

แบบสอบถามความปวดแมคกิลล์แบบสั้นฉบับภาษาอีสาน

	บ่ปวด	ปวดจั๊กนอย	ปวดพอซ่ำใด๋ซ่ำนึง	ปวดแฮง
ปวดมุ๊บ ๆ	0).....	1).....	2).....	3).....
ปวดเดี๊ยด ๆ	0).....	1).....	2).....	3).....
ปวดคือมีดเสียบ	0).....	1).....	2).....	3).....
ปวดปล๊าบ	0).....	1).....	2).....	3).....
ปวดปั้น	0).....	1).....	2).....	3).....
ปวดคือถืกอีหยังไหย่	0).....	1).....	2).....	3).....
ออกฮ้อน	0).....	1).....	2).....	3).....
เจ็บคิง	0).....	1).....	2).....	3).....
ปวดหนักอึ้งตึ้ง	0).....	1).....	2).....	3).....
เจ็บยามถืกบาย	0).....	1).....	2).....	3).....
ปวดคือสิยะออก	0).....	1).....	2).....	3).....
เบิดแฮง/หล่อย	0).....	1).....	2).....	3).....
วินคือสิฮาก	0).....	1).....	2).....	3).....
เป็นตาย่าน	0).....	1).....	2).....	3).....
ปวดยางตายออก	0).....	1).....	2).....	3).....

บ่ปวด_____ปวดแป๋ตาย

ระดับความปวดในป๎จจุบัน

0 บ่ปวด .....

1 ปวดจั๊กนอย .....

2 หนหวย .....

3 อุกอั่ง .....

4 เป็นตาย่านแฮง .....

5 ปวดแป๋ตาย .....